ECONOMIC EVALUATION OF ORNAMENTAL FISH TRADE IN NIGERIA

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ABSTRACT

Nigeria has over three thousand Ornamental Fish species and the potential of being one of the leading exporters. In spite of the flourishing trade of Ornamental Fish worldwide however, her extant share of the trade is below 5% of Africa's total contribution. In addition, there is paucity of information on the marketing factors influencing Ornamental Fish trade in Nigeria. The marketing channel and factors influencing Ornamental Fish trade in Nigeria were therefore investigated.

A two-stage sampling technique was used to select Ornamental Fish traders. The traders were stratified into fishermen, middlemen and exporters, from where 50% sampling from each stratum was carried out. A total sample size of 196 Ornamental Fish traders located in 14 producing states of Nigeria (Lagos, Ogun, Edo, Delta, Rivers, Bayelsa, Abia, Cross River, Akwa Ibom, Kano, Benue, Ondo, Niger and Nassarawa) was used for the study. This includes 139 fishermen, 40 middlemen and 17 exporters. Data were collected on personal characteristics of respondents, sources of fund, types of fish holding facilities, transportation and labour costs, quantity and types of and cost of Ornamental Fish supplied, and revenue generated on quarterly basis using structured questionnaire. Data were analyzed using descriptive statistics, gross margin and multiple regression models at p=0.05.

Male respondents were 91.3%; this includes 72.0%, 19.6% and 8.4% of fishermen, middlemen and exporters respectively. The mean ages of the fishermen, middlemen and exporters were 47.3 ± 1.2, 44.5 ± 1.5, and 42.6 ± 2.3 years respectively. Respondents with no formal education, primary school leaving certificate, secondary school certificate, and tertiary education were 37.3%, 32.3%, 23.5% and 6.1% respectively. The Ornamental Fish marketing channel involved fish sales from fishermen to middlemen who finally sell to consumers. Gross margin of the middlemen were highest in the first (₦9,288,876) and third (₦4,054,679) quarters, while the gross margin of the exporters were highest in the second (₦3,485,961) and fourth (₦4,088,522) quarters of the year. Exporters had the highest average marketing efficiency (85.1%) throughout the four quarters of the year. Factors that significantly influenced the supply of Ornamental Fish were start-up capital ($\beta = 0.98$) and membership of association ($\beta = 0.32$). Supply of fish by middlemen were significantly influenced by international price ($\beta = -0.61$), membership of association ($\beta = -1.33$), and educational qualification ($\beta = 1.03$). Only capital ($\beta = 0.00$) had significant influence on exporters demand for Ornamental Fish. Lack of capital and seasonality of fish species (100.0%) were the major constraints to Ornamental Fish trade.

The trade could be a source of foreign exchange earnings for Nigeria if fishermen associations are empowered and traders have access to start-up capital to expand their business. Investment in the breeding and research on seasonal species will also be required to sustain the industry.

Keywords: Ornamental fish, Marketing efficiency, Market channel, Fish traders

Word count: 454

CERTIFICATION

This is to certify that this research work was carried out by Blessing Nma Korie of the Department of Aquaculture and Fisheries Management, University of Ibadan, Nigeria.

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DEDICATION

This work is dedicated to God Almighty who loves me more than he loves anyone in the whole world.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Ornamental Fish Industry involves the production and marketing of live, attractive or fancy fishes for the sole purpose of beautification of homes and public places. Ornamental Fishes are used in indoor recreation and are usually kept in aquarium. This unit is enclosed volume of water containing a mixture of aquatic organisms for keeping ornamental fish species for decorative purposes. Ornamental brightly colored fishes are kept for their aesthetic and recreational potentials. Recreation is a means of entertaining oneself after work; for the relaxation of one's mind, body and brain (Ayodele, 2002). Though the ornamental fisheries sector in Nigeria is still young, it relies on the wild collection of indigenous species and also the breeding of exotic species (Areola, 2001).

Recreation can be classified into two, i.e. physical recreation and cultural recreation. Physical recreation involves activities such as sighting, fishing, boating, camping, walking and mountain climbing. Cultural recreation has activities which could be historical, geological, and archeological in nature or the study of flora and fauna (Ayodele, 2002). According to the book fisheries recreation is classified into two broad categories i.e. indoor recreation and outdoor recreation. Indoor recreation refers to any fisheries recreational activity carried out indoor from which recreation objectives could be achieved. An example of this is aquarium keeping. Outdoor recreation is further divided into three:

1   Establishment of recreational centre where fisheries recreational activities could be practiced are the nucleus of the activities of the centre. Other activities which could be carried out at the centre include sport fishing, volley balling, basket balling, swimming, table tennis playing, tree climbing and other facilities which could be present at the centre. These include lawn tennis court, supermarket, barbing saloon, telephone room, guest houses or hostel, swimming pool, children play ground and parking lot. At this centre, certain amount of money could be charged before entrance and certain fees paid to partake in any recreational activity at the recreational centre.

2   Spot Fishing in Open Market Water. Entails fishing in water where no fees are charged. Spot fishing employs the use of hooks, lines and baits (which may be artificial or natural.)

3   A portion of the ocean or sea is demarcated and designed to have sitting arrangements which will conveniently accommodate people who have come for relaxation and refreshing by watching the sea or ocean fish species "perform"; hence realizing one of fisheries recreation benefit. For instance in Chicago, USA, dolphins (fish species) are displayed as the man instructing the dolphins makes sounds which the dolphin are trained to understand and respond to. Oceanic recreation is not common and not available in Nigeria. This may be due to lack of adequate technology and capital. It is available in developed countries of the world such as America, Canada and United Kingdom

Nigeria is blessed with an abundant variety of fish species some of which have been exported over the years. Large quantities of fishes and fishery products are exported from Nigeria in different forms and this has been a source of foreign exchange earnings for the country. An estimate value of exports in the fishery sub-sector is approximately $31 million for shrimps, sole fish cat fish and crabs. More than US $3million was realized from sales of ornamental live fishes in 2007 (Fisheries Statistics of Nigeria, 2008) In the United States the ornamental fisheries resource is a great source of income opportunity. In 1996 the United States imports and exports in ornamental fisheries were valued at approximately $1000 million. In Florida, cultured fresh water and collected salt water species accounted for $70 million and $4 million respectively in annual dockside revenues (Chapman *et al*, 1997). The United States fish farmers of just two hundred people within Florida province have been able to generate a large amount of revenue from the rearing and marketing of tropical ornamental fishes. This indicates a great success in National income generation to the United States through the effort of the Florida farmers.(Chapman *et al,* 1997).

In Nigeria, the situation is different. The existing few marketers are scattered within Lagos and their impact is not felt in the economy, despite the abundance of over 300 species (Areola, 2004). The 1985 Western World Pet Supply Association (**WWPSA)** trade show in Long Beach California exposed many countries like

Germany, USA, Malaysia, Peru, France and Singapore to the gains in ornamental fish trading who subsequently took advantage of these opportunities. Currently World trade in ornamental fish is estimated at about 1.8 billion US dollar per annum. Singapore, Malaysia, Hong Kong, Taiwan and Japan control about 60% of the world's ornamental fish product and export earnings while North America and Europe have introduced new dimensions of biotechnology, to produce genetically modified organisms They have succeeded in modifying the natural colours of the fish species to produce desired colour combinations as well as stronger and robust species (Areola, 2004). Nigeria ranks high in export of ornamental fishes amongst African nations such as Republic of Congo, Malawi and United Republic of Tanzania but has not fully exploited her stock of colourful, dark and lovely shaped ornamental fish species. About 100 species of ornamental live fishes have been identified to be regularly exported in Nigeria. There is no stock assessment of the different species but records show that ornamental fish export trade has been carried out in Nigeria for over 40 years.(Areola, 2004). Nigeria is particularly blessed with some species that enjoy high demand in the world market. These fish species are not brightly coloured but have characteristically distinctive shapes which make them unique. These include Longnose (Elephant nose), Reed and Butterfly. Long nose is available in large numbers in Nigeria during the dry season.

Butterfly and Reed are rare species found in our waters. Long nose is used as pollution indicator and also in entertainment centers and games resorts as souvenirs/gifts for its high market price. Reports have it that it is used in laboratories for the preparation of vaccines and anti-allergic ointment. The high demand of some of these ornamental fish species is because they can only be found in Nigeria and all known and reported attempts to reproduce them artificially over the years have failed. The opportunity therefore, exists to capitalize on this and dictate the market price. There is paucity of information on available resources. To date, there is no detailed resource survey to determine the species distribution or the production of exportable fish species in Nigeria.

The collection of these fishes from the wild is not sustainable. There are problems of transportation from collection points to point of exports, loss of time, and high fish mortality due to stress. Very few exporters are breeding some common species such as cichlids, catfish etc. Most often orders are cancelled for lack of the specific fish species. During the rainy season, the volume of water discharged and

flooding does not allow for easy exploitation of these species of fishes. The roads leading to the remote areas where they are located are often not motorable resulting in little or no export during the rainy season. All export is through the Muritala Mohammed International Airport, Lagos, Nigeria. This curtails sourcing and exploitation of the vast abundant resource in the Northern and Eastern States. Other limiting factors include pricing and poaching of customers, losses or "dead on arrival" reports or antics of dubious customers, airline booking and airfreight charges and sourcing of finance for the export of ornamental fishes.

1.2 Problem Statement

Despite Nigeria's immerse oil wealth of over four decades the country's poverty condition has worsened progressively. It is on this basis that Nigeria is ranked the 26th poorest nation in the world by the United Nations (UNDP, 2011)

This pathetic situation calls for massive investment in the non-oil sector in other to create jobs and improve the Nigerian economy. There is therefore the need for diversification to other sectors. And the fisheries sector should be looked into; Nigeria is blessed with an abundant variety of fish species, some of which have been exported over the years.

In the united state the ornamental fish resources is a great source of income opportunity, in 1996 the united states imports and exports in ornamental fisheries were valued at approximately $1.5billion at the border. In Nigeria the situation is different the existing few marketers are scattered within Lagos and their impact is not felt within the economy, despite the abundance of over 300 species (Areola, 2004). Nigeria with over 3000 species of ornamental fish and with the added advantage that most of this fishes are endemic to Nigeria and attempts to breed these fishes have failed. Fisheries graduates should capitalize on this to create employment g, thereby reducing unemployment level and poverty in Nigeria.

The research questions are therefore as follows:
1. Who are the people involved in the marketing of ornamental fish?
2. What is the market structure and marketing channel of ornamental fish
3. What is the marketing margin and marketing efficiency of ornamental fish?
4. What are the factors that influence the demand for ornamental fish?

1.3 Objectives of the Study

The broad objective of this study is to determine the efficiency of ornamental fish marketing, describe the conduct of intermediaries in ornamental fish markets and examine the problems encountered in ornamental fish trade and make recommendations for a more efficient marketing system.

The Specific objectives are:

1) To identify and describe the socio-economic characteristics of the ornamental fish traders.
2) To assess and ascertain the sources of ornamental fish species, structure and channel of ornamental fish marketing in Nigeria.
3) To assess the gross margin and marketing efficiency of ornamental fish in Nigeria.
4) To determine the factors that influences the demand for ornamental fishes.

1.4 Hypotheses

Ho_1:   The marketing of ornamental fish in Nigeria is not efficient.

Ho_2:   Ornamental fish trade in Nigeria is not profitable.

Ho_3:   None of the socio-economic factors affect the demand for ornamental fish in Nigeria.

1.5 Justification of the Study

Ornamental fish industry is concerned with the production and marketing of live and attractive or fancy fishes for the purpose of beautification of homes and public places. Most species of ornamental fish occur naturally in tropical fresh, brackish, and marine waters. Ornamental fish trade is flourishing Worldwide but Nigeria's share of the trade is meager .Nigeria has a vast natural resource of tropical and aquatic life and over 3000 species of ornamental fish out of 5000 species in the world but her export of ornamental fish is estimated at only 5% of the total 20% Africa's contribution of the trade at the moment. In 1992 US imported about 201 million fish valued at $44.7 million. Most of these fish were farm raised and imported from south East Asia .US export of ornamental fish were cultured in the state of Florida, of the 1539 species declared as ornamental, 32 species dominate the trade and they were all of fresh water origin. The average price paid for imported ornamental fish were 45 cents for egg layers and 22cents for live bearers. (Chapman *et al,* 1997)

In the Philippines in 1997, there were 3500-4000 individual fish collectors who produced a total output export value of US $5million (Whittington *et al,* 2000). A project has been carried out in Cameroon since mid 2000 and is still ongoing by World Fish Center in partnership with a community service organization to enable ornamental fishers take control of their business and to build a firm financial footing. The project set goals and objectives are to improve techniques for capture and holding of fish to survival and to assist the local fishers organize themselves into a cooperative whereby they could negotiate better. (Key Lessons Learned, 2007). Nigeria with so many exportable species have not earned as much as these countries. Mbawuike and Pepple (2003) took an inventory of the locally available fish species in Nigeria for export and discovered that most of the fishes exported are ornamental fishes apart from shrimps as Nigeria has not been able to meet up with the local demand for food fish. Much work has not been done on ornamental fish in Nigeria; this is why this study was carried out. The findings from this study will provide useful information for ornamental fish traders and for potential exporters. This will ultimately increase Nigerian market share in the world ornamental fish market, thereby increase the foreign exchange generation for the country. The findings of this work can help create job for fisher men during the off-fish production season and alleviate poverty.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2. 1 Conceptual framework

2.1.1 Concept of Marketing

As a base for a thorough analytical framework of the study, there is need to review some previous studies on some relevant aspect of marketing. The concept of marketing is based on two fundamental beliefs. First, all company planning, policies and operations should be oriented towards the customer. Profitable sales volume should also be the goal of a firm. Marketing concept is a philosophy of business which states that customers want satisfaction which is the economic and social justification of a company's existence. Consequently, all company activities in production, engineering and finance as well as in marketing must be devoted to determining what the customers want are and aim to satisfy those wants while still making profit (Kohls *et al*, 1990).

2.1.2 Market

A market can be defined as any institution or medium through which exchange of commodities and ownership (of shares, title, bonds, and deeds), essentially aimed at creating one form of utility or another takes place (Adeyokunu, 1980). Consequently, market is not restricted to a geographical location. It can, however, depending on the context of reference, be referred to in terms of:

a) Level of operation; e.g. wholesale and retail markets.

b) Location; e.g. Dugbe, Oyigbo and Sabo markets,and

c) Item of exchange e.g., cattle market, stock exchange market, fish market, etc.

Market brings buyers and sellers together in the process of exchange. It is an exchange of goods and services when the buyer and seller interact together physically in a specific location. It could also be by any other means such as purchase order, e-mail, and arrangement on telephone, among several others. For a market to exist, the goods in question must exist, there must be a buyer and a seller and both must agree on a price.

2.1.3 Marketing

Marketing include all those business activities associated with the flow of goods and services from production to consumption (Abbott and Makeham 1994).According to the book the heart of marketing is finding a buyer for the product on sale and the negotiation of acceptable terms. The simplest form of marketing is the bartering of surplus products for products that are needed. It may be difficult to find someone to provide exactly what is needed and who will accept a specific product in return. It is convenient therefore for the farmer to sell to someone who is prepared to pay cash and who will in return look for a customer needing the product. In many countries the town market square is the scene of direct transactions between producers and consumers. Here each producer accepts full responsibility for advertising his produce, finding customers and obtaining information to guide him in bargaining over the price. His task is made easier by the presence of specialized traders who buy more than the consumers need and who will later offer the goods in a market where there is an unsatisfied demand. In larger markets, the producer and consumer may be separated by distance, time and form requirements:, purchasing and selling services may then be furnished in conjunction with other services such as transport, storage and processing. Such services may be provided by specialized commission agents brokers or auctioneers. People engaged in buying and selling need certain information about the products that they deal with. Buyers need to know the character of the product and its suitability for various purposes. They also need to know its price in various markets since they do not want to pay too high a price to the seller. The seller seeks corresponding information, in terms of the location of the people to buy the produce, what form the product should be, best time to sell, and the best price to ask. Advertising and market news system have developed to help answer these questions.

According to Sheth and Garrett (1956), there is no clarity as to the nature and scope of marketing. This is because marketing horizon has been broadened. First marketing is no longer considered as a post manufacturing process but as both a pre-production and post production process because everything in business begins and ends with customer/client satisfaction. Marketing has also been broadened to not only exchanges of value and economic goods but also it has extended to intangible and perishable issues such as shipping, maintenance and banking among other intangible businesses. There are also many pre-production process issues which are basically

within the domain of the marketing discipline. There seem to be consensus among marketers that the most non-profit organizations such as Museums, zoos, churches and political parties engage in numerous activities that are very similar to the marketing activities of their profit-oriented counterparts. Baker (1985) sees marketing as the process of determining consumer client demand for a product or service, motivating its sales and distributing it unto ultimate consumption at a benefit. Kotler (1988) posits that marketing is a human activity directed at satisfying needs and wants through exchange process. Beierlein *et al* (1995) says that marketing's purpose is to bridge the gap between the conflicting needs of producers and consumers. Most of its activities involve helping producers better understand the needs of consumers. In this way it helps producers decide what products to produce, when to produce and how many to produce. The conflicting needs that marketing seeks to resolve are producers seeking to; maximize long run profits, sell large quantities of a small number of products and charge the highest price while consumers seek to: maximize the satisfaction they receive from the products they consume with their limited income, buy small quantities of a large number of products and pay lowest prices.

The American Heritage dictionary perceives marketing as the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create exchanges that satisfy individual and organizational objectives. Merriam Webster (2004) defines it as the process or technique of promoting selling and distributing a product or service. Or an aggregate of functions involved in moving goods from producer to consumer. Kyle (2005) considers marketing as the business activity of presenting products or services to potential customers in such a way as to make them eager to buy. Marketing includes such matters as the pricing and packaging of the product and the creation of demand by advertising and sales campaigns.

The steps to successful marketing and implementation include;

1. Analyzing your customers and the business environment in order to
2. Identify key opportunities to better and more profitably meet customer needs, and
3. Figuring out how to act on those opportunities and then implementing your plan.

Osuagwu (1999) outlines marketing as follows:

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a) Human activities directed at satisfying needs and wants through exchange process that are mutually beneficial to the relevant parties involved in the exchange process;

b) A management process responsible for identifying, anticipating and supplying customers and clients needs, wants and requirements beneficially;

c) A total system of business activities designed to plan, price, promote, mega-market and distribute want satisfying goods and services to present potential customers and clients;

d) A process which identifies, anticipates and satisfies customers and clients needs and wants through conception, promotion, pricing, mutual exchange and physical distribution of economic and non-economic goods and services;

e) Any exchange transaction, which results in mutual satisfaction of the relevant parties involved in the transaction.

The marketing process involves a network of channels of distribution which starts from the producer and goes through several categories of middlemen, such as wholesellers and retailers, before getting to the consumers. A disturbance of the chain can depress effective output as well as results in inflated prices which will consequently curtail effective consumption. Some factors such as prices and marketing institutions and activities, referred to as marketing functions (such as storage, transportation, processing etc.) are of high importance for a smooth marketing process (Osuagwu, 1999).

2.1.4 Importance of Marketing

Osuagwu (1999) observed that there cannot be high level of marketing activities. He is of the opinion that the gross national product of a country can be seen as a fairly comprehensive need of the total marketing activity in a country. He says the contribution of marketing towards reduction of unemployment in the society cannot be over-emphasized. Indeed marketing has contributed a great deal by offering employment to various classes of people in financial, services, agricultural production, nonprofit and mining activities. He also said that marketing improves the standard of living of the citizens by adding value to products and offering. This it does by creating three kinds of utilities of Time, Place, and Possession.

Time utility is created by storage of products/services immediately after production and during distribution of goods and services. Place utility is created in the transportation of the product/service from point of production to the place where the final buyers are located and possession utility is created in the transfer of the title to a product/service, and in the provision of certain data and information required by the buyer or user to enable him use the product/service to his best advantage

2.1.5 Marketing Channel

Adegeye and Dittoh (1985) described marketing channel as the path through which a commodity moves or follows in marketing in its distribution. Market channels can be centralized or decentralized. In centralized marketing, wholesellers buy from farmer's agents in large central or terminal market where the commodities are assembled. A decentralized channel lacks such large assembling marketing facilities and traders buy direct from farmers.

2.1.6 Market Structure

According to Beierlein *et al* (1995), market structure is an organizational characteristic which determines the relations of sellers in the market to each other, of the sellers to buyers, of buyers in the market to each other and of sellers established in the market to other new firms which might want to enter the market for practical purposes. It means those characteristics which seem to influence strategically the nature of competition and pricing, within the market. The characteristics of market structure are:

a) Degree of seller concentration described by the number and size distribution of sellers in the market.

b) Degree of product differentiation in the market is the extent to which products of different firms from the same industry are viewed as non identical by buyers and is achieved through advertising and differences in the physical characteristics of the firm products.

c) The conditions of entry to the market referring to the relative ease or difficulty with which new sellers may enter the market as determined generally by the advantages sellers have over potential entrants, these advantages being reflected in the extent to which established sellers can persistently raise their

prices above a competitive level without attracting new firms to enter the industry.

2.1.7 Market Conduct

A concept related to market structure is market conduct which refers to the pattern of behavior followed by enterprises (firms) in adopting or adjusting to the markets in which they sell and buy. It includes methods employed in determining prices and output, sales promotion, policies among competing firms, the presence or absence of and the extent of exclusionary tactics directed against either established or potential rivals; research and development(Beirelein *et al* 1995).

2.1.8 Marketing Margin

This represents the difference in price paid to the first seller and that paid to the final buyer. Each category of middleman earns a sort of margin for the duties performed in the marketing channel. Since many marketing costs like transportation and wages tend to be fixed; marketing margins tend to be more stable than prices. This inflexibility of the margin causes retail prices to fluctuate less than farm prices. The size of margin is sometimes influenced by the degree of processing of the commodity in question, its bulk and unit values and perishability. Marketing margins are governed by the demand for and supply of marketing services. There are three major ways of measuring the marketing margins in monetary term.

Marketing margin could be determined by recording the volume of total trade carried out, gross margin obtained by dividing money sales minus money purchase by the volume handled. Margins from each intermediate can be added together to obtain overall margin. Prices can be compared at the different levels of marketing. This however depends on the availability of representative and comparable series of prices at each level. Marketing margins can be expressed either in cash or as a percent of the retail cost. Margins indicate the relative cost of market at a particular time (Adegeye and Dittoh, 1985).

2.1.9 Marketing Efficiency

The efficiency of a marketing system is measured in terms of the level and/or costs to the system of inputs to achieve a given level and/or quality of output. Such inputs are generally in the form of land, finance, time, manpower and materials. Typical outputs include the movement of a given amount of products to markets at

specific distances, the supply of a particular level of service to target market segments and the supply of products at a target price. Hence resources are the costs and utilities are the benefits that comprise the marketing efficiency ratio. Efficient marketing optimizes the ratio between inputs and outputs, (Kriesberg, 1974). Marketing efficiency can be grouped into two namely:

a) Technical or Operational Efficiency: This is evident when marketing costs are reduced but outputs are either maintained or actually increased. Technological innovations are not the only avenues leading to higher levels of operational efficiency. An organization that improves its raw material procurement practices by, centralizing purchases, buying in large quantities or taking advantage of unit freight rates is likely to increase operation efficiency. Physical losses as commodities, products or produce move through the channels of distribution are other aspects of operational efficiency. The higher the loss, the lower the level of operational efficiency. Marketing firms operating within a competitive environment are especially well motivated in seeking to increase operational efficiency. Although, their goals may be higher profit, often the benefits of improved operations accrue to customers in the form of lower prices, (Kriesberg, 1974).

b) Pricing or Economic Efficiency: This is based on the assumption that competitive markets are efficient. It is concerned with the ability of the marketing system to allocate resources and coordinate the entire agricultural/food production and marketing process in accordance with consumer directives. The evidence of pricing efficiency is efficient resource allocation and maximum economic output. The best measure of satisfaction-output of the marketing system is probably the price that customers will pay in the market place for the produce, commodity or product in question. The usefulness of pricing efficiency measures in evaluating any marketing system depends upon four conditions.

a) The customers have alternatives from which to choose in the market place. In other words, the measure has little relevance to situations where there is an effective monopoly.

b) The prices of alternatives adequately reflect the costs of providing them. That is, there are no subsidiaries hidden or otherwise for competing products.

c) Organizations must be free to enter or leave the market.

d) There must be competition between those in the market place. Cartel-like behaviour should not be in practice.

2.1.10 Consumer Prices

In Nigeria, consumer price is determined by the degree of market competition and the bargaining ability of the consumer as well as the availability of physical marketing facilities that improve the marketing system.

2.1.11 Marketing Costs

Marketing costs are incurred when commodities move from the farm to the final market, regardless of whether they are moved by farmers, intermediaries, co-operatives marketing boards, wholesalers, retailers or exporters. An increase in urbanization and industrialization lead to marketing cost increase relatively to the farm gate price received by the farmers this is because the product moves greater distances, through more intermediaries and is more sophisticated in its packaging. Marketing costs can also reflect the state of a country's development in that as standards of living increase, smaller proportions of income are expended on raw products of the farm and greater proportions are spent on additional and improved marketing services.

Increasing the value added means among other things, that more people in developed countries are involved in marketing agricultural products than in producing them. Marketing costs include labour, transport, packaging, containers, rent, utilities (water and energy), advertising, selling expenses, depreciation allowances and interest charges, (Kaynak, 1986).

2.1 Literature Review

2.2.1 Sources and Uses of Fish

Domestic Fish productions are from three sectors namely: artisanal, aquaculture and industrial. Artisanal sector accounts for 81.9% of the production and the industrial sector is 4.3 % while the aquaculture sector accounts for 13.8% (Fisheries Statistics of Nigeria, 2008).

Artisanal fisheries are characterized by low technology and intensive labour utilization. The sector consists of small scale fisher folks involved in lagoons, estuaries and inshore canoe fisheries which are characterized by low capital outlay but remain the backbone of domestic fish production in Nigeria. Industrial fisheries include inshore and offshore fisheries, their productivity depends principally upon the equipment onboard of a ship rather than on the ability of the fishermen; although training and capability are required. Cultivation of aquatic organism (aquaculture) is another form of fish production depending upon the degree of control exercised over the environment (Tobor, 1990). The fisheries sector is a source of livelihood and income from the riverine community. Fish is an important food component of humans. The flesh of fish is white or reddish and flaky in texture. It contains 13 to 20% protein and has a food value of 660 to 3530cal/kg depending on the oil content (Tracy *et al*, 1971). Fish has high nutritional value because it contains two essential amino acids, lysine and methionine, which are limited in other animals. Fish is also rich in vitamins. Refined oils from livers of cod and other species provide a concentration of vitamins D. Fish also contains minerals like sulphur, calcium and potassium. Fish is a healthy food. It contains high protein, low fat and low cholesterol. Fish body oil contains Omega-3-fatty acid which has a lowering effect on the blood pressure. Fish fat helps in curing heart problems e.g. arteriosclerosis (Tracy *et al,* 1971).The scraps from canneries as well as the entire fish of some species which are of no interest to fishermen are ground and dried into meat used for feeding pets (dogs and cats), poultry and for fertilizer. Unrefined fish oil is used as paints and insecticide spray. Liquid glues are got from head and trimmings of fish. Large quantities of fishes and fishery products are exported from Nigeria in different forms and which has been a source of foreign exchange earnings for the country. An estimated value of exports in the fishery sub-sector stood at approximately US $ 31 million for shrimps, sole fish and crabs. More than US $ 3 million was realized from

sales of ornamental live fishes in 2007 (Fisheries Statistics of Nigeria, 2008). Fishes are also used for recreation. From documentation, most exported fishes were collected from the Western, Southern and South Eastern parts of Nigeria. It has been verbally reported by those who started the trade years ago that there are large quantities of Polypterus specie especially *Polypterus bichir* and different species of cat fishes exit in large numbers in Lake Chad. Large populations of Cichlids – Hemichromis specie, Hemichromis are found in the Cameroon/Nigerian border and colour puffer fish in Calabar River. About 100 species of ornamental live fishes have been identified to be regularly exported. There is no stock assessment of the different species but records show that ornamental live fish trade has been carried out in Nigeria for almost 40 years (Areola, 2001). Until recently when the Government of fisheries has put in place acts and regulations and encouraged the formation of the Association of Ornamental Fish Farmers and Exporters of Nigeria, it was a free for all trade with indiscriminate methods of removal of these species from the wild (Odunaiya, 1988).

2.2 Ornamental Fish Marketing

Ornamental fish marketing is a trade where quality measurement is more important than other demand factors in consumer preferences. It is estimated that there are more than 1500 species of ornamental fish which are produced and sold worldwide. About 30 species dominate the sales. Chapman *et al* (1997) reported that 32 species account for 58% of imports into the United State of America and that two species namely guppies (*Poecilia reticulata*) and neon tetras (*Paracheirondon inneci*), accounted for 37% of US imports in 1992. Other important species and taxonomic groups of fish noted by Bassleer (1994) include: *Characidae* (tetras), *Cyprininae* (barbs and gold fish), *Callichthyidae* (mostly corydoraes species), *Loricaridae* (plecostonices and Ancistrus), *Poeciliidae* (live bearers i.e. guppies swardtails platys, mollies), *Cichlidae* (cichlids, mouth brooders and egg layers), *Anabantidae* (labrinthfish such as betta and gouramis)

Though the industry uses taxonomic group to classify ornamental fish, characteristics such as size or length of fish fin size and shape, origin of fish and colour variety may also be used to differentiate products into different segments (Brown and Gratzek 1982; Willis, 1995). These characteristics can be important in determining the value of different species, with rare and unusual fish generally fetching the highest prices (Willis 1996). Solely coloured fish with large fins also

command high prices. The International trade in ornamental fish is significant with some 300 million fish sold throughout the world annually (Kaiser and Vine, 1998). According Dykman (2012), more than 100 countries are involved in the trade of ornamental fish, Singapore, Hong Kong, USA, the Netherlands, and Germany representing the top five exporting countries in 1992. Conversely, the top five importing countries were USA, Japan, Germany, the United Kingdom and France. The majority of exporting countries involved in the trades of ornamental fish are in developing countries in Asia, such as Singapore, Thailand, Indonesia and Philippines; with over 80% of the trade involving exports from the Philippines and Indonesia to the USA. The economic disparity between the importing and exporting countries creates many imbalances in the trade, which can lead to social, environment and economic ramifications that are generally shouldered by the poorer exporting countries. According to Dykman (2012) approximately 1 billion ornamental fish are exported annually, with the trade involving more than 100 species. In the cases of Australia alone, 8-10 million ornamental fish are imported each year. Of all the ornamental fish and invertebrate imported into the European Union in 1998, 37% were tropical fresh water fish, 28% were cold water fish, 16% were marine fish, 8% were corals and 11% were other invertebrates. The majority of ornamental fish trade is fresh water and farm-bred, whereas marine ornamental fish species an invertebrate are mainly wild caught. Aquarium animals are the highest value-added product harvested from coral reefs, with aquarium fish selling for an average of $248 per pound compared to food fish at an average of $3 per pound (NOAA, 2011).

2.2.2 Worldwide Demand for Ornamental Fish

The International market for ornamental fish is well established throughout the Western world. Estimates indicate that there are more than 100 million hobbyists throughout the world (Winfree, 1989) There is an estimate of US $3.0 billions worth of ornamental fish and accessories in 1992 (Bassleer, 1994). A FAO report (FAO, 1999) suggests that the International trade in ornamental fish has expanded at an average rate of 14% per annum since 1985. The major markets for ornamental fish are the Industrialized Western economies which are characterized by high population densities and cool climates (Bassleer, 1994). The hobby at keeping ornamental fish enjoys a similar popularity throughout these markets with studies suggesting that it is second most popular hobby after photography in the U.S.A (Dykeman, 2012).

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The market is supplied with a vast range of different species and varieties of fish in excess of 1, 500 fishes and invertebrates now commonly stocked in aquariums throughout the world (Willis, 1995). However more recent estimates indicate that over 3,000 species are currently available (PIJAC, 2000). The number of species has increased rapidly over the past 20 – 30 years and continues to increase due to improvements in breeding, transport and aquarium technology (Willis, 1995).

The market for ornamental fish can be divided into, coldwater fresh water species, tropical fresh water species, cold water marine and brackish species and tropical marine and brackish species. The largest market is for tropical fresh water species accounting for between 85% (Ingram, 1987) and 90% (Bassleer, 1994) of the world wide ornamental market. Willis (1995) observed that Statistics for actual fish numbers and species traded are difficult to find. Andrews (1992) suggests that worldwide retail sales for ornamental fish and associated accessories are worth more than US $ 7.2 billion per annum and Bassleer (1994) quoted retail sales of ornamental fish to be worth US$ 3.0 billion per annum.

The importance of wild caught fish is decreasing due to improvements in breeding and production technology with 80% of species now being produced on farms (Winfree, 1989). The main suppliers of wild caught fish are now South American countries which have to date failed to develop a significant aquaculture industry based on ornamental fish production (Chapman *et al*, 1997).

A comparison of the relative value of ornamental fish compared to food fish is also an interesting point to note, Bassleer (1994) and Willis (1996) indicate that ornamental fish generally have a much higher value than food fish as a result of extra degree of quality control in production of ornamentals and the fact that they are sold live. These levels of quality control in the areas of nutrition, water quality management and disease control are needed when producing ornamental fish in order to ensure the product is healthy and aesthetically pleasing when sold (Willis, 1995). The relative value of food fish is approximately US $ 3.0 per kg compared with ornamental fish at approximately US $ 300 per kg (Bassleer, 1994). FAO (1999) also states that the exports of ornamental fish from Maldives in 1994 were worth US $ 496,000 per ton. In fact some highly priced fish such as *Symphosodium discus* can fetch in excess of $ 3,000 per kg (Willis, 1996).

2.2.3 Ornamental Fish Resources in Nigeria

Ornamental fishes are exported live. In this form of existence, they are exported with specialized techniques and methods to ensure high survival rate on arrival at their destinations. Live fishes exported from Nigeria can be categorized as follows: the way they are used i.e. edible and non-edible, what types, their sizes i.e. table size ,fingerlings and fry, ornamental and none ornamental and by the purpose to which they are put i.e. commercial or scientific for studies which include identification, for experiments and breeding . (Areola, 2004)

All these categorization however overlap but the essence of it is to have a good understanding of the existing laws and regulations relating to the exportation of live fish from the country. The Inland Fisheries Act of 1992 which states that no person shall export or import live fish or any aquatic animal without the permission of the minister was promulgated to acquire the means of monitoring the import and export of the live fishes and the protection of endemic fish species. The existing guidelines on the size, species and types of live fishes that can be exported clearly states 'No edible live fish can be exported out of the country except for research purposes and as a museum specimen which should be carried out under strict supervision' (FDF, 2001). This is because the fish supply from all sources which stood at 1,255,174 tons in 2007 left a huge deficit of 1.49 million tons as the current annual demand for fish in Nigeria is 2.75 million tons.(Fisheries Statistics of Nigeria, 2008).

There are also broad-based international regulations on live fishes which include, among others, all endangered live fishes and aquatic animals under the Convention of International Trade in Endangered Species (CITES). Protected species cannot be exported. By regulations and the prevailing fish food situation, the potential for the exportation of live fish lies only with ornamental live fishes.

The species are said to be over 300 species in number and are often times exploited indiscriminately from the wild. Nigeria is blessed with numerous fresh water lakes, rivers, reservoirs, dams and flood plains. The total water surface is about 12, 547 million hectares (Ita *et al*, 1986). Nigeria is potentially endowed to compete with the big world exporters of ornamental fish.

2.2.4   Export Procedures of Ornamental Fish in Nigeria

The procedure for exportation of live fish is as follows;

a)   Fish sourcing

This involves breeding and collection from the wild. The fishes are sourced by the exporters directly from the wild or through the middle men/suppliers

b)   Holding of fishes prior to export

All exporters must have holding facilities. These facilities/tanks could be concrete, fiber, glass or carpet/wood. These are used to keep the fishes prior to export. This is to allow for the application of medication for disease control and for the fishes to use up the food in their system. These fishes while being kept in readiness for export must not be fed to avoid pollution from fish waste or contamination which could result in high mortality termed Dead on Arrival (DOA) during export (Areola, 2004).

c)   Packaging and labeling

Fish may be transported live using four basic methods (Thone and Hickton, 1999): These include:

a) Damp or moist but not immersed in water.
b) Fish transport trucks.
c) Live fish transporters and
d) In sealed plastic bags.

The main transportation method used in the ornamental fish trade involves the use of sealed plastic bags (Fernando and Phang, 1994). The plastic bag is filled with freshwater at the correct temperature and water quality to between 20 – 50% of bag volume. The fish are then placed in the bag and the air inside the bag is expelled and replaced with oxygen. The bag is sealed by twisting the top of the bag and folded over with rubber bands or metal clips. The plastic bags are placed inside Styrofoam boxes. Each box must be clearly labeled (name of the fish, the consignee and consignor and country of import/export). The number of fish in a bag is determined by the species, the size and county of export which determines the length of the journey. For example for a particular specie of the fish, the number packed in the bag being sent to U.S.A or far East will be less than if being sent to Europe. Usually

only one species is packed in a bag and fish of the same or of almost equal size are bagged together.

d) Guidelines for the Export of Ornamental Fish.

There are Government guidelines for the export of live fishes which must be strictly adhered to. The Inland Fisheries Decree No. 108 of 1992 section 8 prohibits the import or export of live fish or any other aquatic animal without permit. The Federal Department of Fisheries (FDF) is charged with the responsibility of effectively enforcing the provisions of this degree. The following requirements must be met for the purpose of obtaining an export permit.

An application letter by the intending importer or exporter must be addressed to the Director of FDF, Victoria Island, Lagos and Department Quarantine.

The letter should have attached to it certified true copies of the certificate of incorporation of the company. Invoice from overseas customer, current price list per species of fish to be exported. The letter should indicate the expected frequency of exporters, airline to be used and a declaration that no endangered species as contained in the convention of International Trade are to be exported.

An exporter must have a holding facility and the letter of application must state the address of the facility. The Fish Quarantine Services and FDF shall carry out assessment and verification of applicant's facilities for holding fish and disease control. The head of the fish quarantine service shall process all application and issue successful applicants with live fish export permit. Each permit is valid for six months only from January – June, July – December and is issued only on payment of the required fees. Fish export from Nigeria is allowed only when accompanied with a valid export permit and fish health certificate issued only by the FDF. Documentation of export must be done on the fish quarantine certificate of inspection form D and duly signed. An applicant shall also show evidence of remittance to Nigeria the foreign exchange earned in previous transactions to qualify for a new permit (FDF, 2000).

2.2.6 IDENTIFICATION OF SOME IMPORTANT SPECIES

The key for identification of some important ornamental fish species is as follows according to Axelrod *et al* (1995).

PH=Relative acidity/alkalinity of water. Above 7 is alkaline, below 7 is acidic

H = Hardness of water according to German scale, the lower the number the softer the water.

C = Temperature in degrees centigrade

CM =Maximum length to which the fish grows (in centimeters)

L = Capacity (in liters) of smallest aquarium in which fish may be kept

Plate 1 *Brycinus aferlongipinis*

Common Name Alestes

Feeding Habit: Dry packaged food

Reproduction: Egg layer

Aquarium Lighting: Bright, no sunlight

Temperament: Peaceful community fish

pH 6.6

H 6

C 29

Cm 11

L 100

Plate 2 *Polypterus palmas*

Common Name: Palmas

Feeding Habit: Live Fish

Reproduction: Egg layer

Aquarium Lighting: Bright, no sunlight

Temperament: Highly temperamental, eats other fishes.

Aquarium Setup: Rocks plants and driftwood

Swimming Habit: No special swimming level

pH: 8

H: 14

C: 28

Cm: 32

L: 350

Plate 3 *Barbodes callipterus*

Common Name: Barbs (common)

Feeding Habit: Dry packaged food

Reproduction: Egg layer

Aquarium lighting: Bright, no sunlight

Temperament: Peaceful community fish

Aquarium setup: Rocks plants and driftwood

Swimming Habits: no special swimming level

pH: 7

H: 8

C : 23

Cm: 9

L: 80

Plate 4 *Gnathonemus petersii*

Common Name: Elephant nose

Feeding Habit: Live worms, daphnia

Reproduction: Egg layer

Aquarium Lighting: Bright, no sunlight

Temperament: Peaceful community fish

Aquarium Setup: Rocks, plants and driftwood

Swimming Habits: No special swimming level

pH: 6.8

H: 26

Cm: 23

L: 100

Plate 5 *Pantodon buchoizi*

Common Name: Butterfly

Feeding Habit: Live worms, daphnia

Reproduction: Egg layer

Aquarium Lighting: Bright with occasional sunlight

pH : 6.5

H: 3

C: 26

CM: 10

L: 60

Plate 6 *Xenomystus nigri*

Common name: Knife fish

Feeding Habit: Live worms and Daphnia

Reproduction: Egg layer

Aquarium Lighting: As dark as possible as long as fishes are visible

Temperament: Peaceful community fish

Aquarium Setup: Rocks plants and driftwood

Swimming Habit: Bottom swimmer

pH : 6.8

H: 6

C: 26

CM: 20

L: 100

Plate 7 *Erpetoichythys calabarius*

Common name: Reed or rope fish

Feeding Habit: Live fish

Reproduction: Egg layer

Aquarium lighting: As dark as possible as long as fishes are visible

Temperament: Highly temperamental, not recommended for beginners

Aquarium Setup: Rocks plants and drift wood

Swimming Habit: No special swimming level

pH : 8

H: 6

C: 26

CM: 23

L: 100

Plate 8 *Eutropiellus debauwi*

Common name: Dabauwie

Feeding Habit: Live worms, Daphnia

Reproduction: Egg layer

Aquarium Lighting: Bright no sunlight

Temperament: Peaceful community fish

Aquarium Setup: Rocks plants and driftwood

Swimming Habits: Swims in middle of water

pH : 6.8

H: 7

C: 25

CM: 8

L: 100

Plate 9 *Synodontis nigriventris*

Common name: Upside down catfish

Feeding Habit: Dry packaged food

Reproduction: Egg layer

Aquarium Lighting: As dark as possible as long as fishes are visible

Temperament: Peaceful community fish

Aquarium Setup: Rocks, plants and driftwood

Swimming Habits: No swimming level

pH : 7

H: 8

C: 27

CM: 10

L: 100

Plate 10 *Marcusenius angolensis*

Common name: Short nose

Feeding Habit: Dry packaged food

Reproduction: Egg layer

Aquarium lighting: Bright no sunlight

Temperament: Peaceful community fish

Aquarium Setup: Rocks, plants and drift wood

Swimming Habit: Swims in middle of water

pH : 8

H: 14

C: 28

CM: 14

L: 80

Plate 11 *Mormyrus longirostris*

Common name: Dolphins

Feeding Habits: Live worms, daphnia

Reproduction: Egg layer

Aquarium lighting: As dark as possible as long as fishes are visible

Temperament: Peaceful community fish

Aquarium Setup: Rocks, plants and driftwood

Swimming Habit: Bottom swimmer

pH : 7

H: 8

C: 29

CM: 30

L: 150

Plate 12 *Parailia pellucida*

Common name: Glass Catfish

Feeding Habit: Dry packaged food

Reproduction: Egg layer

Aquarium lighting: Bright, no sunlight

Temperament: Peaceful community fish

Aquarium Setup: Rocks, plants and drift wood

Swimming Habits: Swims in middle of water

pH : 7.8

H: 12

C: 28

CM: 10

L: 100

Plate 13 *Malapterurus electricus*

Common name: Electric catfish

Feeding Habit: Livefish

Reproduction: Egg layer

Aquarium lighting: As dark as possible as long as fishes are visible

Temperament: Highly temperamental, not recommended for beginners

Aquarium Setup: Rocks, plants and driftwood

Swimming Habit: Bottom swimmer

pH : 7

H: 8

C: 25

CM: 60

L: 300

Plate 14 *Procatopus similis*

Common name: Similis

Feeding Habit: Live worms, daphnia

Reproduction: Egg layer

Aquarium lighting: Bright, no sunlight

Temperament: Peaceful, community fish

Aquarium Setup: Densely planted aquarium

Swimming Habit: Swims in middle of water

pH : 6.8

H: 7

C: 25

CM: 7

L: 40

Plate 15: *Polypterus congicus*

Common name: Polypterus

Feeding Habit: Live fish

Reproduction: Egg layer

Aquarium lighting: Bright no sunlight

Temperament: Cannot live peacefully with other fishes

Aquarium Setup: Rocks, plants and driftwood

Swimming Habit: No swimming level

pH: 8.1

H: 13

C: 27

CM: 70

L: 400

Plate 16 *Protopterus dolloi*

Common name: Lung fish

Feeding Habit: live fish

Reproduction: Egg layer

Aquarium lighting: Bright, no sunlight

Temperament: Not recommended for beginners

Aquarium Setup: Rocks, plants and driftwood

Swimming Habit: Bottom swimmer

pH: 7.8

H: 14

C: 28

CM: 83

L: 500

Plate 17 *Barbodes trispilos*

Common name: Silver Barb

Feeding Habit: Dry packaged food

Reproduction: Egg layer

Aquarium lighting: Bright, no sunlight

Temperament: Peaceful community fish

Aquarium Setup: Rocks, plants and driftwood

Swimming Habit: No special swimming level

pH: 6.5

H: 6

C: 25

CM: 10

L: 60

Plate 18 *Aplocheilichthys macrophthalmus*

Common name: Blue fish

Feeding Habit: Live worms, daphnia

Reproduction: Egg layer

Aquarium lighting: Bright, no sunlight

Temperament: Peaceful community fish

Aquarium Setup: Densely planted aquarium

Swimming Habit: Swims in middle of water

pH : 7

H: 10

C: 24

CM: 5

L: 40

Plate 19 *Auchenoglanis occidentalis*

Common name: Shovel nose

Feeding Habit: Live worm

Reproduction: Egg layer

Aquarium lighting: As dark as possible as long as fishes are visible

pH: 7.2

H: 9

C: 27

CM: 50

L: 300

Plate 20 *Holacanthus africanus*

Common name: African angel fish

Feeding Habit: Dry packaged food, live worms, daphnia, vegetarian

Aquarium lighting: Bright with occasional sunlight

Temperament: Peaceful community fish

Aquarium Setup: Rocks, no plants

Swimming Habit: No special swimming level

pH:7

H: 13

C: 26

CM: 18

L: 200

CHAPTER THREE

METHODOLOGY

3.1   **The Study Area**.

The Federal Republic of Nigeria is situated between latitude 4° and 14° North and longitude 3° and 14° East. Nigeria's land area of about 92,377 million hectares is entirely within the tropical zone extending Northward from coastline for over one thousand and forty-nine kilometers. Ornamental fish species are collected from 14 states in the country as presented in Figure1.

The major ornamental fish marketing activities is carried out mainly in Lagos. it lies within the latitude 6 and 24^1 and 6 31^1 N, longitude 3° 16^1 and 3° 37^1 E. It has a land area cover of about 3577sq km and the population of about 12 million.(NPC,2006) There are two long sand beaches separating the sea from the internal water way system formed by lagoons and creeks. The two beaches are separable by entrance to Lagos Harbour.   The Lagos coastline is about 180km long and is generally characterized by steep sandy beaches, offshore wave breakers and literal drift (Webb, 1958).

Exportation of ornamental fishes is carried out from different locations of the state . There are ornamental fish markets at Ikorodu town, and Epe town (Oja Oba), Ibiajengbede and Akio Village. The Nigerian Aviation Handling Company shed of the Muritala Mohammed International Airport is the only outlet for ornamental fish export. The Ornamental Fishes are collected mainly from Lagos, Ogun, Edo, Delta, Rivers, Bayelsa, Abia, Niger, Ondo, Nasarawa, Cross-River, Akwaibom, Kano and Benue States. Some of the Fishes can also be collected from Oyo State.

Figure 1: Map of Nigeria of study area.
Source: Geography Department University of Ibadan, 2012.
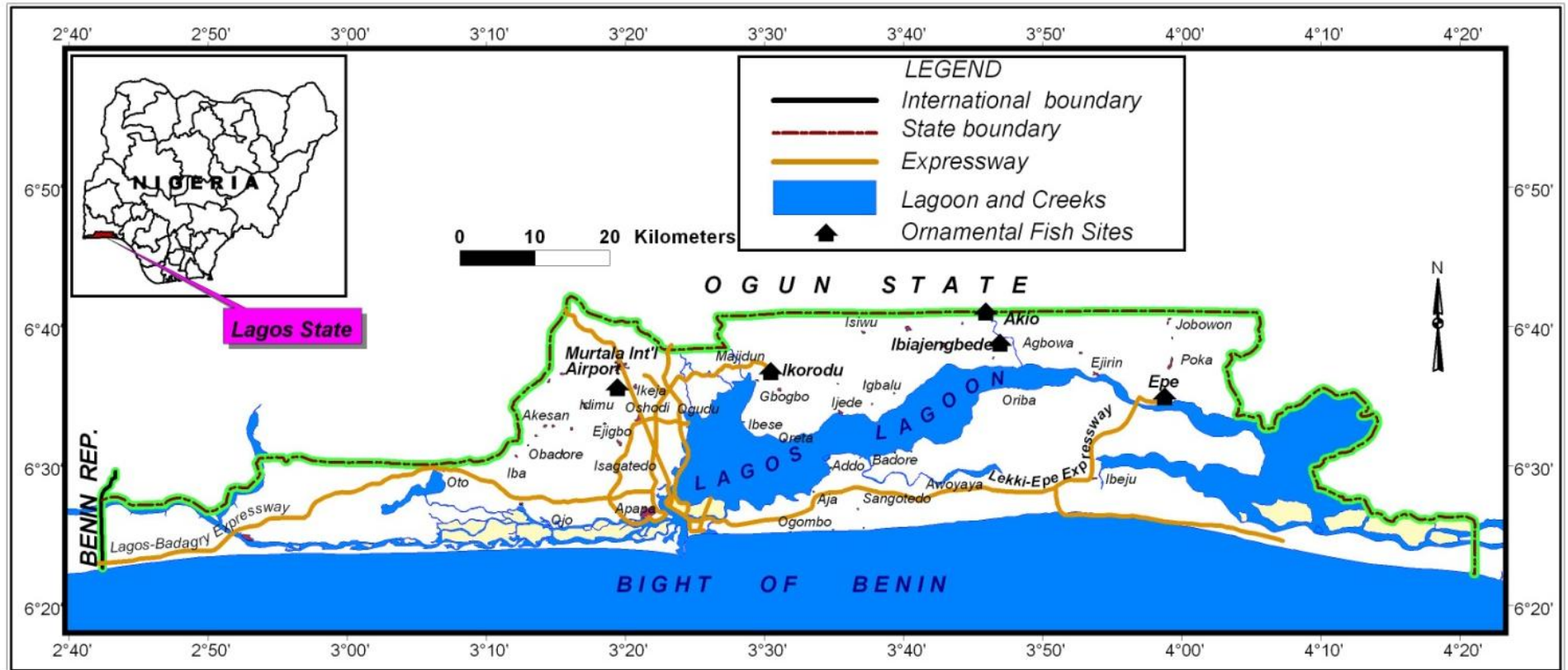
Fig2: Location of Ornamental Fish Trade in Lagos State
Source: Geography Department, University of Ibadan, 2012.

3.2   Source of Data

Data used for this research was collected from the ornamental fish traders. Primary data was collected from one hundred and ninety six ornamental fish traders with the use of a structured questionnaire and interview schedule. Secondary data was collected from the Federal Department of Fisheries Lagos, and the Association of Fish Farmers and Export (AFFE) Office in Ikorodu, Lagos State.

3.3 Sampling Design

A two stage stratified sampling approach was used to select the ornamental fish traders. The traders were stratified into fishermen, middlemen and exporters from where 50% sampling from each stratum was carried out. A total sample size of 196 ornamental fish traders located in fourteen producing states of Nigeria (Lagos, Ogun, Edo, Delta, Bayelsa, Abia, Niger, Ondo, Nasarawa, Rivers, Cross River, Akwa Ibom, Kano and Benue.) was used for the study This include 139 fishermen, 40 middlemen and 17 Exporters. (Table 1) The data were collected from January –March (first quarter), April-June (second quarter), July-Sept, (third quarter) and October-December (fourth quarter).

TABLE 1: List of Fishermen, Middlemen and Exporters Sampled

S/No	State	Total no of fishermen	No sampled	Total no of middlemen	No sampled	Total no of exporters	No sampled
1.	LAGOS	72	36	29	14	34	17
2.	OGUN	12	6	3	2	-	-
3.	EDO	19	10	20	10	-	-
4.	DELTA	76	37	27	14	-	-
5.	RIVERS	15	8	-	-	-	-
6.	BAYELSA	10	5	-	-	-	-
7.	ABIA	10	5	-	-	-	-
8.	NIGER	9	4	-	-	-	-
9.	ONDO	9	4	-	-	-	-
10.	NASARAWA	9	4	-	-	-	-
11.	CROSS-RIVER	21	11	-	-	-	-
12.	AKWA IBOM	5	3	-	-	-	-
13.	KANO	5	3	-	-	-	-
14.	BENUE	5	3	-	-	-	-
	TOTAL	**277**	**139**	**79**	**40**	**34**	**17**

The Fishermen and the middlemen called the suppliers come to Lagos to supply the exporters. The entire Exporters are based in Lagos State.

3.3 **Scope of Study:**

This included Socio Economic Variables such as: Local Government Area, State, gender, age, and level of education, marital status, number of wives, household size, religion and number of years in business., Source of Capital: as Personal Savings, loans without interest and loans with interest., Investments: Like Types of holding tank, number of holding tanks, cost of holding tanks, other accessories and their costs. and Transportation: such as Type of transportation used by the Traders and the transportation costs. Also included in the Scope of Study are Labor Requirements: such as the number of people employed, category of workers (permanent or temporary workers, amount paid to each category of worker, number of family members that contribute and how many hours contributed .Supply :In terms of number of fishes sold, types of fishes sold, amount that specie sells for, the most demanded species and the effect of season on the availability of ornamental fishes. The data were collected in March, June, September and December of the year 2007.

3.5 Problems and Limitations of the Data

A total of 380 copies of questionnaires were distributed, out of which 250 were returned, out of the number returned, 54 were discarded because they were not properly filled. The sample size of 196 as 50% enumeration used in this research is believed to be large enough to give a near accurate result. It is required that the sample size of cross sectional survey be large to get to get a near accurate result.

The Fishermen and Middlemen could not ascertain precisely how much ornamental fish they sold or how much they spent in catching, buying and selling these fishes because of lack of accurate record of catches, buys or sales. Some traders were reluctant to fill the questionnaire because it had so many questions to be answered. They said it will waste their time and thought the income information will be used against them especially in area of taxation. Some said it is a taboo and not African to count the number of children one has. Some people said the answers needed the use of calculator or knowledge of arithmetic and they don't have this knowledge. All the Fishermen and Middlemen had to rely on memory to recall. Some

of them were proud and this limited the success of data collection. Some Fishermen and Middlemen exaggerated their sales of ornamental fish and their expenditure in order to assume a fake economic status. Some denied taking any loan so as to make the researcher believe that they are not borrowers.

The data were collected from fourteen states of the federation, as mentioned earlier in very remote part of these states where accessibility is very difficult. It was difficult getting into the creeks and water bodies. Most times, canoe was used to cross the rivers and the researcher cannot swim. Several futile trips were made to uncompromising traders in these areas which resulted to waste of energy, time and money. Many of the fishermen cannot read and write in English and therefore could not appreciate the importance of this study. Some of the traders who can read and write were unfamiliar with an exercise of this kind. Some of them demanded for money to fill the questionnaire while some of the traders took away the questionnaires and never returned them. As a result of the above problems, many of the questions from the Fishermen and Middlemen got incorrect, exaggerated or underestimated responses while others did not respond. This is why 54 questionnaires were discarded.

3.6 Methods of Data Analysis.

3.6.1 Descriptive Statistics.

The primary data was analyzed using descriptive statistics such as percentage and frequency distribution for socio-economic variables of the sampled Traders; Others descriptive analysis used include flow chart and tables to assess the market structure and the marketing channel of ornamental fish, the gross margin model to determine the gross margin and the marketing efficiency. The following models by (Okumadewa *et al*, 2000) were used. The gross margin of an enterprise is the difference between the total value of production and the total variable cost of production. The average marketing margin is obtained by dividing the marketing margin by the total purchasing cost. This help in comparing the margin and cost.

Gross Margin = Total Revenue – Total Variable Cost … (1)

Profit Margin = Gross Margin- Total Common Cost …. (2)

Average Relative Marketing Margin = $\underline{\text{Marketing Margin}}$ x 100….. (3)
                                                                Purchase Cost

Marketing Efficiency = $\dfrac{\text{Total Revenue}}{\text{Total Marketing Cost.}}$ ……….(4)

The gross margin for the Fishermen, the Middlemen and the Exporters were calculated. The different marketing efficiency for each group of Traders were calculated .

3.6.2 Inferential Statistics.

The Inferential Statistics used include t-test, ANOVA and Regression. A Two way ANOVA was used to know the group that is more efficient.

Regression Analysis was used to analyzed the factors that influence the demand for ornamental fishes in Nigeria. The analytical technique that was used in this study is the stepwise multiple regression using the ordinary least square method. Data collected was tried on linear double, logarithmic forms of general model(equation5)   Linear and Cobb-Douglas functions was also used. The general form of the model is given as thus:

$$Qd = f (Pd, PI, Y, S, MA, EX, A, Eq, E1)…………(5)$$

Where:

Qd =   Quantity of ornamental fish sold in the quarter (kg)

Pd =   Domestic price of ornamental fish (₦ kg)

PI =   International price of ornamental Fish (₦ kg)

Y =   Amount of capital of the Trader

S =   Season

MA =   Member of association

Ex =   Years of experience in Business

A =   Age

Eq =   Educational qualification

E_i =   Stochastic or Error term which is assumed to be normally distributed with zero mean and constant variance.

Data collected was tried on Linear Double, Logarithmic and Semi Logarithmic Forms of the general model (equation 5)

Linear Form:

$$Qd = a_0 + a_1 Pd, +a_2 PI +a_3 Y, +a_4 S + a_5 Ma + a_6 Ex + a_7 A + a_8 Eq + E_1 … (6)$$

Double Logarithmic Form:

$$LogQd = a_0 + a_1 \log Pd + a_2 \log PI + a_3 \log Y + a_4 \log S + d5 \log MA + a_6 \log Ex + a_7 \log A + a_8 \log Eq + \log EI \dots (7)$$

Semi Log Form:

$$Qd = a_o + a_1 \log Pd + a_2 \log P1 + a_3 \log Y + a_4 \log S + a_5 \log MA + A_6 \log Ex + a_7 \log A + a_8 \log Eq + \log Ei \dots (8).$$

a_o is a constant, it is the Qd intercept term while a $(1,2\dots8)$ is the coefficient of the variables used. All the other variables are as defined in equation. These coefficients will be tested for their significance using t-test.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF RESULTS

. The first subsection discusses the socio economics characteristics of traders, the second on the marketing channel or marketing structure, while the third sub-section is on the marketing margin and marketing efficiency of ornamental fish marketing in Nigeria. The last sub-section will address the determinants of ornamental fish demand.

4.1 Socioeconomics Characteristics of traders

4.1.1 Gender of traders

Table 4.1 showed the distribution of traders by their gender across the three main activities. Majority (91.3%) of respondents were male, while 8.7% were female. Fish trading is the main activity in the study area.

Table 4.1: Distribution of the traders by Sex

Sex	Fishermen	Middlemen	Exporters	Total	Percent (%)
Female	10	5	2	17	8.7
Male	129	35	15	179	91.3
Total	139	40	17	196	100.0

Source: Computed from survey data (2007)

4.1.2 Age of traders

Evidence from Table 4.2 showed that the mean age of traders was 46 years. Majority (47.4%) of traders were between the age group of 41-60 years, while 38.8% was between age group of 21-40 years. Only 13.8% of traders were between 60 years and above. This showed that (61.2%) of the traders (61.2%) were within the active age group (21-60 years).

Table 4.2: Distribution of traders by Age

Age Group	Type of Traders			Total	Percent(%)
	Fishermen	Middlemen	Exporters		
21-40	55	14	7	76	38.8
41-60	61	23	9	93	47.4
61 and above	23	3	1	27	13.8
Total	**139**	**40**	**17**	**196**	**100**

Source: Computed from survey data (2007)

4.1.3 Marital Status of traders

Table 4.3 shows that majority (79.1%) of the traders were married, while 15.8% were single. Very few (5.1%) were divorced and this phenomenon was mainly found among fisherman and Middlemen.

Table 4.3: Distribution of traders by Marital Status

	Type of traders			**Total**	**Percent(%)**
	Fishermen	**Middlemen**	**Exporters**		
Married	118	20	17	155	79.1
Single	14	17	0	31	15.8
Divorced	7	3	0	10	5.1
Total	**139**	**40**	**17**	**196**	**100**

Source: Computed from Survey Data (2007)

4.1.4 Household Size of traders

Table 4.4 showed that 63.8% of the traders had a household size of between 0 and 5 persons, 23% between 6 and 10 persons.5.1% had household size of between11and 15 persons, and 3.1% between 16 and 20 people's and5.1% had more than 21 persons in their household. The average household size of the fishermen is 11, middlemen, 7 and exporters 8. According to Fregene (2002), over 65% of the fisher folks belong to an average household size between 6 and 10, 22.8% had a household size of more than 10 persons; only 4% had smaller household size.

Table 4.4   Distribution of traders by Household Size

Household size	Fishermen	Middlemen	Exporters	Total	Percentage
0 – 5	82	31	12	125	63.8
6 – 10	34	8	3	45	23.0
11 – 15	8	1	1	10	5.1
16 – 20	5	0	1	6	3.1
>21	10	0	0	10	5.1
Total	139	40	17	196	100

Source: Computed from survey data (2007)

4.1.5 Number of Children of traders

Table 4.5 showed that 22% of the traders had less than 6 children, 56.6% between 6 and 10 children. 9.7% between11 and 15, 4.1% between16 and 20 and 7.7% had more than 21 children. The average number of children for the fishermen was7, middlemen 4 and exporters 5.

Table 4.5 Distribution of traders by number of children

No. of Children	Fishermen	Middlemen	Exporters	Total	Percentage
1 – 5	27	12	4	43	22.0
6 – 10	75	25	11	111	56.6
11 – 15	16	3	0	19	9.7
16 – 20	7	0	1	8	4.1
>21	14	0	1	15	7.7
Total	139	40	17	196	100

Source: Computed form survey data (2007)

4.1.6 Number of Wives of the traders

Table 4.6 showed that 89.3% of the traders had less than 3 wives, 8.7% had between3 and 4 and the remaining 2% between 5 and 7 wives. The average number of wives for the fishermen was 2, middlemen 1 and exporters 1.

Table 4.6 Distribution of traders by number of wives

No. of Wives	Fishermen	Middlemen	Exporters	Total	Percentage
0 – 2	119	40	16	175	89.3
3 – 4	16	0	1	17	8.7
5 – 7	4	0	0	4	2.0
Total	139	40	17	196	100

Source: Computed from survey data (2007)

4.1.7 Experience of traders

The average number of years spent by traders in their respective fish business activity is found to be about 17 years. Results presented in Table 4.7 below reveals that (85.2%) of the traders had been long in the business for between 6-21 years and above while only 14.8% of the traders had years of experience less than 5 years.

Table 4.7 Distribution of traders by years of Experience

Years of Experience	Type of traders			Total	Percent(%)
	Fishermen	Middlemen	Exporters		
less than 5	19	5	5	29	14.8
6-10	23	4	4	31	15.8
11-15	15	8	3	26	13.2
16-20	37	16	2	55	28.1
21 and above	45	7	3	55	28.1
Total	**139**	**40**	**17**	**196**	**100**

Source: Computed from Survey Data (2007)

4.1.8 Educational Status of Traders

   Table 4.8 below showed that 33.2% of traders had primary education level, 33.7% of traders had no formal and 3.6% have Arabic education. Those that had attained secondary school level are 23.5%, while the remaining (6.1%) had tertiary educational level.

Table 4.8 Distribution of traders by Educational Status

	Type of traders			Total	Percent(%)
	Fisherman	**Middlemen**	**Exporters**		
None	61	2	3	66	33.7
Arabic	7	0	0	7	3.6
Primary	53	2	10	65	33.2
Secondary	18	24	4	46	23.5
Tertiary	0	12	0	12	6.1
Total	139	40	17	196	100

Source: Computed from survey data (2007)

4.1.9 Distribution of traders by sources of marketed fish

Data presented in Table 4.9 showed that (70.9%) of the supply of fish come from the fishermen, 18.9% of supply came from the middlemen and exporters supplied 10.2% of the Fish.

Table 4.9   Distribution of traders by Classification of the Market

	Frequency	Percentage (%)
Fisherman	139	70.9
Middlemen	40	20.4
Exporter	17	8.7
Total	**196**	**100.0**

Source: Computed from survey data (2007)

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4.1.10 Source of Start-up Capital

Empirical evidence from Table 4.10 shows that (93.4%) of the respondents' started their businesses with their own personal money. 0.5% of the marketers had access to institutional credit (banks), 4.6% of the marketers obtained loans from cooperative, while 1.5% got it from other sources. It must be noted that none of the exporters received loan from either commercial banks or cooperatives, but depended only on their personal capital.

Table 4.10: Distribution of traders by Sources of Start-Up Capital

Source of Start-up capital	Fishermen	Middlemen	Exporters	Total	Percent(%)
Personal	131	35	17	183	93.4
Commercial bank	1	0	0	1	0.5
Cooperatives	4	5	0	9	4.6
Others	3	0	0	3	1.5
Total	**139**	**40**	**17**	**196**	**100.0**

Source: Computed from survey data (2007)

4.2 Sources of Ornamental Fish Species Demanded and Marketing Structure

The Fishes are sourced from different parts of the country (Appendix 2). Some were found in all waters. Some were obtained in specific towns, rivers and villages. The community location of ornamental fish species is presented in Appendix 3. The fish species in table 4.11 were ranked according to the demand pattern.

There was freedom of entry and exit in this market and the marketers were said to have perfect knowledge of the market. But from the information acquired, fish market is imperfectly competitive, both in operational and pricing terms because of lack of integration and lack of standardized grades.

In terms of product differentiation, the product was homogenous in nature, but the difference in the product was in the market functions (packaging) carried out by some of the marketers especially the middlemen and exporters. There was no evidence of vertical or horizontal integration because traders sold only fish.

Table 4.11: Demanded Species According to Demand Pattern

Species	Ranking of preferred fish species
Gnathonemus petersi	*1*
Pantodon bucholzi	*2*
Erpetooichythys calabaricus	*3*
Pelvicachromis taeniatus	*4*
Nannocharax latifasciatus	*5*
Paraila pellucida	*6*
Mercusenius angolensis	*7*
Afromastacembelus frenatus	*8*
Alestes micralestes stormi	*9*
Synodontis nigriventis	*10*
Synodontis eupterus	*11*
Synodontis occellatus	*12*
Labeo rubropunctatus	*13*

Source: Field Survey, 2007

Figure 3 is a flow chart of ornamental fish marketing. The ornamental fish came directly from the fishermen to the middlemen. These middlemen sold to the shippers also known as exporters. The middlemen also sold to the local consumers. The exporters sold to the wholesalers also known as the consignee or customers abroad. These exporters also sold to the local consumers. The consignee (wholesalers) sold to the retailers who sold to pet shops, who then sold to the final consumers. The retailers also sold to the final consumers. In India the most prevailing marketing channel of ornamental was a collector or fishermen –unregistered small traders – wholesalers –exporters at various ports. (Mahapatra *et al*, 2006).
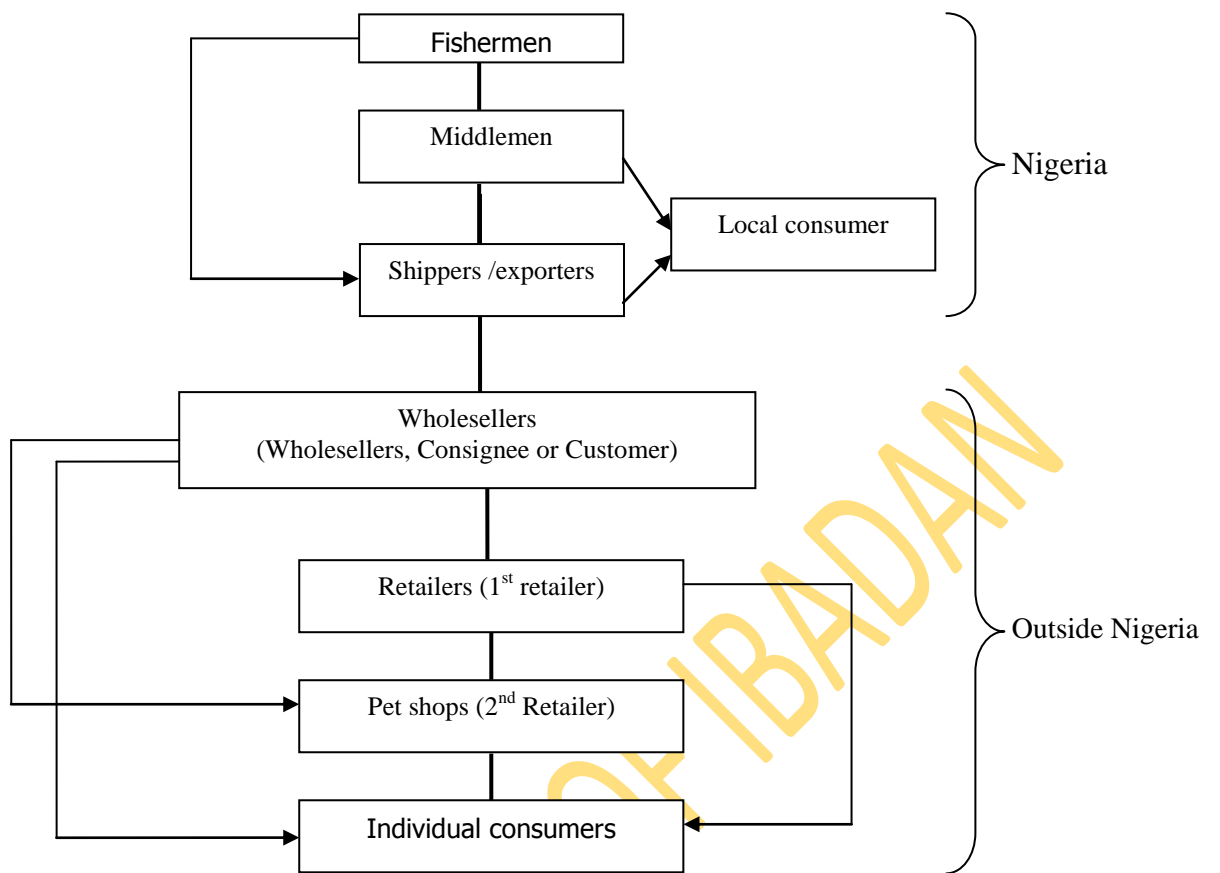
Figure 3: Channels of Distribution in and Outside Nigeria.

Source field survey, 2007

4.3 Marketing Margin and Marketing Efficiency of Ornamental Fish

4.3.1 Gross Margin

The gross margin analysis was used to determine the profitability of the marketers in the study area as shown in Table 4.12 below. Result showed that the gross margin of suppliers was the highest throughout the four quarters with ₦9,288,876, ₦2,183,506, ₦4,054,671 and ₦2,611,749 for the first, second, third and fourth quarter respectively. The exporters earned the least gross margin (₦2, 186,677) which occurred in the third quarter. This may be due to the introduction of some marketing functions like transport cost, packaging etc. which the suppliers and fishermen avoided. In the first three quarters, profit of the exporter increased but decreased in the fourth quarter. This could result from the fact that the fishermen supplied to some of the consumers directly.

4.4 Variable Costs.

Variable cost is an expense that varies with the level of production. Variable costs are those costs that vary depending on a company's production volume; they rise as production increase and fall as production decreases. Variable costs differ from fixed costs such as rent, buildings canoes holding facilities and permanent workers which tend to remain the same regardless of production output.

4.4.1 Variable Cost for Fishermen

The average variable costs for the fishermen for the first, second, third and fourth quarters were N8, 651.00, N19, 369.00, 21,572.73 andN26, 725.20 respectively as shown in table 4.12.

Table 4.12: Variable Costs for Fishermen

Variable Costs	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Total
Worms	390.00	951.00	790.73	760.00	**2,891.73**
Pepper	855.00	912.00	1,095.00	1,015.00	**3,877.00**
Feed	3,045.00	4,075.00	6,490.00	4,455.00	**18,065.00**
Poly bags	790.00	640.00	1,300.00	1,690.00	**4,420.00**
Gas	1,590.00	1,731.00	2,010.00	3,811.00	**9,142.00**
Medication	681.00	8,005.00	4,087.00	9,073.20	**21,846.20**
Nylon	400.00	600.00	790.00	1,400.00	**3,190.00**
Band	-	-	-	761.00	**761.00**
Head cost	-	1,200.00	1,900.00	940.00	**4,040.00**
Boat cost	700.00	630.00	1,810.00	2,820.00	**5,960.00**
Casual workers	200.00	625.00	1,300.00	-	**2,125.00**
TOTAL	**8,651.00**	**19,369.00**	**21,572.73**	**26,725.20**	**76,317.93**

4.4.2 Variable Cost for Middlemen

The average variable costs for the middlemen in the first, second, third and fourth quarters were N116,298.60,N221,368.70,N347,023.70 andN2,996,561.00 respectively as shown in table 4.13.

Table 4.13: Variable Cost for Middlemen

Variable Costs	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Total
Feed	14,560.00	28,110.00	54,520.00	303,110.00	**400,300.00**
Oxygen gas	11,410.00	18,260.00	30,100.00	183,980.00	**243,750.00**
Pepper	7,010.00	13,010.00	18,020.00	350,010.00	**388,050.00**
Casual workers	10,910.00	13,050.00	15,100.00	683,980.00	**748,040.00**
Plastic bags	20,523.00	34,354.00	49,312.00	540,820.00	**645,009.00**
Cello tape	3,260.00	5,660.70	7,640.00	47,604.00	**64,164.70**
Medication	19,760.00	40,220.00	44,200.00	102,780.00	**206,960.00**
Tetracycline	1,680.60	2,360.00	3,800.00	20,186.00	**28,026.60**
Bands	1,985.00	1,164.00	3,490.70	10,300.00	**16,939.70**
Boat cost	-	5000.00	20,000.00	136,900.00	**136,900.00**
Taxi cost	5,000.00	16,200.00	35,000.00	148,000.00	**204,200.00**
Head cost	4,500.00	9,400.00	23,500.00	108,000.00	**145,400.00**
Fish cost	15,700.00	34,580.00	42,341.00	360,891.00	**453,512.00**
TOTAL	**116,298.60**	**221,368.70**	**347,023.70**	**2,996,561.00**	**3,681,252.00**

4.4.3 Variable Costs for Exporters

The variable costs for the exporters for the first, second, third and fourth quarters were N25, 781.35, N31147.28, N23, 364.39 and N35,930.80 respectively as shown table 4.14

Table 4.14: Variable Costs for Exporters

Variable Costs	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Total
Worms	2,830.00	2,900.00	1,972.00	2,740.00	**10,442.00**
Oxygen gas	2,450.00	3,450.00	3,450.00	6,500.00	**15,850.00**
Pepper	1,125.00	2,005.28	1,725.39	2,766.88	**7,622.55**
Poly bags	1,520.00	2,220.00	2,345.00	2,895.00	**8,980.00**
Gas	2,750.35	2,475.00	2,250.00	3,250.00	**10,725.35**
Band	715.00	605.00	770.00	1,075.00	**3,165.00**
Tetracycline	1,900.00	1,280.00	1,400.00	1,310.00	**5,890.00**
Head cost	1,305.00	1,660.00	1,350.00	1,600.00	**5,915.00**
Boat cost	2,706.00	3,900.00	3,000.00	4,000.00	**13,606.00**
Stiro foam	590.00	907.00	890.00	894.00	**3,281.00**
Fish cost	7,890.00	9,745.00	4,212.00	8,900.00	**30,747.00**
TOTAL	**25,781.35**	**31,147.28**	**23,364.39**	**35,930.88**	**116,223.90**

Table 4.15: Average Gross Margin

	Fisherman			Middlemen			Exporters		
	GR(₦)	TAVC(₦)	GM(₦)	GR(₦)	TAVC(₦)	GM(₦)	GR(₦)	TAVC(₦)	GM(₦)
Jan-March	1,949,027	8,651	**1,940,376**	9,405,175	1,16298.6	**9,288,876**	2,960,012	2,5781.35	**2,934,230**
April-June	1,654,959	1,9369	**1,635,590**	2,404,874	2,21368.7	**2,183,506**	3,517,108	3,1147.28	**3,485,961**
July-Sept	1,499,635	2,1572.73	**1,478,062**	4,313,848	3,47023.7	**4,054,671**	2,210,042	2,3364.39	**2,186,677**
Oct-Dec	1,949,572	2,6725.2	**1,924,712**	3,774,99.5	2,996,561	**2,611,749**	4,124,453	3,5930.88	**4,088,522**

GR: Gross Revenue

TAVC: Total Average Variable Cost

GM: Gross Margin

Source: Computed from survey data (2007)

4.5 ANOVA Test of Comparison between Gross Margins

This test was carried out in order to test the variability in gross margin from one quarter to another, from one group to another and determine whether quarters and groups simultaneously affected the variability of the gross margin. Post-hoc test such as LSD, Scheffe and Tucky were carried out (see Appendix 4).

The results presented in the table 4.13 showed that from one quarter to another and one group to another, gross margin significantly vary ($p < 0.01$) and the simultaneous effect of quarter and group also affects the variability of gross margin significantly ($p < 0.01$). These are shown by the values of F-statistic of 10.699, 5.237 and 10.329 respectively.

Table 4.16: Tests of Between-Subjects Effects

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3638177658684024.(a)	11	330743423516729	7.916	.000
Intercept	2258356020855766	1	225835602085576	54.050	.000
Quarter	1341060771596525	3	447020257198841	10.699	.000
Group	437596260471478	2	218798130235739	5.237	.005
Quater* group	2589476636007375	6	431579439334562	10.329	.000
Error	35431997607042620	848	41783016046040		
Total	42139907517462570	860			
Corrected Total	39070175265726640	859			

a R Squared = .093 (Adjusted R Squared = .081)

4.6 Profit Margin

Table 4.14 presented the distribution of profit margin among fishermen, exporters and middlemen throughout the four quarters. In the first quarter (Jan-March), the profit margin of middlemen (₦9, 208,066) was the highest followed by that of the fishermen (₦1, 897,486) and exporters (₦2, 881,972).   In the second quarter (April-June) exporters earned the highest profit. (N3, 433,272) followed by the middlemen (N2, 130,745), then the fishermen (N1, 576,730).

In the third quarter (July-Sept) the middlemen paid the same amount to the fishermen because of their pre-knowledge of the market which now reduces the profit margin of the latter and increases that of the former. And due to the higher supply, the price of fish dropped and reducing the profit margin of the exporters.

In the fourth (October-December) quarter, the exporters earned the highest profit (N4, 012,974) followed by the middlemen (N2, 632,666). The fishermen earned the least (N1, 897,878). The exporters earned more because they paid little for the fishes from the fishermen and the middlemen and sold it expensively to their abroad customers. The exporters were paid in dollars and when the dollars were converted to Naira, their earnings increased. The comparison of that distribution between groups throughout the quarters is shown in Figure 4.The middlemen enjoyed the lion's share of profit (48.3%), followed by the exporters (33.4%) and the fishermen (18.3%). In India estimation showed that exporters enjoyed the lion's share of profit (45%), followed by the wholesalers (30%), unorganized trade (20%) and a meager share of (5 %) was realized by the collectors or fishermen.(Mahapatra *et al,*2006)
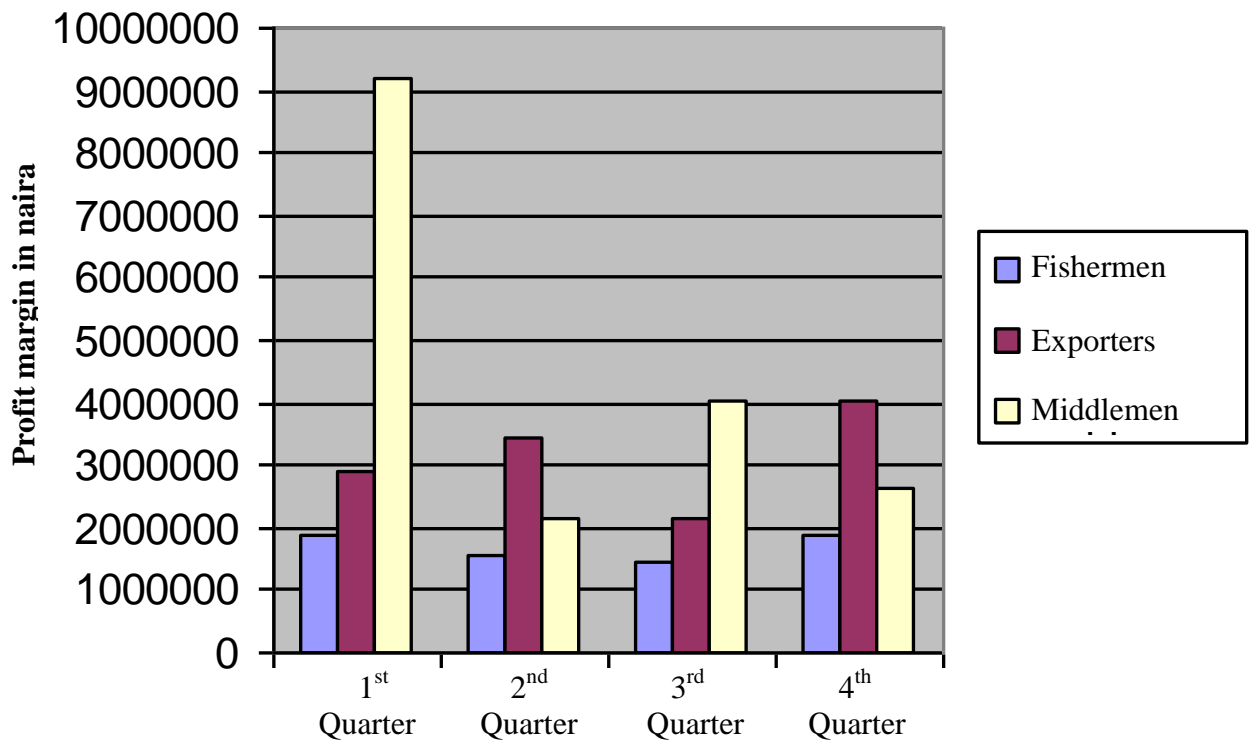
Figure 4: Comparison of the Distribution between Groups

Source: Computed from survey data (2007)

4.7 Fixed Costs.

Fixed costs are a periodic cost that remains more or less unchanged irrespective of the output level or sales revenue such as rent, buildings, holding tanks, canoes and nets in the short run. In the long all costs vary.

4.6.1 Fixed Costs for Fishermen.

The fixed costs for the fishermen for the first, second, third and fourth quarters were N42, 890.00, N58, 860.00, N 29,702.00 and N26,725.00 respectively as shown in table 4.17

Table 4.17: Fixed Costs for Fishermen

Fixed Costs	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Total
Holding Tanks	5,800.00	7,650.00	3,000.00	4,500.00	**20,950.00**
Canoe	7,800.00	9,900.00	6,000.00	4,500.00	**28,200.00**
Net	2,540.00	2,680.00	1,010.00	3,100.00	**9,330.00**
Hand nets	1,540.00	1,650.00	2,500.00	1,500.00	**7,190.00**
Buckets	1,080.00	2,275.00	1,390.00	750.00	**5,495.00**
Bowls	595.00	705.00	1,300.00	105.00	**2,705.00**
Permanent staff	23,535.00	34,000.00	14,502.00	12,270.00	**84,307.00**
TOTAL	**42,890.00**	**58,860.00**	**29,702.00**	**26,725.00**	**158,177.00**

4.7.2 Fixed Costs for Middlemen.

The fixed costs for the middlemen for the first, second, third and fourth quarters were N80,810.00, N52,761.00, N39,088.25 and N2,996,561.00 respectively as shown in table 4.18.

Table 4.18: Fixed Costs for Middlemen

Fixed Costs	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Total
Holding Tanks	8,200.00	5,911.00	3,100.00	505,800.00	**523,011.00**
Air pump	8,400.00	6,000.00	3,200.00	668,200.00	**685,800.00**
Bowls	1,150.00	2,650.00	1,000.00	45,750.00	**50,550.00**
Buckets	2,900.00	1,150.00	1,580.00	46,900.00	**52,530.00**
Water aerator	2,250.00	-	2,250.00	25,377.00	**29,877.00**
Hand nets	7,750.00	9,250.00	2,750.25	40,500.00	**60,250.25**
Permanent staff	32,900.00	16,000.00	16,208.00	45,034.00	**110,142.00**
TOTAL	**80,810.00**	**52,761.00**	**39,088.25**	**2,996,561.00**	**3,169,220.25**

4.7.3 Fixed Costs for Exporters

The fixed costs for the exporters for the first, second, third and fourth quarters were N52,258.80, N52,688.89 , N74,548.00 and N232,184.58 respectively as shown in table 4.19.

Table 4.19: Fixed Costs for Exporters

Fixed Costs	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Total
Holding Tanks	7,100.00	7,800.00	7,700.00	8,000.00	**30,600.00**
Canoe	5,632.00	5,336.00	6,362.00	9,632.00	**26,962.00**
Nets	1,000.00	1,800.00	2,100.00	18,500.00	**23,400.00**
Hand nets	991.00	1,000.00	700.00	1,020.00	**3,711.00**
Bowls	975.00	775.00	6,145.00	1,405.00	**9,300.00**
Buckets	2,310.00	2,100.00	1,310.00	1,530.00	**7,250.00**
Water aerator	5,050.00	5,550.00	4,250.00	4,250.00	**19,100.00**
Hand nets	6,200.00	6,200.00	5,800.00	6,200.00	**24,400.00**
Permanent staff	23,000.80	22,127.89	18,321.89	24,011.00	**87,461.58**
TOTAL	**52,258.80**	**52,688.89**	**52,688.89**	**74,548.00**	**232,184.58**

Table 4.20: Average Profit Margin

	Fishermen			Middlemen			Exporters		
	GM(₦)	TAFC(₦)	PM(₦)	GM(₦)	TAFC(₦)	PM(₦)	GM(₦)	TAFC(₦)	PM(₦)
Jan—march	1,940,376	42,890	**1,897,486**	9,288,876	80,810	**9,208,066**	2,934,230	52,258.8	**2,881,972**
April-June	1,635,590	58,860	**1,576,730**	2,183,506	52,761	**2,130,745**	3,485,961	52,688.89	**3,433,272**
July-Sept	1,478,062	29,702	**1,448,360**	4,054,671	39,088.25	**4,015,582**	2,186,677	52,688.89	**2,133,988**
Oct-Dec	1,924,712	26,725	**1,897,878**	2,611,749	2,996,561	**2,632,666**	4,088,522	74,548	**4,013,974**

GM: Gross Margin

TFC: Total Fix Cost

PM : Profit Margin

Source: Computed from survey data (2007)

4.8 ANOVA Test of Comparison between Profit Margins

This test was carried out to test the variability in profit margin by quarters, group and interaction between season and group. Post-hoc tests such as LSD, Scheffe and Tucky were carried out (Appendix 8).

The results presented in Table4.15 showed that Profit Margin (PM) was significant ($p < 0.01$) for quarters and group interaction of quarter and group also affect the variability of profit margin ($p < 0.01$). These are shown by the values of F-statistic of 10.564, 5.142 and 10.259 respectively.

Table 4.21: Tests of Between-Subjects Effects

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3602644449166972a)	11	327513131742451	7.840	.000
Intercept	2167803413888707	1	2167803413888707	51.891	.000
Quarters	1323963884452176	3	441321294817392	10.564	.000
Group	429609218194540	2	214804609097270	5.142	.006
Quarters * group	2571363497916199	6	428560582986033	10.259	.000
Error	35426149530276720	848	41776119729099		
Total	41970332175762010	860			
Corrected Total	39028793979443700	859			

aR Squared = .092 (Adjusted R Squared = .081)

4.9 Distribution of traders by Average Marketing Margin

Each category of middlemen earns a share of the margin for the duties performed in the marketing channel. This represents the difference in price paid to the first seller and that paid to the final buyer. Since many marketing costs like transportation, wages etc tend to be fixed; marketing margins tend to be more stable than prices.

Table 4.16 showed the distribution of traders according to their average marketing margin. The marketing margin of the exporter's decreased between January and September but increased from October to December. Market margin of the middlemen increased continually throughout the year. But it is important to notice that the marketing margin of middlemen was greater than that of exporters during the four quarters. This may be due to certain heavy taxes that exporters may be exposed to due to the nature of their activity. The graphical comparison between the two groups average marketing margin is shown in Figure 4.2 below. The t-statistic of -4.063 confirms that there is a significant difference ($p < 0.01$) between the two marketing margins (Table 4.16).

Table 4.22: Average Marketing Margin

	Middlemen N	Exporters N
Jan-March	1,450,716	181,098.8
April-June	4,879,530	104,977.1
July-Sept	4,601,827	61,943.38
Oct-Dec	6,303,196	200,483.5

Source: Computed from Survey Data (2007)

Table 4.23: Test of Comparison between Marketing Margins

| | Paired Differences | | | | | T |
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | Mean |
				Upper	Lower	
Exporter – Suppliers	-4171680.55	2053443.02	1026721.50	-7439177.62	-904205.48	-4.063***

***: significant at 0.01

Figure 5 Comparisons between the Two Groups Average Marketing Margin
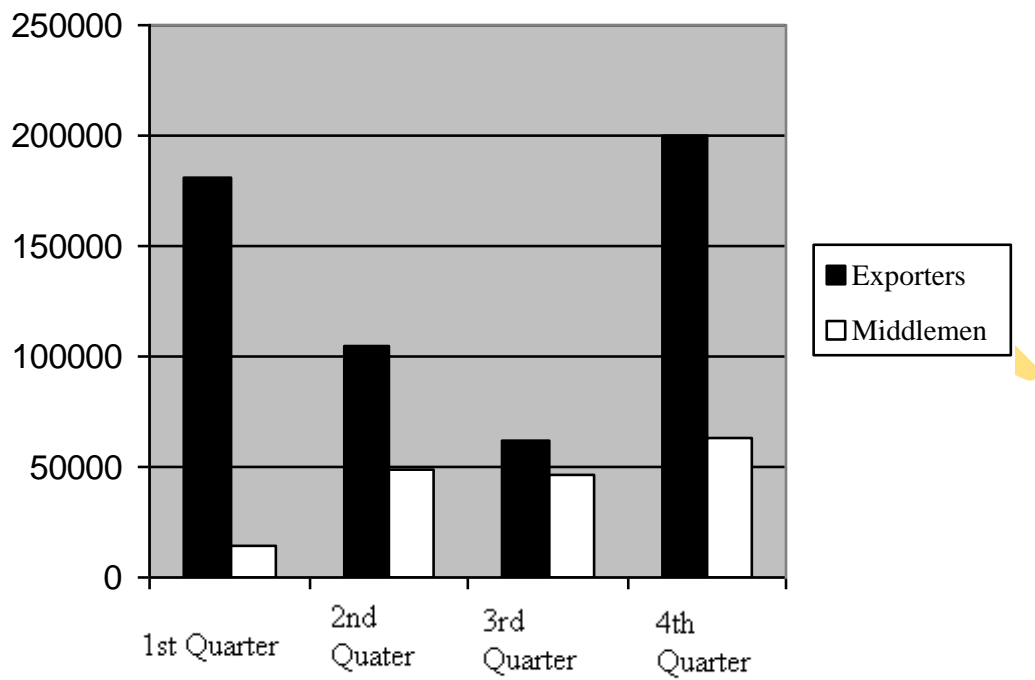
Source: Computed from survey data (2007)

From figure 5, supplier marketing margin increased with Quarters. Marketing margins in imperfect markets are likely to be higher than they are in competitive markets because of abnormal profits.

4.9.1 Average Relative Marketing Margin

The distribution is shown in Table 4.18. On the average, in the first season the intermediaries (exporters and middlemen) got 83% of the price paid by the consumers i.e. 17% of the consumer price went to the fisherman. In the 2nd, 3rd, and fourth quarters, 41.5%, 30.73%, 37.45% of the marketing margin was earned by the intermediaries in each of the season and the remaining 58.5%, 69.27%, and 62.55% were earned by the fisherman respectively.

The t-test showed that there was significant difference between the mean relative marketing margin of middlemen and exporters. This is shown by the T-value of the mean 2.166 is significant ($p < 0.05$).

Table 4.24 Distribution of Respondents by Average Relative Marketing Margin

Rd	Middlemen (%)	Exporters (%)
1st Quarter	11.5	71.5
2nd Quarter	11.0	30.5
3rd Quarter	16.3	14.5
4th Quarter	22.1	15.3

Source: Computed from survey data (2007)

Table 4.25: Test of Comparison between Average Relative Marketing Margins

	Paired Differences					**T**
				95% Confidence Interval of the Difference		
	Mean	**Std. Deviation**	**Std. Error Mean**	**Upper**	**Lower**	**Mean**
Exporter – Suppliers	17.73	30.41	15.21	-30.66	66.14	2.166**

4.9.2 Average Marketing Efficiency

The efficiency of a marketing system is measured in terms of the level and/or costs to the system of inputs to achieve a given level and/or quality of output. From the Table 4.19, in the first quarter the marketing efficiency of middlemen is higher than that of fisherman and that of fisherman is greater than that of the exporter. This could be due to the fact that the supplier will have to include some marketing functions which will increase their efficiency.

During the second quarter, the efficiency (14.38) of middlemen was still higher and increased compared to that of 1st quarter but that of fisherman reduced (36.11). Also Exporters efficiency increased due to introduction of some marketing functions like advertising. In the third quarter, the marketing efficiency of all the marketers decreased. Lastly, in the fourth quarter the marketing efficiency of the exporter, supplier and fishermen increased due to increased demand. Fish is a perishable commodity, and transportation is more hazardous for fish than for crop products. Judging from the modest profits of intermediaries and their reasonable marketing margins, fish markets appeared to be competitive and efficient

Table 4.26: Distribution of Average Marketing Efficiency

	Fishermen	Middlemen	Exporters
Jan-March	46.22	63.57	123.52
April-June	36.11	14.38	115.01
July-Sept	23.05	13.67	99.07
Oct-Dec	50.51	15.79	402.79

Source: Computed from survey data (2007)

Figure 6 Comparison of Average Marketing Efficiency
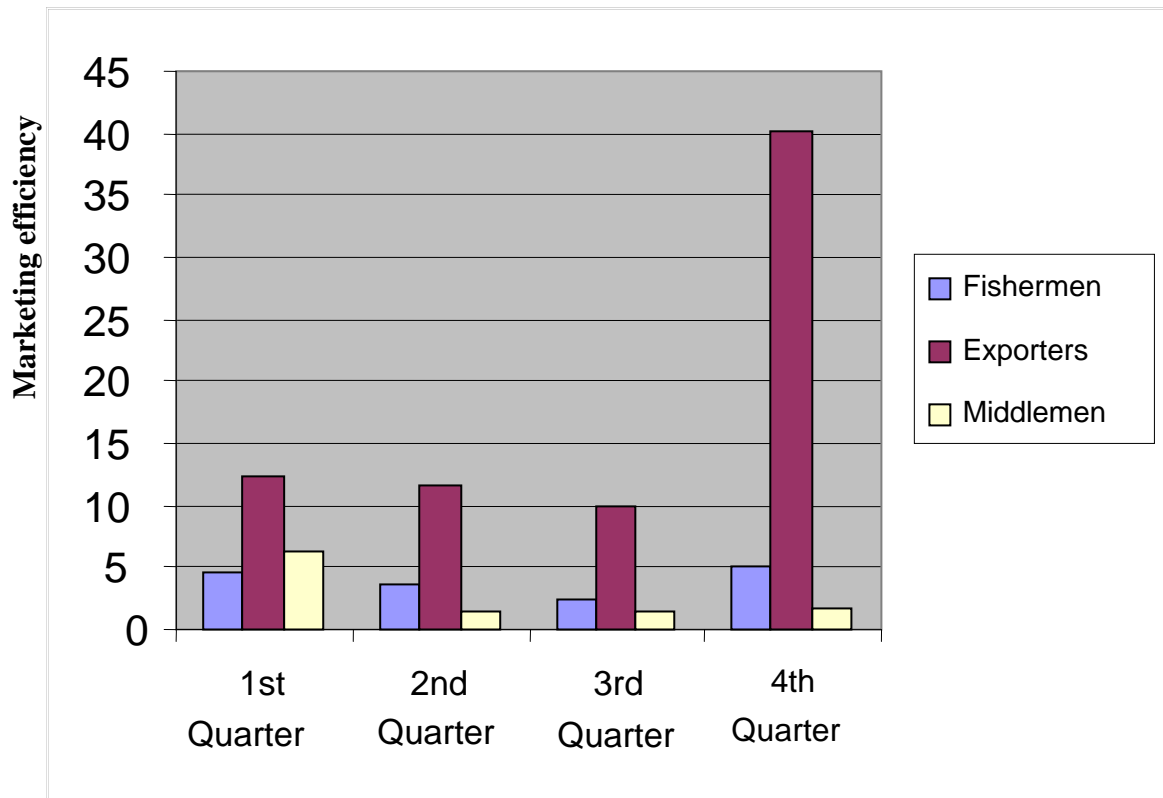
Source: Computed from survey data (2007)

4.10 The Multivariate ANOVA Test of Comparison between Average Marketing Efficiency (ME)

This test was carried out in order to test the variability in average marketing efficiency by season, group and interaction between quarter and group. Post-hoc tests such as LSD, Scheffe and Tucky were carried out (see Appendix 12).

The results presented table 4.20 showed that by quarter and group (fishermen, middlemen and exporters), Marketing Efficiency (ME) was significantly different. Interaction between quarter and group affected the variability of ME significantly ($p < 0.01$).

Table 4.27: The Multivariate ANOVA Test of Comparison between Average Marketing Efficiency (ME)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	984359(a)	11	89487	6.491	.000
Intercept	1379401	1	1379401	100.051	.000
Seasons	156869	3	52289	3.793	.010
Group	471155	2	235577	17.087	.000
Seasons * group	473617	6	78936	5.725	.000
Error	11691367	848	13787		
Total	14359271	860			
Corrected Total	12675726	859			

aR Squared = .078 (Adjusted R Squared = .066)

4.11 Regression Results

Regression analysis was carried out to determine the of socio economic variables on demand. Four functional forms of equations were estimated using Ordinary Least Squares (OLS) method. These include linear, semi-log, exponential and double –log. The choice of appropriate functional form might be approached in many ways. First the choice may be based on a priori expectations, which is in turn guided by economic theory. In this regard, the appropriate functional form may be determined "experimentally" by fitting various functions and selecting the best on the basis of economic and statistical criteria. Other criteria for choosing the most appropriate functional form are previous studies and the nature of the commodity concerned. Others include the coefficient of multiple correlations R^2 or the adjusted R^2, standard errors of regression estimates, T-statistics, F-ratios and the reasonableness of the estimated coefficients with respect to signs and magnitude

4.11.1 Regression Analysis for the Fishermen

On the basis of the statistical and economic criteria, i.e. signs of regression coefficients, magnitude of coefficient of determination (R^2) and F-statistic, the semi log equation was chosen as lead equation for fishermen, the double-log equation was chosen as the lead equation for middlemen, and linear equation as the lead equation for exporter as shown in Table 4.21 and 4.22 respectively.

In Table 4.20, the coefficient of determination multiple (R^2) was found to be 0.21 in semi-log model because the capital and membership of association is significant at 1% level. This implied that 21 percent of the total variation in the quantity of fish supplied by the fishermen is explained by the significant variables of association member and capital. The remaining 79 percent will be attributed to error terms, which arise as a result of discrepancies in the value obtained, or some other variables not included in the model. The constant term and regression coefficients, amount of capital and member of association are significant ($p<0.01$). The coefficients having positive signs showed that the variables have direct relationship with the quantity supplied. Thus an increase in the amount of capital will lead to an increase in the quantity of fish supplied by the fisherman and being a member of the association will increase the quantity of fish supplied.

Table 4.28 Regression Analysis Results for the Fishermen

Equation	Constant	Capital	Experience	Domestic price	Educational qualification	Association	R^2	$\overline{R}^2$	F-cal
Linear	17961.76 (7747.83)**	0.00 (0.00)***	-149.79 (230.84)	-4.17 (10.56)	-278.06 (2348.71)	31564.25 (10725.12)***	0.35	0.33	14.17
Double log	7.89 (0.94)***	0.12 (0.06)**	0.06 (0.10)	-0.05 (0.06)	0.13 (0.14)	0.55 (0.34)	0.08	0.04	2.22
Semi-log	-108125.4 (33431.35)***	9856.92 (2131.96)***	-2864.64 (3712.56)	-1374.24 (2065.61)	755.80 (5135.03)	32256.63 (11886.09)***	0.21	0.18	6.91
Exponential	9.48 (0.23)***	0.00 (0.00)***	0.00 (0.01)	-0.00 (0.00)	0.04 (0.07)	0.53 (0.32)***	0.15	0.12	4.79

*   Significant at 10% level

**   Significant at 5% level

***   Significant at 1% level

Values in parentheses are standard errors

4.11.2 Regression Analysis for the Middlemen

From Table 4.21 in the double-log model, the international price and educational qualification is significant at 5% level and the membership of association is significant at 1% level. The coefficient of multiple (R^2) was found to be 0.41. This implied that 41.0 percent of the total variation in the quantity of fish supplied by the middlemen is explained by the significant variables of association member and capital. The remaining 59.2% was attributed to error terms, which arose as a result of discrepancies in the value obtained, or some other variables not included in the model. The regression coefficients; international price and educational qualification are significant ($p < 0.05$) the constant term and member of association are significant ($p < 0.01$). It was also observed that, the coefficients of variables having positive signs have direct relationship with the quantity of fish supplied by the middlemen. Thus an increase in the educational qualification of the middlemen will give a corresponding increase in the quantity of fish supplied. Coefficients having negative signs showed that the variables have inverse relationship with the quantity of fish supplied. Thus a decrease in international price will increase quantity of fish supplied. Quantity of fish supplied by a middleman increased when he is not a member of an association. An increase in educational qualification will increase the quantity of fishes supplied

Table 4.29: Regression Analysis Results for the middlemen

Equation	Constant	Capital	Experience	international price	Educational qualification	Association	R^2	$\overline{R}^2$	F-cal
Linear	82.51	0.00	1.37	-0.00	10.09	-73.25	0.27	0.17	2.60
	(53.00)	(0.00)	(1.75)	(-0.00)*	(12.78)	(25.45)***			
Double log	7.51	0.09	0.24	-0.61	1.03	-1.33	0.41	0.31	4.01
	(2.76)***	(0.07)	(0.25)	(0.30)**	(0.50)**	(0.40)***			
Semi-log	464.58	7.06	18.13	-54.16	41.13	-78.09	0.44	0.34	4.49
	(180.50)**	(4.41)	(16.52)	(19.31)	(32.64)	(26.00)			
Exponential	3.03	0.00	0.02	-0.00	0.35	-1.22	0.23	0.17	2.59
	(0.84)***	(0.00)	(0.03)	(0.00)*	(0.20)*	(0.40)***			

*   Significant at 10% level

**   Significant at 5% level

***   Significant at 1% level

Values in parentheses are standard errors

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4.11.3 Regression Analysis for the Exporter

In Table 4.22, the coefficient of multiple (R^2) was found to be 0.63. This implied that about 63 percent of the total variation in the quantity of fish supplied by the exporters was explained by the significant variables association member and capital. The remaining 37 percent was attributed to error terms, which arose as a result of discrepancies in the value obtained, or some other variables not included in the model. The regression coefficient of the amount of capital is significant ($p<0.01$). Coefficients having positive signs showed that the variables have direct relationship with the quantity supplied. Thus an increase in the amount of capital will give a corresponding increase in the quantity of fish supplied by the exporter. Those coefficients that are not significant have no effect on the quantity of fish supplied by the exporter.

Table 4.30: Regression Analysis Results for the Exporter

Equation	Constant	Capital	Experience	domestic price	Educational qualification	R^2	$\bar{R}^2$	F-cal
Linear	147.7 (144.71)	0.000 (0.00)***	0.16 (2.49)	-1.01 (1.07)	-30.56 (37.38)	0.63	0.51	5.14
Double log	-0.92 (3.89)	0.52 (0.23)**	-0.05 (0.26)	0.10 (0.36)	-0.95 (1.45)	0.39	0.18	1.90
Semi-log	-671.83 (440.14)	65.62 (25.69)**	12.31 (29.80)	7.42 (40.70)	-55.26 (165.07)	0.40	0.20	2.00
Exponential	5.65 (1.56)***	0.00 (0.00)**	-0.01 (0.03)	-0.00 (0.01)	-0.42 (0.40)	0.44	0.26	2.37

*   Significant at 10% level

**   Significant at 5% level

***   Significant at 1% level

Values in parentheses are standard errors

4.12 Constraints to Ornamental Fish Trading

Based on the results obtained from this study Ornamental Fish Trade in Nigeria is faced with a lot of problems which include:

1. Seasonality:

Ornamental fishes are not available all the year round especially during the rainy season (between June and September) which is the breeding season for fishes. The fishes usually migrate to the shore where there are grasses. They hide under the grasses to feed and breed and are rarely seen. During this season, most of the exporters do not export. If and when the matured female fish is caught during this period for export, they release their eggs into the holding bags, as a result of stress arising from packaging and movement, thereby polluting the water. This has in the past resulted in high cases of Dead on Arrival (DOA) which is sometimes as high as 100% in some cases. Due to this same experience over a period of time, the exporters have learnt not to waste any female fish during this period.

2. Low Participation of Farmers:

There is an observed low participation in ornamental fish farming by Nigerian fish farmers which is caused partly by low encouragement on the part of the government The Government have not given any incentives for ornamental fish farming probably due to the fact that most of the ornamental fishes cannot be bred in captivity.

3. Poor and High Cost of Transportation facilities

The villages where these ornamental fishes are caught are remote. It is difficult to access them. Therefore, transportation cost is high. The fishes are abundant in the villages, but not available in the cities where the shippers reside.

4. High Cost of the Fish and Packaging Material

The fishes are now very expensive and the packing costs very high, the shippers cannot increase the price of these fishes because it has already been fixed.

5. Financial Constraints

Most of the fishermen, suppliers and shippers do not have enough funds to acquire very good facilities where they can keep the fishes until they are sold. Banks do not give them loans because they trade in perishable goods. The best they can do

is source for loans from what is known as local money lenders. Who are known to charge between 20 – 40% interests per month, thereby taking most of their profit.

6. Air freight Problems

There might be delay in delivery of the goods; because it is a perishable commodity, if there is any delay, most of them will be dead on arrival. The maximum hours it can stay before delivery is 48 hours but at times, there will be stopovers and the airline might also forget to pack them in. All these result in Dead on Arrival which will lead to losses.

7. Multiple Taxes.

There is also the problem of multiple taxes at the airport. After paying for export permit at the Federal Department of Fisheries twice in a year (₦20, 000) from Jan. – June and again from July to Dec, they still pay airport charges to NDLEA, SSS, Quarantine, fisheries and health papers at the airport.

8. Uncertain Business Trust and Delayed Payments.

There is also the problem of customers who are not sincere. This is a business that is based on trust. Sometimes the oversea customer will claim that most of the fishes died on arrival. It might not be true, and because the shippers will have to ship out the goods first and their customers acknowledge receipt before paying, some of the oversee customers either delay paying or do not pay. The fishermen and the middlemen complained about bad debt on the part of the shippers.

9. Unstable Currency Exchange Rate.

The naira depreciation against the dollar has reduced the income of these shippers. The shippers cannot increase prices the shippers are paid in dollars. When the money is changed in naira, it would not be as much as when the dollar value was high.

Table 4.31 Constraints to ornamental fish trade

Constraints	Fishermen	Middlemen	Exporters
Seasonality	139	40	17
Low fish farming	0	40	17
High transport cost	0	40	17
High packaging cost	0	40	17
Financial constraints	139	40	17
Air freight problems	0	0	17
Multiple Taxation	0	0	17
Uncertain business trust and delayed payment	139	40	17
Unstable currency exchange rate	0	0	17

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Summary of the Study

The study was aimed to determine the marketing efficiency of ornamental fish trade, describe the conduct of intermediaries in ornamental fish markets and examine the problems encountered in ornamental fish trading and make recommendations for a more efficient marketing system. Primary data collected from one hundred and ninety six ornamental fish marketers with the use of a structured questionnaire, interview schedule and secondary data collected from the Federal Department of Fisheries Lagos, and the Association of Fish Farmers and Export Office in Ikorodu, Lagos State were used for the study.

The distribution of traders by their gender across the three main activities showed that majority of traders (91.2 %) were male, while 8.8% were female. The mean age of traders was 46 years. Majority of traders (46.5%) were within the age range of 41-60 years. Distribution of traders by marital status and startup capital revealed that (79.1%) of respondents were married and 93.5% of the traders started their businesses with their own personal money.

The gross margin analysis showed that the gross margin of middlemen is the highest throughout the four quarters with N8, 855,599 at the first quarter, N2, 274,735, and N4, 334,454 for the second and third quarters respectively. In the first three quarters profit of the exporter's increased but decreased in the fourth quarter, due to the fact that the fishermen supplied to some of the consumers directly. The marketing margin of the exporters decreased throughout the first three quarters but increased in the fourth quarter, while that of middlemen increased continually throughout the four quarters. But it's important to note that the marketing margin of middlemen was greater than that of exporters during the four quarters.

On the average, in the first quarter, the intermediaries (middlemen and exporters) got 83% of the price paid by the consumers while 17% of the consumer price went to the fisherman. In the 2nd, 3rd, and fourth, quarter 41.5%, 30.73%, 37.45% of the marketing margin was earned by the intermediaries in each of the quarter and the remaining 58.5%, 69.27%, and 62.55% were earned by the fishermen respectively.

The coefficient of multiple determinations (R^2) was found to be 0.21, 0.41 and 0.63 for fishermen, middlemen and exporters respectively. In all the models considered association and startup capital were the most significant variables. ($p<0.05$, $p<0.01$)

5.2 Recommendations

Formal Approval of Fisheries Department at all Ports in Nigeria.

During the period of the study, it was observed that ornamental fishes are only shipped out of the Muritala Mohammed International Airport, Lagos. The Federal Department of Fisheries do not have a formally established office at the Airport. The need to establish these service in all airports include the certification of all exports, data collection and to ensure that all exports are covered by export permit which is a source of revenue to the Government from the fish harvested from the wild.

Funding for the Ornamental Fish Business

The major problem of the fishermen, middlemen and exporters was lack of finance because they do not have access to credit facilities. If they benefit from agricultural loan at the normal agricultural interest rates, there will be a lot of improvement in ornamental fish business. This will enhance the expansion of the business

Research on Ornamental Fish Breeding, and Infrastructural Development of Fishing Communities.

There is the need to carry out research in the breeding of these fishes by research institutes and Department of Fisheries in the Universities. They should and work in collaboration with the fishermen, the middlemen and the exporters. Most of the fishes from Nigeria are darkly coloured, in order to improve the market demand and acceptability of the countries ornamental fishes, there is need to research into improving the colour of these fishes through biotechnology.

There is also a need to provide basic rural infrastructure to make the fishing communities where the fishes are bred to be accessible throughout the year.

Improved Repatriation of Fund Process for Live Fish Exporters.

The export trade is said to be worth over \$300,000 per annum (Areola, 2004), A lot of export activities are not recorded as they are carried out by touts and

repatriation of funds cannot adequately be monitored. There is the need for adequate monitoring so that the fraudulent customers abroad do not cheat Nigerian exporters. The exporters lose a lot of revenue as the banks dictate the exchange rate used in converting the proceeds of live fish export. Sometimes the banks refuse opening domiciliary accounts for exporters for official repatriation of their export proceeds. It is hereby recommended that this should be taken up by National Chambers of Commerce Industry Mines and Agriculture (NACCIMA) so that the actual contribution of this sector to the Nigerian economy can be known.

5.3 CONCLUSION

The fishermen, middlemen and exporters profit margins were positive for the period under study. Their marketing efficiencies were greater than one. There is freedom of entry and exit so the market can absorb more traders. A gradual trend towards effective regulation of activities and data collection has been established through the effort of the Federal Department of Fisheries. The sector is a potential developing source of foreign exchange earnings for the country, if strategic management policies are put in place. The sector also poses ultimate self employment opportunities for the unemployed graduates most especially the fisheries graduates.

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Questionnaire on Ornamental Fish Trade in Nigeria

Introduction: This questionnaire is purely designed for research purpose. Any information given will be treated as strictly confidential.

A. Socio Economic Information

1. Name…………………………………………………………
2. Gender   Male   (   )   Female   (   )
3. Age ………………………………………………………….
4. State…………………………………………………………
5. Local Government Area ………………………………….
6. Marital Status ( ) Married ( ) (b) Single ( ) (c) Widowed ( ) (d) Divorced ( )
7. If married, kindly give your household composition

S/No	Household members starting with respondent	Status in the household 1=husband 2=wife 3=Son 4=daughter 5=relative	Age years	Education 1 = None 2 = Arabic 3 = Primary 4 = Secondary 5 = Tertiary
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

B. Ornamental Fish business and Capital requirements

8. Classification of the marketer

(a) Fisherman only ( ) (b) wholesaler ( )   (c) Retailer only   ( )

(d) Both fisherman and margent agent   ( )

9. How long have you been in ornamental fish business?

10. Do you have any other business?....................................

11. If yes, which one is your major business………………..

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12. What is your source of start-up capital?

(a) Personal ( ) (b) commercial bank ( ) (c) Cooperatives ( )   (d) Others……

13. If you obtained a loan , kindly give the amount borrowed, year, source and

interest paid…………………………………………………………………….

S/No	Amount borrowed	Year borrowed	Source	Interest paid (%)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

C. Marketing Structure and Channels

14. Is there any association for the ornamental fish marketers? Yes [ ]   No   [   ]

15. If yes do you pay association dues

(a) Yes [ ]   (b) No [   ]

16. If yes, how much do you pay per year ₦

17. Is anybody fee to enter or leave the association (a) Yes   [   ]   No   [   ]

18. Who do you buy from

(a) Self   (b) Fishermen   (c) Wholesaler   (d) agent (e) Wholesaler and fishermen

19. Who do you sell to ?   (a) Wholesaler (b) Middleman   (c) Agent   (d) Retailer   (e) Consumer

20. What are the problems hinder your ornamental business   (tick all that applies)

S/NO	Problems	Tick all that applies
1		
2		
3		
4		
5		

D. Marketing Margin and Efficiency

21. Which material (s) do you use for holding the tank?

(a)   Wood [ ] (b) Glass [ ] (c) Plastic   [   ]

22.   How many holding tanks do you have while starting the business? ....

23.   Are the tank of the same size? (a) Yes [ ] (b) No   [ ]

24.   If no, please specify their sizes

S/no	Quantity of tanks	Sizes (dimension)	Unit Cost
1			
2			
3			
4			
5			

25.   What other facilities or accessories are needed in the holding tank to provide enabling environment for the fishes. Kindly provide the cost

S/No	Material name	Quantity in use	Unit cost
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

26.   What are the materials needed for handling and packing of the fishes before sale? Kindly provide the costs (per trip)

S/No	Tables Materials	Numbers	Unit cost
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

E.   **Transportation**

27.   How do you transport your fishes to your point of sale, sale and what cost per trip?

S/No	Types of Transportation	Cost per trip	Number of trips made
1			
2			
3			
4			
5			

28.   How many times did you use transport in a month?

29.   What month of the year do you catch the fish most?

S/No	Species of fish	Source
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

F. **Labour**

30.   How many people are in your employment (total)?......................................

31.   How may of them are permanent/salaried workers?..

32.   How many are casual workers? ....

33.   How much do you need for each of the salaried workers per month? N…………

34.   How many days do you engage your family members in a month? …………………

G.   **Marketing**

Based on species and size consideration, what minimum quantity of fishes are allowed to be packaged in one box?

S/no	Species	Size	Number in box	Cost per box
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

H. Demand

35. How many fishes do you sell per month and how do you sell them?

January	Species	Quantity	Unit price N	Quantity sold	Unit price N
February					
March					

36.　 Kindly rank the fish species according to their demand pattern (1 = Mostly/always demanded and 10 = lowest demand)

S/No	Fish species	Rank (1-10)

37.   Given reason(s) for fish rank 1 ……………………………………………
……………………………………………………………………………..
………………………………………………………………………………..

Sources of Ornamental Fishes in Nigeria

List of Ornamental Aquarium Fishes Endemic in Nigeria Fresh Waters

S/NO	COMMON NAMES	GENERIC NAMES	LOCATIONS
1.	Elephant Noses	*Gnathonemus petersi*	Edo/Delta/Epe
2.	Butterly	*Pantodon bucholzi*	Lagos/Ogun/Ondo
3.	Aba Babies (Nile)	*Gymnachus niloticus*	Delta/Ogun/Ondo
4.	Arowana (Babies)	*Osteoglossumbicirrosum*	All Waters
5.	Alestes	*Brycinus afer/longipinis*	All Waters
6.	Bush Fish	*Ctenopoma kingslayea*	All Waters
7.	Leaf Fish	*Monocirrus polyacanthus*	All Waters
8.	Mudskippers	*Perohtalmus vulgaris*	Lagos/Brachy Waters
9.	Spinny Eel	*Afromastacembelus frenatus*	Lagos/Delta
10.	Lung Fish	*Protopterus annectens/dolloi*	Delta
11.	Reed	*Erpetoichythys calabaricus*	All Waters
12.	Polypterus	*Polypterus congicus*	Ogun/Delta
13.	Palmas	*Polypterus palmas*	Delta
14.	Delhezi	*Polypterus delhezi*	Edo/Ogun/Niger
15.	Knife Fish	*Xenomystus nigri*	All Waters
16.	Marble Knife Fish	*Papyrocranus afer*	Most Waters
17.	Blood Fish	*Phractolemus ansorgii*	Most Waters
18.	Silver Round Nose	*Petrocephalus simus*	Lagos/Delta
19.	Round Nose	*Pollimyrus nigripinnis*	All Waters

20.	Short Noses	*Mercusenius angolensis*	All Waters
21.	Dolphins	*Mommyrus longirostris*	Lagos/Edo
22.	Lussosso	*Distichodus lussosso*	Bayelsa/Delta
23.	Neon Tetra	*Neolebias angorgii*	Most Waters
24.	Tiger Fish	*Hepsetus odoe*	Most Waters
25.	Mommyrus	*Briemommyrus brachyistus*	All Waters
26.	Congo Tetra	*Phenacogramus interruetus*	C/River
27.	Longfin Alestes	*Hemigramus caudalis*	Delta/Ondo/Ogun
28.	Red Eyes	*Arnoldichytis spilopterus*	Most Waters
29.	Pencil Fish	*Nannocharax specie*	Most Waters
30.	Red Tail	*Alestes micralestes stormsi*	Most Waters
31.	Moon Fish	*Citharinus citharus*	Bayelsa
32.	Clarias	*Clarias angolensis*	Most Waters
33.	Phago	*Phago maculatus*	Lagos/Ogun/Ondo
34.	Glass Catfish	*Paraila pellucida*	Lagos/Ogun/Ondo
35.	Grass Cuter	*Schilbe mystus*	Lagos/Ogun
36.	Electrick Catfish	*Malapterus electricus*	Most Waters
37.	Debauwie	*Entropiel debauwie*	Lagos/Ogun/Ondo
38.	Whiptail Catfish	*Phractura ansorgii*	Delta/C.River
39.	Spotted Cat	*Paraochenoglanis macrostoma*	Lagos/Delta
40	Apple Catfish	*Syndontis budgetii*	Delta/Lagos.
41.	Network Catfish	*Synodontis eupterus*	Bayelsa
42.	Occellfer	*Synodontis occelatus*	Bayelsa
43.	Ud. Cat	*Synodontis nigriventris*	All Waters

44.	Batensoda	*Synodontis brachy*	Bayelsa
45.	Bagrus	*Bagrus ubangesis*	Bayelsa
46.	Stripped Catfish	*Clarotes laticeps*	Bayelsa
47.	Barbs (Common)	*Barbodes callipterus*	All Waters
48.	Silver Barbs	*Barbodes camptacanthius*	C. River
49.	Barbs Silverticus	*Puntius sylvaticus*	Rivers State
50.	Lebeo	*Labeo rubropunctatus*	Bayelsa
51.	Aphyosemion	*Aphy. Australis/bivitatum*	Lagos/Selta
52.	Aphy Calliurum	*Aphyosemion calliurum*	Delta
53.	Big. Apyosemion	*Aphy. Deltahense*	Delta
54.	Aphy Arnoldii	*Aphy. Arnoldii*	Delta
55.	Blue Fish	*Aplocheilichthysmyyersi*	Lagos
56.	Scheeli	*Aplocheilichtyhs scheeli*	Lagos
57.	Macrophtalmus	*Aplocheili macrophtalmus*	Lagos/Rivers
58.	Flavescence Blue Fish	*Apl. Flavescence*	Rivers
59.	P. Similis	*Procatopus similis*	Ogun/Delta/C.Rivers
60.	Bifasciatus	*Epiplatys bifasciatus*	Delta
61.	Krisbensis (Yellow)	*Pelvicachromis pulcher*	Delta
62.	Red Kribensis	*Pelvicachromis pulcher*	Abia
63.	Taeniatus	*Pelvicachromis taeniatus*	Delta/Rivers
64	Chromidotilapia	*Chr. Guentheri*	Lagos/Delta/C.rivers
65.	Thysia Cyclid	*Thysia ansorgii*	Lagos/Delta
66.	Jewel Fish	*Hemichromis bimaculatus*	Lagos/Delta
67.	Puffer	*Tetraodon fahaka*	Bayelsa/C.Rivers

68.	Crayfish (Small)	*Crustacea specie*	All waters
69.	Shrimps (Big)	*Crustacea specie*	All waters
70	Water snail	*Pmacie bridgesii*	All waters
71.	Gobies	*Gobio cudgeon*	Lagos/Delta
72.	Underwater frog	*Pipa-pipa*	Delta/Lagos
73.	Lampeyes	*Aplocheilichthys spec*	Most waters
74.	Mono	*Monodactylus sebae*	Lagos
75.	Blue panchares	*Epiplatys specie*	Lagos
76.	Snake head	*Channas striatus/asiatica*	Lagos
77.	Pipe fish	*Microphis brachyurus*	Lagos/Delta
78.	One line tetra	*Nannocharax latifasciatus*	Lagos/Ndo
79.	Atya shrimps	*Atya gabonensis*	Edo/Bayelsa/C.river
80.	N. Powelli	*Neolebias powelli*	Rivers
81.	Lates	*Lates niloticus/microlepis*	Niger

Source: FDF, 2004

APPENDIX 3

Community Location Of Ornamental Fish Species

S/NO	COMMON NAMES	GENERIC NAMES	LOCATION
1.	Elephant/Long Noses	*Gnathonemus petersi*	Epe, Igele, Iwopin, Siloko, Afiesere, Ewu Ughelli, Nikorua
2.	Butter Fly	*Pantodon bucholzi*	Ado, Ota, Akio, Ajegbende, Iwopin, Siloko
3.	Aba babies(nile)	*Gymnachus niloticus*	Ota, Okitipupa, Iwopin
4.	Arowama (babies)	*Osteoglossumbicirrosum*	Epe, Iwopin, Ughelli, Okitipupa
5.	Alestes	*Brycinus afer/longipinis*	Ikorodu, Epe, Ado, Ota, Akio Igele
6.	Bush Fish	*Ctenopoma kingslayea*	Ajegbende, Akio, Ota, Ughelli
7.	Leaf Fish	*Monocirrus polyacanthus*	Epe, Igele, Iwopin, Siloko,
8.	Mudskippers	*Perohtalmus vulgaris*	Majidun
9.	Spinny Eel	*Afromastacembelus frenatus*	Akio, Afiesere, Ewu
10.	Lung Fish	*Protopterus annectens/dolloi*	Elegbete, Ughelli
11.	Reed	*Erpetoichythys calabaricus*	Ughelli, Iwopin, Ikorodu
12.	Polypterus	*Polypterus congicus*	Epe, Iwopin, Ughelli
13.	Palmas	*Polypterus palmas*	Ughelli, Ilaro
14.	Deleizi	*Polypterus delhezi*	Ilaro, Elegbete, Badagry
15.	Knife Fish	*Xenomystus nigri*	Ado-Agbowa, Ughelli, Okitipupa
16.	Marble Knife Fish	*Papyrocranus afer*	Okitipupa, Ughelli

17.	Blood Fish	*Phractolemus ansorgii*	Ado-Agbowa, Epe
18.	Silver Round Nose	*Petrocephalus simus*	Ajegbende, Siloko
19.	Round Nose	*Pollimyrus nigripinnis*	Ajegbende, Ota, Siloko
20.	Short Nose	*Mercusenius angolensis*	Ajegbende, Akio, Okitipupa, Ughelli
21.	Dolphins	*Mommyrus longirostris*	Ajegbende, Siloko
22.	Lussosso	*Distichodus lussosso*	Patani, Ughelli
23.	Neon Tetra	*Neolebias angorgii*	Ade-Agbowa, Ota – Agbwa
24.	Tiger Fish	*Hepsetus odoe*	Molajoye, Ota Agbowa, Akio
25.	Mommyrus	*Briemommyrus brachyistus*	Ajegbende, Siloko
26.	Congo Tetra	*Phenacogramus interruetus*	Oban, Isiokpo
27.	Long Fin Alestes	*Hemigramus caudalis*	Ikorodu, Akio, Itu
28.	Red Eyes	*Arnoldichytis spilopterus*	Akio, Okitipupa
29.	Pencil Fish	*Nannocharax specie*	Ota-Agbowa, Akio, Ughelli
30.	Red Tail Alestes	*Alestes micralestes stormsi*	Akio, Asiokpo
31.	Moon Fish	*Citharinus citharus*	Patani, Bomadi
32.	Clarias	*Clarias angolensis*	
33.	Phago	*Phago maculatus*	Patani, Bomadi
34.	Glass Catfish	*Paraila pellucida*	Epe, Ado-Agbowa
35.	Grass Cutter	*Schilbe mystus*	Ajegbende, Ota-Agbowa, Akio
36.	Electric Catfish	*Malapterus electricus*	Akio, Ota-Agbowa, Igele, Okitipupa
37.	Debauwie	*Entropiel debauwie*	Okitipupa, Epe, Siloko, Ughelli
38.	Whiptail Catfish	*Phractura ansorgii*	Akio, Ota-Agbowa, Iwopin

39.	Spotted Catfish	*Paraochenoglanis macrostoma*	Ughelli, Ikiokpo
40	Apple Catfish	*Syndontis budgetii*	Ughelli
41.	Network Catfish	*Synodontis eupterus*	Obrigbene
42.	Occellifer	*Synodontis occelatus*	Obrigbene
43.	Ud Catfish	*Synodontis nigriventris*	Ota, Agbowa, Akio, Ajegbende, Siloko, Ugbelli
44.	Batensoda	*Synodontis brachy*	Obrigbene
45.	Bagrus	*Bagrus ubangesis*	Obrigbene
46.	Striped Catfish	*Clarotes laticeps*	Obrigbene
47.	Barbs(common)	*Barbodes callipterus*	Akio, Okitipupa, Ughelli
48.	Silver Babrbs	*Barbodes camptacanthius*	Isiokpo
49.	Barbs silverticcus	*Puntius sylvaticus*	Patani, Isiokpo
50.	Labeo	*Labeo rubropunctatus*	Patani,Bomadi.Kaiama
51.	Aphyosemion	*Aphy. Australis/bivitatum*	Majidun, Ikorodu, Ado-Agbowa
52.	Aphylcalliurum	*Aphyosemion calliurum*	Ughelli, Kolorwari
53	Big Apyosemion	*Aphy. Deltahense*	Ughelli
54.	Aphy Arnoldii	*Aphy. Arnoldii*	Ugehelli
55.	Bluefish	*Aplocheilichthysmyyersi*	Ado, Agbowa, Majidun
56.	Scheeli	*Aplocheilichtyhs scheeli*	Majidun
57.	Macrophtalmus	*Aplocheili macrophtalmus*	Ikenne, Isiokpo
58.	Flavescence	*Apl. Flavescence*	Isiokpo
59.	Bluefish P.smiths	*Procatopus similis*	Ijebu-Ode, Isiokpo
60.	Bifasciatus	*Epiplatys Bifasciatus*	Ughelli,kolorwari
61.	Kribensis(yellow)	*Pelvicavhromis Pulcher*	Ughelli,ph,bori,cam p

62.	Red kribensis	*Pelvicachromis Pulcher*	Azumiri
63.	Taeniaus	*Pelvicachromis Taeniaus*	Ughelli,isiokpo,ikan g,oban
64.	Chromidotilapia	*Chr.Guentheri*	Ikorodu, ota- aghowa,ado-aghowa,ugehilli,
65.	Thysia Cyclid	*Thysia Ansorgh*	Ota-aghowa,ughelli,isiok po
66.	Jewel Fish	*Hemichromiss Bimaculatus*	Ado-agbowa,badagry,ughelli
67.	Puffer	*Tetraodon Fahaka*	Obrigbene,itu
68.	Crayfish(small)	*Crustacea Specie*	Ikorodu, ota- agbowa, akio
69.	Shrimps(big)	*Crustacean Specie*	Ikorodu, ota- agbowa, akio
70.	Water Snail	*Pomacie Bridgesh*	Majidun, ughelli, itu
71.	Gobies	*Gobio Gudgeon*	Ikorodu
72.	Underwater Frog	*Pipa Pipa*	Ugehilli
73.	Lampeyes	*Aplocheilichthys Spec*	Ikorodu, epe, ota, ado-aghowa
74.	Mono	*Monodactylus Sebae*	Majidun
75.	Blue Panchares	*Epiplatys Specie*	Majidun
76.	Snake Head	*Channas Striatus/Asiatica*	Epe, okitipupa
77.	PipeFish	*Microphis Brachyurus*	Majidun
78.	One Line Tetra	*Nannocharax Latifasciatus*	Ota-aghowa,akio
79.	Atya Shrimps	*Atya Gabonensis*	Benin, bomadi, patani
80.	N Powelli	*Neolebias Powelli*	Isiokpo
81.	Lates	*Lates Niloticus/Microlepis*	Minna,benue river

Source: Field Survey, 2007

APPENDIX 4

Post Hoc Tests for Gross margin

Quarters

Multiple Comparisons

Dependent Variable: GM

	(I) Quarters	(J) Quarters	Mean Difference (l-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1.00	2.00	1571407.1	623441.4	.058	-33413.7748	3176227.879
		3.00	843991.69	623441.4	.529	-760829.1341	2448812.520
		4.00	2266262.5*	623441.4	.002	661441.6957	3871083.350
	2.00	1.00	-1571407.1	623441.4	.058	-3176227.88	33413.7748
		3.00	-727415.36	623441.4	.648	-2332236.19	877405.4678
		4.00	694855.47	623441.4	.681	-909965.3566	2299676.298
	3.00	1.00	-843991.6	623441.4	.529	-2448812.52	760829.1341
		2.00 •	727415.36	623441.4	.648	-877405.4678	2332236.186
		4.00	1422270.8	623441.4	.103	-182549.9973	3027091.657
	4.00	1.00	2266262.5*	623441.4	.002	-3871083.35	-661441.6957
		2.00	-694855.47	623441.4	.681	-2299676.30	909965.3566
Scheffe		3.00	-1422270.8	623441.4	.103	-3027091.66	182549.9973
	1.00	2.00	1571407.1	623441.4	.096	-174919.6297	3317733.734
		3.00	843991.69	623441.4	.608	-902334.9890	2590318.375
		4.00	2266262.5*	623441.4	.004	519935.8407	4012589.205
	2.00	1.00	-1571407.1	623441.4	.096	-3317733.73	174919.6297
		3.00	-727415.36	623441.4	.715	-2473742.04	1018911.323
		4.00	694855.47	623441.4	.743	-1051471.21	2441182.153
	3.00	1.00	-843991.69	623441.4	.608	-2590318.38	902334.9890
		2.00	727415.36	623441.4	.715	-1018911.32	2473742.041
		4.00	1422270.8	623441.4	.158	-324055.8523	3168597.512
	4.00	1.00	2266262.5*	623441.4	.004	-4012589.20	-519935.8407
		2.00	-694855.47	623441.4	.743	-2441182.15	1051471.212
LSD		3.00	-1422270.8	623441.4	.158	-3168597.51	324055.8523
	1.00	2.00	1571407.1*	623441.4	.012	347737.7787	2795076.326
		3.00	843991.69	623441.4	.176	-379677.5806	2067660.967

(I)	(J)	Mean Difference	Std. Error	Sig.	Lower Bound	Upper Bound
	4.00	2266262.5*	623441.4	.000	1042593.249	3489931.796
2.00	1.00	1571407.1*	623441.4	.012	-2795076.33	-347737.7787
	3.00	-727415.36	623441.4	.244	-1951084.63	496253.9143
	4.00	694855.47	623441.4	.265	-528813.8032	1918524.744
3.00	1.00	-843991.69	623441.4	.176	-2067660.97	379677.5806
	2.00	77415.36	623441.4	.244	-496253.9143	1951084.633
	4.00	1422270.8*	623441.4	.023	198601.5561	2645940.103
4.00	1.00	2266262.5*	623441.4	.000	-3489931.80	-1042593.25
	2.00	-694855.47	623441.4	.265	-1918524.74	528813.8032
	3.00	1422270.8*	623441.4	.023	-2645940.10	-198601.5561

Based on observed means.

. The mean difference is significant at the .05 level.

Homogeneous Subsets

GM

	Quarters	N	Subsets 1	2	3
Tukey HSD[a,b]	4.00	196	793453.2		
	2.00	196	1488309	1488309	
	3.00	196	2215724	2215724	
	1.00	196		3059716	
	Sig.		.103	.058	
Duncan[a,b]	4.00	196	793453.2		
	2.00	196	1488309	1488309	
	3.00	196		2215724	2215724
	1.00	196			3059716
	Sig.		.265	.244	.176
Scheff[a,b]	4.00	196	793453.2		
	2.00	196	1488309	1488309	
	3.00	196	2215724	2215724	
	1.00	196		3059716	
	Sig.		.158	.096	

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 41783016046040.830.

a. Uses Harmonic Mean Sample Size = 196.00.

b. Alpha = .05.

Group

Multiple Comparisons

Dependent Variable: GM

	(I) type	(J) type	Mean Difference (l-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Tukey HSD	100	2.00	857880.99	616223.6	.345	-588907.5854	2304669.570
		3.00	1473969.7*	574038.8	.028	-2821715.46	-126224.0304
	2.00	1.00	-857880.99	616223.6	.345	-2304669.57	588907.5854
		3.00	2331850.7*	748171.1	.005	-4088429.71	-575271.7667
	3.00	1.00	1473969.7*	574038.8	.028	126224.0304	2821715.461
		2.00	2331850.7*	748171.1	.005	575271.7667	4088429.709
Scheffe	1.00	2.00	857880.99	616223.6	.380	-653146.5846	2368908.569
		3.00	1473969.7*	57403.8	.037	-2881556.85	-66382.6429
	2.00	1.00	-857880.99	616223.6	.380	-2368908.57	653146.5846
		3.00	2331850.7*	748171.1	.008	-4166423.74	-497277.7345
	3.00	1.00	1473969.7*	574038.8	.037	66382.6429	2881556.848
LSD		2.00	2331850.7*	748171.1	.008	497277.7345	4166423.741
	1.00	2.00	857880.99	616223.6	.164	-351621.3659	2067383.350
		3.00	1473969.7*	574038.8	.010	-2600673.15	-347266.3379
	2.00	1.00	-857880.99	616223.6	.164	-2067383.35	351621.3659
		3.00	2331850.7*	748171.1	.002	-3800335.10	-863366,3715
	3.00	1.00	1473969.7*	574038.8	.010	347266.3379	2600673.153
		2.00	2331850.7*	748171.1	.002	863366.3715	3800335.104

APPENDIX 7

Homogeneous Subsets

GM

	type	N	Subset	
			1	**2**
Tukey HSD[a,b]	2.00	137	886999.3	
	1.00	559	1744880	1744880
	3.00	164		3218850
	Sig.		.385	.061
Duncan[a,b]	2.00	137	886999.3	
	1.00	559	1744880	
	3.00	164		3218850
	Sig.		188	1.000
Scheff[a,b]	2.00	137	886999.3	
	1.00	559	1744880	1744880
	3.00	164		3218850
	Sig.		.419	.077

Means for groups in homogeneous subsets are displayed.

Based on Type Ill Sum of Squares

The error term is Mean Square(Error) = 41 783016046040.830.

a. Uses Harmonic Mean Sample Size = 197.554.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I
   error levels are not guaranteed.

c. Alpha = .05.

Post Hoc Tests for Profit Margin

Quarters

Multiple Comparisons

Dependent Variable: PM

	(I) Quarters	(J) Quarters	Mean Difference (l-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1.00	2.00	1570760.2	623390.0	.058	-33928.2146	3175448.552
		3.00	825646.18	623390.0	.548	-779042.1995	2430334.567
		4.00	2240926.2*	623390.0	.002	636237.7791	3845614.546
	2.00	1.00	-1570760.2	623390.0	.058	-3175448.55	33928.2146
		3.00	-745113.98	623390.0	.630	-2349802.37	859574.3983
		4.00	670165.99	623390.0	.705	-934522.3895	2274854.377
	3.00	1.00	-825646.18	623390.0	.548	-2430334.57	779042.1995
		2.00	745113.98	623390.0	.630	-859574.3983	2349802.368
		4.00	1415280.0	623390.0	.106	-189408.4046	3019968.362
	4.00	1.00	2240926.2*	623390.0	.002	-3845614.55	-636237.7791
		2.00	-670165.99	623390.0	.705	-2274854.38	934522.3895
		3.00	-1415280.0	623390.0	.106	-3019968.36	189408.4046
Scheffe	1.00	2.00	1570760.2	623390.0	.097	-175422.3913	3316942.728
		3.00	825646.18	623390.0	.625	-920536.3762	2571828.744
		4.00	2240926.2*	623390.0	.005	494743.6024	3987108.722
	2.00	1.00	-1570760.2	623390.0	.097	-3316942.73	175422.3913
		3.00	-745113.98	623390.0	.699	-2491296.54	1001068.575
		4.00	670165.99	623390.0	.764	-1076016.57	2416348.554
	3.00	1.00	-825646.18	623390.0	.625	-2571828.74	920536.3762
		2.00	745113.98	623390.0	.699	-1001068.57	2491296.545
		4.00	1415280.0	623390.0	.162	-330902.5813	3161462.538
	4.00	1.00	2240926.2*	623390.0	.005	-3987108.72	-494743.6024
		2.00	-670165.99	623390.0	.764	-2416348.55	1076016.566
		3.00	-1415280.0	623390.0	.162	-3161462.54	330902.5813
LSD	1.00	2.00	1570760.2*	623390.0	.012	347191.8829	2794328.454
		3.00	825646.18	623390.0	.186	-397922.1020	2049214.469
		4.00	2240926.2*	623390.0	.000	1017357.877	3464494.448
	2.00	1.00	1570760.2*	623390.0	- .012	-2794328.45	-347191.8829
		3.00	-745113.98	623390.0	.232	-1968682.27	478454.3008
		4.00	670165.99	623390.0	.283	-553402.2920	1893734.279

3.00	1.00	-825646.18	623390.0	.186	-2049214.47	397922.1020
	2.00	745113.98	623390.0	.232	-478454.3008	1968682.271
	4.00	1415280.0*	623390.0	.023	191711.6929	2638848.264
4.00	1.00	2240926.2*	623390.0	.000	-3464494.45	-1017357.88
	2.00 .	-670165.99	623390.&	.283	-1893734.28	553402.2920
	3.00	141528O.0*	623390.0	.023	-2638848.26	-191711.6929

Based on observed means.

The mean difference is significant at the .05 level.

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Homogeneous Subsets

PM

	Quarters	N	Subset		
			1	2	3
Tukey HSD[a,b]	400	215	767837.5		
	2.00	215	1438003	1438003	
	3.00	215	2183117	2183117	
	1.00	215		3008764	
	Sig.		.106	.058	
Duncan[a,b]	4.00	215	767837.5		
	2.00	215	1438003	1438003	
	3.00	215		2183117	2183117
	1.00	215			3008764
	Sig.		.283	.232	.186
Scheff[a,b]	4.00	215	767837.5		
	2.00	215	1438003	1438003	
	3.00	215	2183117	2183117	
	1.00	215		3008764	
	Sig.		.162	.097	

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 41776119729099.910.

a. Uses Harmonic Mean Sample Size = 2 15.000.

b. Alpha = .05.

APPENDIX 10

Group

Multiple Comparisons

Dependent Variable: PM

	type	(J) type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1.00	2.00	846425.58	616172.7	.355	-600243.5997	2293094.752
		3.00	.1462655.8*	573991.4	.030	-2810290.26	-115021 .2874
	2.00	1.00	-846425.58	616172.7	.355	-2293094.75	600243.5997
		3.00	.2309081.4*	748109.4	.006	-4065515.35	-552647.3483
	3.00	1.00	1462655.8*	573991.4	.030	115021.2874	2810290.262
		2.00	2309081.4*	748109.4	.006	552647.3483	4065515.354
Duncan	1.00	2.00	846425.58	616172.7	.390	-664477.2973	2357328.450
		3.00	.14626558*	573991.4	.039	-2870126.71	-55184.8386
	2.00	1.00	-846425.58	616172.7	.390	-2357328.45	664477.2973
		3.00	.2309081.4*	781O9.4	.009	-4143502.95	-474659.7528
	3.00	1.00	1462655.8*	573991.4	.039	55184.8386	2870126.711
		2.00	2309081 4*	748109.4	.009	474659.7528	4143502.949
Scheff	1.00	2.00	846425.58	616172.7	.170	-362976.9631	2055828.116
		3.00	.14626558*	573991.4	.011	-2589266.20	-336045.3525
	2.00	1.00	-846425.58	616172.7	.170	-2055828.12	362976.9631
		3.00	23090814*	748109.4	.002	-3777444.53	-840718.1769
	3.00	1.00	1462655.8*	573991.4	.011	336045.3525	2589266.197
		2.00	2309081 4*	748109.4	.002	840718.1769	3777444.525

Based on observed means.

. The mean difference is significant at the .05 level.

APPENDIX 11

Homogeneous Subsets

PM

	Type	N	Subset	
			1	**2**
Tukey HSD[a,b,c]	2.00	137	858917.5	
	1.00	559	1705343	1705343
	3.00	164		3167999
	Sig.		.395	.064
Duncan[a,b,c]	2.00	137	858917.5	
	1.00	559	1705343	
	3.00	164		3167999
	Sig.		.193	1.000
Scheff[a,b,c]	2.00	137	858917.5	
	1.00	559	1705343	.1705343
	3.00	164		3167999
	Sig.		.429	.080

Means for groups in homogeneous subsets are displayed.

Based on Type Ill Sum of Squares

The error term is Mean Square(Error) = 41776119729099.910.

a. Uses Harmonic Mean Sample Size = 197.554.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Post Hoc Tests for Average Marketing Efficiency

Post Hoc Tests

Quarters

Multiple Comparisons

Dependent Variable: ME

	(I) Quarters	(J) Quarters	Mean Difference (l-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1.00	2.00	-11.0175	11.32480	.765	-40.1690	18.1340
		3.00	-1.5457	11.32480	.999	-30.6972	27.6058
		4.00	7.9716	11.32480	.896	-21.1800	37.1231
	2.00	1.00	11.0175	11.32480	.765	-18.1340	40.1690
		3.00	9.4718	11.32480	.837	-19.6798	38.6233
		4.00	18.9890	11.32480	.337	-10.1625	48.1406
	3.00	1.00	1.5457	11.32480	.999	-27.6058	30.6972
		2.00	-9.4718	11.32480	.837	-38.6233	19.6798
		4.00	9.5173	11.32480	.835	-19.6343	38.6688
	4.00	1.00	-7.9716	11.32480	.896	-37.1231	21.1800
		2.00	-18.9890	11.32480	.337	-48.1406	10.1625
		3.00	-9.5173	11.32480	.835	-38.6688	19.6343
Scheffe	1.00	2.00	-11.0175	11.32480	.814	-42.7395	20.7045
		3.00	-1.5457	11.32480	.999	-33.2677	30.1763
		4.00	7.9716	11.32480	.920	-23.7504	39.6935
	2.00	1.00	11.0175	11.32480	.814	-20.7045	42.7395
		3.00	9.4718	11.32480	.873	-22.2502	41.1938
		4.00	18.9890	11.32480	.422	-12.7329	50.7110
	3.00	1.00	1.5457	11.32480	.999	-30.1763	33.2677
		2.00	-9.4718	11.32480	.873	-41.1938	22.2502
		4.00	9.5173	11.32480	.872	-22.2047	41.2393
	4.00	1.00	-7.9716	11.32480	.920	-39.6935	23.7504
		2.00	-18.9890	11.32480	.422	-50.7110	12.7329
		3.00	-9.5173	11.32480	.872	-41.2393	22.2047
LSD	1.00	2.00	-11.0175	11.32480	.331	-33.2454	11.2104
		3.00	-1 .5457	11.32480	.891	-23.7736	20.6822
		4.00	7.9716	11.32480	.482	-14.2564	30.1995
	2.00	1.00	11.0175	11.32480	.331	-11.2104	33.2454

	3.00	9.4718	11.32480	.403	-12.7561	31.6997
	4.00	18.9890	11.32480	.094	-3.2389	41.2170
3.00	1.00	1.5457	11.32480	.891	-20.6822	23.7736
	2.00	-9.4718	11.32480	.403	-31.6997	12.7561
	4.00	9.5173	11.32480	.401	-12.7106	31.7452
4.00	1.00	-7.9716	11.32480	.482	-30.1995	14.2564
	2.00	-18.9890	11.32480	.094	-41.2170	3.2389
	3.00	-9.5173	11.32480	.401	-31.7452	12.7106

Based on observed means.

Homogeneous Subsets

ME

	Quarters	N	Subset
			I
Tukey HSD [a,b]	4.00	215	35.1254
	1.00	215	43.0970
	3.00	215	44.6427
	2.00	215	54.1145
	Sig.	215	.337
Duncan [a,b]	4.00	215	35.1254
	1.00	215	43.0970
	3.00	215	44.6427
	2.00	215	54.1145
	Sig.	215	.128
Scheffe [a,b]	4.00	215	35.1254
	1.00	215	43.0970
	3.00		44.6427
	2.00		54.1145
	Sig.		.422

Means for groups in homogeneous subsets are displayed.

Based on Type IN Sum of Squares

The error term is Mean Square(Error) = 13786.990.

a. Uses Harmonic Mean Sample Size = 2 15.000.

b. Alpha = .05.

type

Multiple Comparisons

Dependent Variable: ME

	(I) type	(J) type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
TukeyHSD	1.00	2.00	20.2067	11.19369	.168	-6.0742	46.4876
		3.00	52.6943*	10.42740	.000	-77.1760	-28.2125
	2.00	1.00	-20.2067	11.19369	.168	-46.4876	6.0742
		3.00	72.9009*	13.59051	.000	-104.8092	-40.9927
	3.00	1.00	52.6943*	10.42740	.000	28.2125	77.1760
		2.00	72.9009*	13.59051	.000	40.9927	104.8092
Scheffe	1.00	2.00	20.2067	11.19369	.197	-7.2411	47.6545
		3.00	52.6943*	10.42740	.000	-78.2630	-27.1255
	2.00	1.00	-20.2067	11.19369	.197	-47.6545	7.2411
		3.00	72.9009*	13.59051	.000	-1 06.2259	-39.5760
	3.00	1.00	52.6943*	10.42740	.000	27.1255	78.2630
		2.00	72.9009*	13.59051	.000	39.5760	106.2259
LSD	1.00	2.00	20.2067	11.1939	.071	-1.7639	42.1773
		3.00	52.6943*	10.42740	.000	-73.1608	-32.2277
	2.00	1.00	-20.2067	11.19369	.071	-42.1773	1.7639
		3.00	72.9009*	13.59051	.000	-99.5759	-46.2260
	3.00	1.00	52.6943*	10.42740	.000	32.2277	73.1608
		2.00	72.9009*	13.59051	.000	46.2260	99.5759

Based on observed means.

The mean difference is significant at the .05 level.

APPENDIX 15

Homogeneous Subsets

ME

	type	N	Subset	
			1	**2**
Tukey HSD [abc]	2.00	137	17.2085	
	1.00	559	37.4152	
	3.00	164		90.1094
	Sig.		.202	1.000
Duncan [abc]	2.00	137	17.2085	
	1.00	559	37.4152	
	3.00	164		90.1094
	Sig.		.088	1.000
Scheffe [a,b,c]	2.00	137	17.2085	
	1.00	559	37.4152	
	3.00	164		90.1094
	Sig.		.232	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 13786.990.

a. Uses Harmonic Mean Sample Size = 197.554.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.