THE SUPPLY-DEMAND AND VALUE CHAIN OF CATFISH IN THE TWO NORTHERN CITIES OF NUEVA ECIJA, PHILIPPINES

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ABSTRACT

The study was designed to determine the status of the catfish industry in the two northern cities of Nueva Ecija through the supply-demand chain connectivity design using a quantitative Likert scale-based survey and a qualitative Focus Group (FGC) methodology. It was found out that the chain was highly contiguous within the area as no outside players were found. There were two short chains that were determined, the direct express chain and the single node chain. Both chains comprise the same players and only differ in the positioning of the market connecting nodes. The areas of improvement were strategic and transactional partnerships, particularly in financial management, feedback, and technical support. Overall, the efficiency of the chain is low, while its flexibility and market responsiveness are high. The chain highly needs institutional support, particularly, from the local government units and national fishery divisions and institutions doing research and extension activities in freshwater aquaculture. The lack of policy positions of the local government where the chain belongs provides for the self-sustenance of the chain making it highly vulnerable to market adjustments due to external abnormalities.

Keywords: Catfish, Demand Chain, Fishery Industry, Supply Chain, Value Chain.

INTRODUCTION

Catfish is one of the major freshwater aquaculture species in the world. It has an annual production of about 370,000 tons and contributes 17.5 % to the overall production of freshwater fish culture (Cacot & Hung, 2011). Globally, fifteen catfish species from seven families are consumed for food. However, only two families, Ictaluridae and Clariidae, represent more than 95% of the total global catfish production (Obirikorang et al., 2014). In Asia and the Pacific, highest production comes from Clarias of the family Clariidae (Tan-Fermin, 2003), which is also observed in the Philippines since this specie is abundant in the country. However, only *C. batrachus*, *C. gariepinus*, and *C. macrocephalus* are commonly found in the Philippine market today. The other three species, *C. nieuhofii*, C. *meladerma*, and *C. fuscus*, have not been reported in recent years (Santos et al., 2015).

From 1997 to 2001, the Philippines is the fourth biggest catfish-producing country in Southeast Asia. Catfish is the second-highest freshwater fish produced in fishponds in 2001 next

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to tilapia (Tan-Fermin, 2003). One species of catfish, *C. macrocephalus*, locally called "*hitong tagalog*" is indigenous in Philippine waters. It has been a favorite freshwater food fish and many consider its tender flesh delicious and excellent. However, the population of the native catfish continued to decrease due to habitat loss, poor water quality, increasing pollution, and the presence of larger-sized competitors (Vidthayanon & Allen, 2013).

On the other hand, the culture of Thai catfish (*C. batrachus*) and African catfish (*C. gariepinus*) has been well established in the country. *C. batrachus* was introduced in 1972 from Thailand while *C. gariepinus* was introduced in 1985 in Taiwan, China (Cagauan, 2007). Both have been desirable species for fish farmers due to their high growth rate, resistance to handling and stress, relatively low requirements for water quality, amenability to high stocking densities, excellent meat quality, and preference amongst consumers (Hecht et al., 1996). Filipinos have also accepted these two species due to their familiarity with the native catfish (Surtida & Buendia, 2000). Likewise, the dwindling catch for native catfish from the wilds has proliferated the establishment of catfish farms in the province of Nueva Ecija. This is further heightened by the landlocked topography of the province, making the population depends mainly on freshwater fishes as a source of cheap and fresh protein.

Research Objectives

Presently, as the catfish gained popularity being served as table food, it has also been considered a gourmet food in high-end restaurants and common foodstuffs in the grill (ihaw-ihaw) and specialty restaurants. Such led to the government through its various agencies, initiating the production of the catfish (hito), yet, demand still exceeds supply (PSA, 2017).

This study was designed to assess the existing market supply-demand link and value chain of catfish in two adjacent cities in Nueva Ecija and to identify areas for improvement. The specific objectives are as follows:

1. Provide an overview of the Nueva Ecija catfish industry;
2. Map out the specific supply-demand and value chains for catfish in Nueva Ecija in terms of strategic partnership and business process management
3. Identify areas for improvement in the chains, particularly, behavioral as reflected through strategic partnership and transactional aspects in terms of business process management;
4. Analyze the performance of the catfish supply-demand and value chains in terms of efficiency, flexibility, and overall market responsiveness
5. Provide specific policy recommendations to improve the catfish industry and specific types of chains discovered.

Significance of the Study

The results could provide a glimpse of the catfish industry in the area and eventually reflect opportunities in engaging in entrepreneurial endeavours. Further, catfish appreciation in the light of its role in the food industry and as a commodity that commands income and market value can be used in planning future projects. As a relatively new fish commodity in food circles, its popularity projects potential for novel food concoctions leading to a new market, entrepreneurial directions, and niche businesses.

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Theoretical and Conceptual Framework

The consideration of the supply side and the demand side of the industry is established through the determination of linkage factors described through behavioral practices in terms of strategic partnerships and transactional activities and characteristics as determined through business process management (Santos-Recto, 2012). The research will determine the extent of the linkages between the supply side and the demand side of the catfish industry in Nueva Ecija.

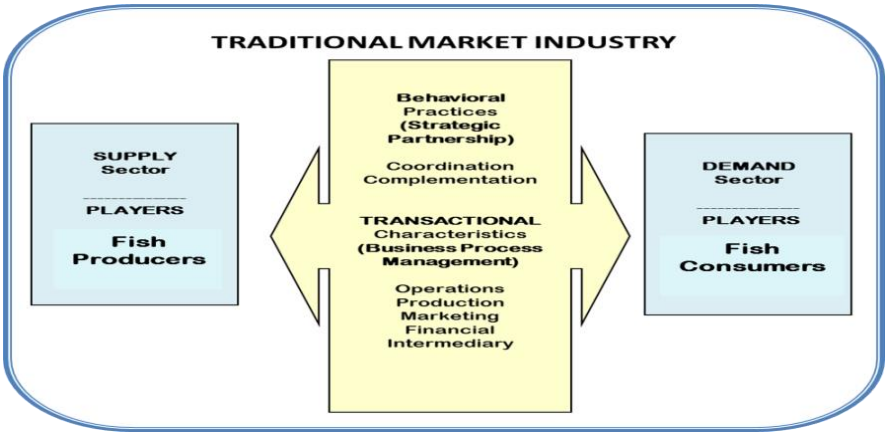

FIGURE 1
CONCEPTUAL FRAMEWORK

Scope and Limitations

This study focused only on the supply and demand of African catfish (C. gariepinus) in the popular northern cities of Nueva Ecija.

METHODOLOGY

Locale and Respondents

Two populous and adjacent cities in Nueva Ecija, San Jose City, and the Science City of Muñoz served as the locale of the research (Figure 1).

Four groups of respondents were considered to specifically determine the demand-supply relations in the industry. For the producer/supplier side, the small hold fish farmer, commercial grower, and institutions like CLSU involved in catfish processing and serving were considered. For the demand side, the middlemen, restaurant owners, grilling stores, fish sellers, and direct consumers were considered.

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FIGURE 2
LOCALE OF THE STUDY IN NUEVA ECIJA, CENTRAL LUZON, PHILIPPINES

Sampling Design

Systematic area sampling or convenience sampling was undertaken to determine the location and people's involvement in the industry. Logrolling was undertaken to determine the players' connection, role, and participation in the chain (Figure 2).

Instrumentation

Guided interview questionnaires were used for the direct interviews and focus group discussions and 5-level Likert scale questionnaires with categorical measures were devised and pre-tested for the supplier or producer group and the demand or consumer group. The categorical scale of the instruments is as follows: 1-Never; 2-Seldom; 3-Sometimes; 4-Often; and 5-Always. Never is taken at 0% frequency, sometimes at 50% frequency, and Always at 100% frequency. The instruments were divided in portions of SDCs, on behavioral practices particularly described within the context of strategic partnership, on transactional characteristics defined by way of business process management, and questions on problems and recommendations.

Data Collection

Primary data were collected with the use of questionnaires coupled with direct interviews, focus group discussions, and field visits.

Data Analysis

Hejase et al. (2012) contend that informed objective decisions are based on facts and numbers, real, realistic, and timely information. Furthermore, according to Hejase & Hejase (2013), "*descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that can provide a better understanding of the collected data*" (p. 272). Therefore, this research used the mean average of the categorical 5-level Likert scale data to analyze the results.

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RESULTS

Overview of the Catfish Industry in Central Luzon

There are three common species of catfish in the Philippines: one is the native catfish commonly called "hito" (*Clarias macrocephalus*) that thrives in rice fields, rivers, and sometimes in muddy places, and the other two species introduced (Surtida & Buendia, 2000), the African catfish (*C. gariepinus*) and Thai catfish (*C. batrachus*). All are grown commercially but the African is widely accepted due to the dwindling existence of the native catfish. However, a high-breed catfish was developed out of the Native and African species which now has gained popularity. Catfish can grow to a size weighing 3000 grams or three kilos per fish within four months. It is also hardy and easy to grow.

Catfish farming produces two (2) crops a year at an average rearing period of five (5) to six (6) months. It is best to stock in the late afternoon or early morning when it is cool. Catfish are carnivorous so their feed is 90 percent meat or other protein sources. These can be ground fresh trash fish, worms, insects, slaughterhouse by-products, chicken entrails, dried or freshwater shrimp, fish from fall, and by-products of canning factories. The remaining 10 percent is composed of boiled broken rice mixed with vegetables or rice bran. Catfish culture requires extremely heavy stocking (50 to 100 fingerlings per square meter) and intensive feeding (90 percent protein). Hito fry supplies are few; thus, those who go into catfish rising depend on natural sources for fry. But technically seeds could be produced artificially.

The catfish industry in the Philippines is growing and is projected to expand in the coming years. This is evident because present production can hardly supply the demands of buyers despite its being hardy and easy to grow (Surtida & Buendia, 2000). For instance, the demand for catfish in Iloilo all year round prompted operators to expand farm areas attributed to the availability of stocking materials due to DA-LGU's continuous fingerling dispersal (PSA, 2017).

Catfish is not among the top ten aquaculture species in the Philippines (BAS, 2002) considering that we have indigenous species. In 2017 it gained 12 thousand metric tons, 7.38% higher than in 2016 (PSA, 2017). Inland municipalities contributed 65.61% of the total catfish production while aquaculture shared 34.39%. (PSA, 2017). Data further showed that catfish production has an increasing trend. Farming is done in the three islands of the country; CALABARZON and Central Luzon in Luzon; Western Visayas in Visayas and North Cotabato and Maguindanao in Mindanao (PSA, 2017).

In region 3, the production of catfish was in an ascending trend for the last three years in Central Luzon with Nueva Ecija and Zambales provinces as growth potentiates. But despite the vigorous growth of the industry, catfish is not among the top aquaculture species in the country providing a significant contribution to revenue earnings.

Catfish Culture

Catfish species can be reared in ponds and tanks. It can be bred naturally whereas

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reproduction has to be induced artificially in other species (Cacot & Hung, 2011). It can also be grown in both intensive and extensive cultural methods (Surtida & Buendia, 2000) The intensive method involves high fish density, artificial food, and running water in a raceway or floating cage whereas extensive conditions use fertilized pond with lower fish stocking density. After harvesting, catfish are sold in the market mostly as live, fillets, whole-dressed fish, and the remaining as steaks, nuggets, and value-added products (USDA, 2018).

In the Philippines, grilled catfish are also sold in the market. The flesh of catfish is preferred since it always presents a non-bony flesh, which is a great advantage when compared to the Cyprinids Consumers appreciate this species very much due to its soft and white flesh and good taste which is associated with its high lipid content (Cacot & Hung, 2011).

Catfish is likewise one of the major freshwater aquaculture species in the world. It has an annual production of about 370,000 tons and contributes 17.5 % to the overall production of freshwater fish culture (Cacot & Hung, 2011). Globally, fifteen catfish species from seven families are consumed for food.

Supply-Demand and Value Chains for Catfish in Nueva Ecija

Results showed two highly observed chains in the Nueva Ecija catfish industry, the formal market chain (Figure 3) and the direct express chain (Figure 4). Both embed the same groups of players, but the identification of the players' roles depends on the engagement of their transactional relations. The differences between the chains lay in the length of the chain which is interpreted as the number of times the commodity lands on a particular player in the chain.

The Chain Players

As found out, there were four important chain players: the catfish farmers, the middlemen, the retailers, and the final consumers. The catfish farmers provide the live fish as a market commodity and are price setters. As found out, there were only two fish farms in the area both of which were located in San Jose City. One started his business by his own efforts and the other inherited it from his parents. The owners invested an average of PHP 2.25 Million for the establishment and maintenance of their fish farms. They claimed that they can sell an average of 50 kg to 110 kg per day up or to 1,500 kg per month depending on the season. A gate price per kg is offered at PHP 100.00 to PHP 140.00 or even up to PHP 150.00 during summer when fish kills could happen. With such sales, they can fetch an average income of PHP 300,000.00 per month. The fish farmers employ an average of 4-6 regular employees and up to 6 additional hands. Their employees have been working with them for an average of 3 years. The farmers were not members of any organizations, have no institutional affiliations, and were not attending training regarding catfish production.

As for the 9 middlemen respondents, they claimed that they were already 9 years on average in the business, and have been continuously doing the job due to the easy work and income they get by acting out as agents of established clients like retailers and final consumers. They claimed that they earn at least PHP 1,200.00 per deal at one to two deals per day considering a mark-up of PHP 10.00 to PHP 30.00 per kilo based on the gate price offered by the producers. They get the orders from the fish farms and bring the live catfish to their customers.

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Freshly harvested fish they claimed were highly saleable.

The market retailers are actually the live fish sellers who are positioned in the city markets and/or act as ambulant vendors. They are investing based on orders and usually get their catfish from the middlemen. The retailers claimed to sell at least 20 to 30 kilos per day and earn from PHP 800.00 to PHP 1,500.00 daily. Most were already in the business for an average of 10 years. They also claimed that they have other sources of income like farming, other blue-collar employments as wage earners, and recipients of OFW remittances.

There were two groups of final consumers: the restaurant owners/grilling (ihaw-ihaw) eateries, stalls, and stands, and the individual consumers/eaters. The restaurant owners and grilling stalls were already in the business for 2 to 22 years and have invested from PHP 60,000.00 up to PHP 200,000.00 for their business. The restaurants serve the catfish dish and price it per serving. The grilling eateries, stalls, and stand owners earn on a per-piece basis in accordance with the size of the fish. The mark-up per piece is from PHP 30.00 to PHP 50.00 each. They employ an average of 2 to 4 helpers, regular salaried and wage earners. On average, they claimed to earn at least PHP 2,500.00 per day depending on the season. The individual consumers who like to eat catfish were more in the younger generations, aged 22 to 45, and claimed that they liked the fish because it tastes delicious, especially when it is fresh. It is likewise affordable and is readily available as an alternative viand, in addition to it going well with drinks.

The N.E. Catfish Chains

The Nueva Ecija Catfish value chains were of two types. The first chain refers to the Formal Market Chain which follows the usual route for the final processed commodity to reach the final consumer. As the catfish is to be changed hands alive, it is needed that the fish reaches the end of the chain at the earliest time. As determined, it takes only about 6 to 8 hours for the live fish to reach the final consumer. This is because the source of supply and the destination of the demand is within the locale of the adjacent cities. In the formal market chain, there are two nodes between the producer and the final consumer, the middlemen and the retailers of live fish.

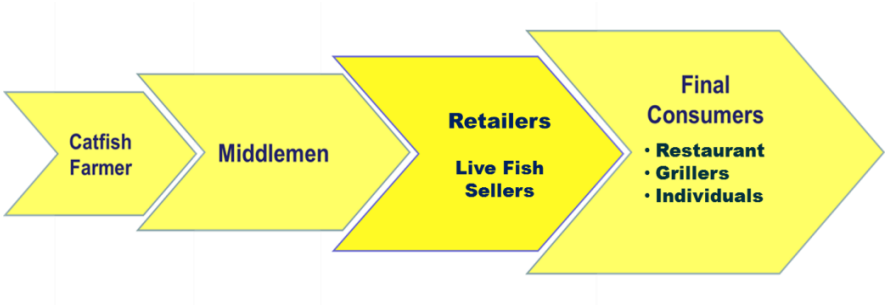

FIGURE 3
FORMAL MARKET CHAIN

The other chain is the Direct Express chain characterized by all the other players in the formal chain going directly to the fish farmer and obtaining the commodity for their own business purposes or final consumption. This is the shortest because the direct linkage between

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the supply source and the demand entities is forged without any nodes in between.

FIGURE 4
DIRECT "EXPRESS" CHAIN

INDUSTRY SITUATION

Strategic Partnership of Players

A business cannot stand alone such that it must be characterized by a strategic partnership (Sheth & Parvatiyar, 1995; Spekman et al., 2000). A strategic partnership describes the collaborative efforts between two or more firms that pool their resources in an effort to achieve mutually compatible goals that they could not achieve easily alone (Hunt et al., 2002; Egan, 2007). It is an inter-firm cooperative agreement aimed at achieving a competitive advantage for the partners (Elmuti et al., 2005). A partnership is an umbrella expression used for linkage, interaction, collaboration, cooperation, and alliance (Snyder, 1997), each of which represents a specific form of relationship characterized by the creation of a separate entity having a distinct mission, strategy, and policy (Taylor, 2005).

A strategic partnership underlines the importance of making decisions that will ensure the organization's ability to successfully respond to the changing circumstances in the long run (Wheelen & Hungar, 2000). Future-oriented partnerships must be trusting and interactive (Bryceson, 2004), enabling the diffusion of creativity, ideas, skills, and people with the aim of creating mutual value for both the partners over a long period of time (Plewa & Quester, 2006). This connotes that both the entities must stay abreast of rapid changes in a holistic manner with long-term perspectives to enable them to make the best decisions in particular circumstances.

When entrepreneurs such as buyers and suppliers interact in a coordinated arrangement, the resultant chain is usually viewed as a competitive unit with a management philosophy defined by supply management orientation anchored on the values of strategic partnership. Such orientation has long been characterized by scholars with long and extended planning horizons because participants in the entrepreneurial chain expect continuous partnering relationships through time (Heide, 1994; Coughlan et al., 2001).

Supply-demand parallelism provides the impression of the role of a chain player as a consumer and then supplier at an end-to-end role in a node. Such that, like the middleman, at one end, acts as the consumer initially of the previous player (catfish farmer), and then later, as the supplier for the next player (retailer). The parallelism is measured through the compatibility of successive players as consumers of the previous player and suppliers of the next player.

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The behavioral partnership is shown through strategic partnership feedback, communications, customer-client relations, and intervening factors. The behavioral partnership of the catfish players in Nueva Ecija is shown in Table 1. The overall partnership relationship statistically manifests an average of 2.67, which is seldom to sometimes. Although there were only a few players in the chain, they claimed that their interactions were highly limited to the sales transactions and that they do not need to keep it extensive. Likewise, they were not getting further into their customer relations in terms of the business side because they consider their market stable with supplies being always available and prices unwavering. It can be determined then that the behavioral partnership of the players is not that strong although, as claimed, there is much familiarity amongst them.

Table 1
BEHAVIORAL PARTNERSHIP IN SUPPLY-DEMAND PARALLELISM

Chain Players/ Strategic Partnership Relations	Catfish Farmer	Middleman		Retailer		Final Consumer	Average
	Supply	Demand	Supply	Demand	Supply	Demand	
Feedbacks	2.39		2.44		2.53		**2.45**
Communication	3.00		3.03		3.03		**3.05**
Customer-Client Relations	2.62		2.62		2.95		**2.7**2
Intervening Factors	2.35		2.46		2.60		**2.47**
Overall Average							**2.6725**

Categorical Scale: 1–Never 2–Seldom 3–Sometimes 4-Very Often 5 -Always

Coordination

Coordination is demonstrated through communications and feedback. The in-between communications of the players were described as sometimes, thus, only when sales transactions are undertaken. They only do their business communications through the cell phone when loads and through the internet when connections are available. Because their transactions need to be on a face-to-face basis, direct and personal communications are pursued more frequently but only when needed and on an occasional basis. The Face-to-Face (F2F) personal communication is considered vital for the players due to catfish supply needs for delivery to specific customers. Thus, it was determined that it is likely that the clients do the contacts rather than the suppliers.

The feedback among players was also likewise described as seldom because they are not used to giving suggestions, comments, and criticisms. The respondents claimed that there was no need to provide feedback because they felt that their business partners knew better than them and are already knowledgeable about the business as they were already engaged in the trade for a long time. They claimed, however, that the customers/consumers, in general, praise the fish for being plump and savory. Customers are likewise prone to repeat buying. It was claimed too that due to lack of feedback they did not have the incentives to join organizations.

Complementation

The complementation of the players was indicated through good customer relations

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(vendor-client) and the identification and provision of solutions to the intervening factors. Customer relations were described as statistically low at 2.72 (Table 1) because the players do not need to exert too much effort to engage because most reside within the area, thus, making it easy for them to trust each other, communicate and cooperate when there are issues and other intervening factors that are to be undertaken. Some of their valued clients come from other towns and provinces and even from abroad. New customers learn about the respondents through word of mouth.

The identified intervening factors in their sales relations were the weather, especially during typhoons, transportation, choosy customers, available sturdy containers, and sometimes calendar seasons and occasions like Christmas, Lent and fiestas, and summer holidays. During these times demand suddenly shoots up. Lean months also affect the sales of the suppliers. One factor which was specifically mentioned was the role of the barangay and/or city government in terms of regulations and fee collection for doing business. They however claimed that they have not received any new information about the catfish industry through barangay coordination and other agencies.

Transactional Business Process Management (BPM) of Players

A BPM commonly represents and describes a sequence of activities. It typically shows events, actions, and links or connection points, in a sequence from end to end. The sequence is significant and essential to most aspects of business process modeling, but there are exceptions to this especially at the higher level of organizational operations (Mcdonald & Dunbar, 2004). These management innovations are expressed in terms of what is done, when, and for what reasons, especially when different possibilities or options exist, as in a flow diagram (Owen & Raj, 2003).

The final output of BPM is improvement in the way the business process works and enhancements on the "*value-added*" features and actions that make the customer service and experience better (Coe, 2003). There are two main different types of BPM: the "*As Is*" or baseline model (the current situation), and the "To Be" model (the intended new situation) which are used to analyze, test, implement and improve the process. The aim of modeling is to innovate and illustrate a complete process, enabling managers, consultants, and staff to improve the flow and streamline the process. The outcomes of a business process modelling are essentially value for the customer and reduced costs for the company, leading to increased profits (Ghosal et al., 2007).

BPM enables businesses to respond to changing consumer, market, and regulatory demands faster than competitors, thus, creating a competitive advantage (Fink & Holden, 2005). The role of the enterprise is to select the best suppliers, negotiate beneficial relationships, and then work with the systems people to help design BPM. Once the relationships are in place, strategic issues are resolved to bring about improved services, reduced costs, empowered end-users, and increased compliance with respect to the relationship with preferred suppliers (Fawcett, 2005).

The transactional business process management of the chain players is depicted in terms of operations, production, marketing, financial, and intermediary factors (Table 2). Overall, the statistical categorical results of the chain's BPM averaged 2.70 indicating that seldom do the

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players are concerned with the aspects of business process management. Further, data indicated that the players are more concerned about their own particular processes like production and financial aspects. They are however more concerned about the intermediary factors because they believed that it affects their production and selling activities more than any of the other factors because they feel that these aspects can be their source of support, protection and information needs.

Table 2
TRANSACTIONAL BUSINESS PROCESS MANAGEMENT DELINEATION

Business Process Management	Categorical Scale
Operations	2.72
Production	3.26
Marketing	2.21
Financial	2.03
Intermediary	3.29
Overall Average	2.702

Categorical Scale: 1 – Never 2 – Seldom 3 – Sometimes - 4 - Very Often- 5 - Always

Operations Management

The operations management of the players averaged at 2.72 (Table 3) indicating that it is seldom that they focus much on it. As to order receipts and fulfillment of orders, they claimed that most often customers require fish quality in terms of size and/or number of fish per kilo and advance orders in terms of number of kilograms. The orders were always provided accordingly, but there were also a few walk-in customers whose orders were not fulfilled. Inventory management was easy because all catfish sold are alive and classified at the farm level. Containers were sometimes lacking due to the influx of more orders. Production resource care focused on the fishponds for the fish farmers, the containers for the middlemen, fish market stalls and containers for the retailers, tanks, and freezers for the final consumers referring to the restaurants and grilling stands and stations. All of the respondents claimed that they maintain the cleanliness of their inventory resources and that they make sure that the catfish stay fresh. Quality control focuses mostly on the size of fish and cooking procedures.

Table 3
OPERATIONS MANAGEMENT DEPICTION

Operations Management	Categorical Scale
Order Receipts and Fulfilment	2.76
Inventory Management	3.14
Production Resource Care	3.63
Operations Assistance & Technical Support	1.00
Employment Management	3.08
Overall Average	2.722

Categorical Scale: 1 – Never 2 – Seldom 3 – Sometimes 4 - Very Often 5 - Always

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Production Management

Production management averaged about 3.27 which indicated that the players were concerned about this aspect. It is interesting that taken separately the players do their quality control, handling, and processing thoroughly as they would like to retain their standards too (Table 4). The quality control and certification of the sold processed catfish by the restaurants and grilling stalls/stands like grilled, fried, sinigang, etc. are done with accordance to the correct process, recipes, health standards, and requirements asked by the City Health Offices. The respondents claimed that they always make sure that they sell and process live catfish as dead ones ensue a different taste.

Table 4
PRODUCTION MANAGEMENT DEPICTION

Production Management	Categorical Scale
Quality Control & Certification	3.44
Handling and Processing	3.09
Overall Average	3.265

Categorical Scale: 1 – Never 2 – Seldom 3 – Sometimes 4 - Very Often 5 - Always

Marketing Management

The result of the parallelism of the players in terms of marketing management is 2.21 (Table 5), indicating that seldom do they focus on this factor. For them, packaging and labeling are considered as never an issue to contend with because they have no brands to consider and the live fish do not need to be highly marketed in packages with particular labels. They likewise do not advertise because buyers go to them and sales happen more based on word of mouth. Yet, they still experience market fluctuations like changes in demand and price. As to transport, delivery, and distribution, only the middlemen are concerned with it because they are the ones who go to the fish farms to get supplies and deliver them to the retailers. They claimed to have not experienced delivery returns because they provide the pre-orders on time and accordingly as asked. Competition is experienced more by those at the end of the chain, the owners of restaurants, grilled stands, and even the final consumers. This is so because there are already numerous restaurants and grilling stalls offering cooked catfish and the food has already gained popularity amongst gourmet and exotic eaters. Cooked catfish customers often make repeat buying because they consider the food delicious, affordable, and always available.

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Table 5 MARKETING MANAGEMENT DEPICTION	
Marketing Management	**Categorical Scale**
Packaging and Labelling	1.00
Sales	2.64
Transport, Delivery and Distribution	2.65
Delivery Returns	1.00
Market and Competition	3.15
Feedback After Sales	2.83
Overall Average	2.212

Categorical Scale: 1 – Never 2 – Seldom 3 – Sometimes 4 - Very Often 5 - Always

Financial Management

The financial management of the players is statistically depicted at 2.03 (Table 6) indicating that they seldom focus too much on billing, payments, and other costs related to their business. That is because, as claimed, payments are given as cash on delivery, no credit extension policy, and advance payment for farm orders are practiced in cash and in check payments. As to tax obligations, the fish farmers, restaurant owners, and market stall vendors claimed that all their taxes and city obligations were being paid on time, thus they do not encounter problems with financial obligations.

Table 6 FINANCIAL MANAGEMENT DEPICTION	
Financial Management	**Categorical Scale**
Billing and Payments	2.00
Other Costs	2.06
Overall Avarage	2.03

Categorical Scale: 1 – Never 2 – Seldom 3 – Sometimes 4 - Very Often 5 - Always

Intermediary Factors

The respondents considered the local government units and barangays where they belong, calendar seasons and occasions, overall market condition, weather, information, and associations as factors they are more concerned with. The LGUs and the barangay units are instrumental in the continuance of their regular marketing activities because they provide the passage permits for the transport and delivery of the fish in addition to the control of officials permits, taxes, health permits, and other market policies. Occasions command the demand for the commodity while weather dictates the supply. On both factors, the players adjust and sometimes experience market imbalances, especially in sales. As to the continuance of the chain, all players considered that there is a need for a unifying unit such as an association that will provide needed information about the catfish industry and likewise training for the improvement of the commodity.

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Connectivity of Chain Players

Low Connectivity

The low connectivity of players can be described based on the areas in which there were statistically low results. In the strategic partnership areas, the lack of feedback provided by the players for each other is low because they are not concerned with so many customer requirements to inform the suppliers. In operations, management assistantship and technical support also manifested low connectivity because the players on the demand side were not actually concerned regarding the production of the supplies needed from the catfish farms. In Marketing, there is no connectivity to packaging because there was no need for it. Delivery returns do not happen because all supplies were received accordingly.

High Connectivity

Results indicated high connectivities in strategic partnerships due to good communications. There were likewise good connectivities in the specific business process management practices. In operations, production resource care which refers to the processing of finished commodities for consumption has high connectivity because the suppliers provide the goods in accordance with the specifications of the consumers. In production, quality control, handling, and processing are given importance by all of the players because the commodity needs to conform to the demands of the consumers. In marketing, the connectivity is in competition because the players need to have knowledge of how their competitors work in the small catfish market of the area.

Value Chain Performance of the Catfish Industry

The initiatives to improve the plight of any sector are seen in the expansion of small-hold enterprises that have established their market networks. These enterprises are regarded as ground structures that can support the further development of the industry. The same enterprises represent the individual producers who are the start-ups realizing the minimal gains from the business. Eventually, it is the financial gains, no matter how small, and other socio-economic benefits that make the players remain in the industry.

The economic importance of intermediaries, like the government and other industry players, is seen in the roles they play in price setting, market clearing, providing liquidity and immediacy, coordinating of buyers and sellers, guaranteeing product quality, and monitoring performance (Spulber, 1996). The middlemen who act as the buyers or suppliers can accelerate the search process and facilitate the matching process of entrepreneurial partners, thereby eliminating the time-consuming series of pairwise meetings (Rubinstein & Wolinsky, 1987).

The breakdown of the strategic partnership relations is shown in Table 7. The operations management shows differentiation in particular areas. Commodity procurement from the fish farms up to final consumers' delivery shows different time lags indicating however that the chain continuity goes from 1 day to 3 days. States of inventories differ from live and fresh catfish sourced from the fish farm to being cleaned by the retailers and cooked or grilled for the final

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consumers who eat catfish. Inventory management likewise differs if referring to the commodity, but all are the same in terms of the maintenance of sanitation and hygiene regarding the materials and measurement devices. All of the players practice fish size classification. The marketing system of the chain indicates differences in the players' roles whether as a supplier or a consumer. In terms of financial returns, the mark-up of the retailers and the food processors ranged from 30% per kg to 50% per fish based on the procurement price. The unit of sales also ranged from per kg to per piece.

Table 7
CATFISH VALUE CHAIN BREAKDOWN

Factors of Strategic Partnership Relations and Business Process Management	**Catfish Farmer**	**Middleman**		**Retailer Seller Ihaw-Ihaw/Restaurants**		**Final Consumer**
	Supply	**Demand**	**Supply**	**Demand**	**Supply**	**Demand**
Operations						
Employees	4 - 6		2 - 4		2 for restaurants/stalls eateries	
Inventory Time Lag	1- 3 months		1 – 2 days		daily, as desired	
Operations/Processes	anytime		daytime		afternoon to night	
Inventory State	Freshly harvested live weight		live weight, cleaned		Freshly grilled, fried or cooked	
Inventory Management	feeding, classifying, disease control		tanking; refrigeration		freshly cooked, refrigeration	
Marketing						
Customer size requirements	Small: 6-7 fishes/ kilo Medium: 4-5 fishes/kilo Large: 2-3 fishes /kilo		depends on orders		as desired	
Place	Fish farm		Wet market		stalls, restaurants	
Packaging/handling materials	pails, tub, drum		bags, pails		Foil, banana leaves	
Customers	long-time, regular clients		long-time clients; established restaurants		long-time clients; new clients	
Market Responsiveness	inelastic		Moderately elastic		elastic	
Requirements	freshly harvested		live		freshly cooked, cleanly processed,	
Delivery process	on farm selling		market stall selling, delivered to customer		goes to the stall/restaurants	
Sold/consumed per day	80 -110 kilos per farm		15 -25 kilos per middleman		15-40 pieces per food processor (restaurants, etc.)	
Financial						
Price	PHP 100.00-140.00 per kilo		PHP 10.00 - 30.00 mark up per kilo		PHP 80.00 -120.00 per piece	
Unit of Sales	3-5 fishes per kilo		3-5 fishes per kilo		per piece	

Areas for Improvement

It was found that the highly identified area for improvement referred to the role of the barangay in terms of security and associations for organizational purposes. Based on the

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transactional aspect, the feedback mechanism among the players was very weak. Considering that there were only 2 commercial fish in the area, it was easy to monopolize the supply. However, they cannot influence the price because the catfish retail market in the area is highly competitive.

Consequent Nueva Ecija Supply-Demand Framework

Based on the results of the survey, it was revealed that the supply sector is only composed of the small hold farmers and commercial growers and the demand sector comprises the middlemen of the live fish sellers, the restaurant owners, grillers, and the final direct consumers (Figure 5). It can be deduced that the chain is quite short but has variety in the exchanges of the players. What makes the chain highly volatile is that once a player discontinues its role, the chain will ultimately be broken because the components of the chain are close-knit and no outsiders act as additional players. Findings likewise revealed that the overall connectivity of the players in terms of strategic partnership and transactional practices manifested low statistical results and thus described as weak.

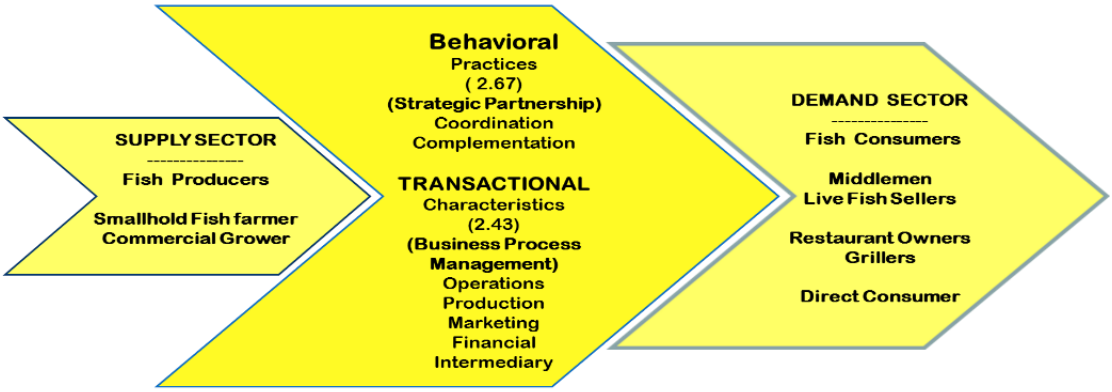

FIGURE 5
SUPPLY-DEMAND AND VALUE CHAIN OF NUEVA ECIJA CATFISH INDUSTRY

CONCLUSION

In conclusion, the catfish industry in the two northern cities of Nueva Ecija is highly contiguous only within the area as no outside players were found. There were two short chains that were determined, the direct express chain and the single node chain. Both of the chains comprise the same players and only differ in the positioning of the market connecting nodes. The areas of improvement were on strategic and transactional partnerships, particularly in financial management, feedback, and technical support. Overall, the efficiency of the chain is low, while its flexibility and market responsiveness are high. The chain highly needs institutional back-ups particularly, from the local barangay units and national fishery divisions and institutions doing research and extensions on like freshwater aquaculture.

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Based on the results of the study, it was found that there was an actual lack of policy positions in the local government where the chain belongs and linkages from government institutions in charge with the technical assistantships and advice for the improvement of the sector. Thus, it is highly recommended that linkages with experts in the field of catfish culture and business management be established through the creation of extension and further research activities in the areas of post-harvest management, and commodity market development. This could be made possible with the support coming from the local city government offices and national institutions.

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