Fish Chain Performance in Madrid Market: An Empirical Analysis

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Abstract

Food chain analysis is becoming a useful instrument to increase efficiency. We focus the attention in the fish sector looking at the links from consumer to wholesalers in the region of Madrid. In order to get adequate information we developed face to face enquiries to the consumers, retailers and wholesalers. The analysis of the Madrid market give us a useful approach of the national and international sector, due to the fact that Mercamadrid is the biggest fish wholesale market in Europe, and the consumption in Madrid is representative in many ways of the Spanish market. Finally there are some conclusions and recommendations oriented toward the stakeholders.

Keywords: Fish, food chain, performance, competition.

1. Introduction

The importance of fish products in the Spanish food sector, and the increasing attention as a basic element in a healthy diet, are some of the clues for the analysis from wholesalers to consumers.

Food scandals in the last decade had a negative influence in consumer attitude; therefore the marketing chain has to provide adequate elements for the traceability and quality control. Another item of interest is to identify the main factors that may influence the socio-economic efficiency of the stakeholders involved in the marketing process.

With those basic ideas, we focused our research in the area of Madrid. Madrid is the central logistic fish market in Spain due to the geographical situation and the competitiveness and efficiency of its wholesale market, Mercamadrid. Beside the high fresh fish consumption in Madrid, there is a great concentration of the supply and acts as a distribution centre. Also there is a very strong fish industry oriented toward can, frozen and elaborated fish products. Therefore, in spite or its continental situation, with not any harbour around, Madrid is a very important region on Spanish fish sector.

Due to the socio-economic importance of this sector, the Regional Administration of Madrid sponsored a research project, what allowed the authors to leader a group in order to get primary information. This paper is based on a research project sponsored by the Regional Government of Madrid in 2001(number P220405), and developed at the Polytechnic University of Madrid by the authors with some collaborators.

2. Methodology

Marketing chain analysis is a key instrument for an adequate understanding of the food sectors. During last years many authors have focused interesting research works on this area looking for a framework of comparative analysis (Omta SW, et al. 2001)

Along the food chain, and according Network Theory (Omta SW et al. 2002) actors can be distinguished either at the micro level (firms, institutions, government agencies). This focus is quite useful in our case where there is a mixture of activities at micro and meso-levels and where solutions came from the coordination of all of them.

In a very simple way, food chain includes all the socio-economic activities involved along the chain value from producer to final consumers. Looking at the fresh fish sector, very perishable and a great competition from inside and outside the chain, the efficiency should include the organization management logistic and marketing strategies.

Due to the heterogeneous structure of the enterprises involved in the fresh fish chain the capacity to follow some of the recommended activities to increase their efficiency change very much.

Food chain performance in relation to quality and food safety has a broader horizon that individual enterprises behaviour. (M Garcia et al. 2003). Along the chain there are services, information exchange and products moving along the stockholders. All of them are focused to satisfy consumers' demand. However consumers´ preferences are tailored by several exogenous elements such as : physical characteristics (such as perishability, what is very important in fresh fish) economic dimensions and market organisation (very significant in our case, such as wholesale market and retail distribution) cultural and habits in enterprises and consumer behaviour (Madrid is one area with great tradition on this sector, and high consumption)

One of the aims of this work has been to study the relationship between the firms collaborating in the up and down chain, looking the future activities evolution. In that scenario there are several dimensions to consider: the innovation, the institutional framework and the behaviour. (De Felipe I. 2003).

Innovation is one of the horizons with firms' integration with the use of Information and Communication Technologies, such as B2B and auction e-markets.

The institutional dimensions describe the relationship between the institutions and professional organizations along the links. It is very important to get coordination among fishermen, wholesaler and retailer organization with the national and regional institutions.

Behaviour is another important item, but sometimes difficult to evaluate and get adequate information.

The analysis of the value chain performance has two main steps: the diagnostic of the problems and the therapy, how to resolve them with the resources available.

In the first phase, we should identify where the action is taken (economic, geographic, markets).

In our case we focus in the links from the wholesaler to the consumer in the region of Madrid. Some of the reasons for developing the research on this area where the socio-economic importance of the Madrid Fish Wholesale market, the more important of Europe, the high consumption per capita, the importance of the firm transformer sector, and the fact that Madrid market is the crossroad and test market for fish food in Spain.

The users of the study results are the institutions, mainly the Regional Administration of Madrid that sponsored the research project, the professional organizations and the consumers. The methodology applied is related to the chain network, describing the main stakeholders.

Besides the secondary data, it has been developed several surveys at wholesalers, retailers and consumers, getting in that way actual and primary information from those links. A SWOT matrix has been carried out in order to identify the main aspects. However, we understand that although the SWOT do not give weight of the factors that may influence the performance, we are able to see how the different elements contribute to the competition and establish the conditions for the future evolution and their behaviour.

Finally in the last step, there are conclusions and recommendations in order to resolve the main problems identified and increase the efficiency of the system. Among the possibilities and measures to be taken, we may consider those related to economic and regulatory policies, food safety, quality control and traceability, marketing mix strategies, management control, costumer relation management and others.

3. Empirical analysis

Following the fish chain performance, the first step was to study the primary demand through the consumer's attitude, after we analyse the retail sector and later the wholesalers. In all of them we carried on face-to-face interviews, giving us useful information about the situation (Briz et al. 2001)

3.1 Consumer's analysis

Related to fish consumption, the attitudes toward fish in Spain have changed in the last few decades. One reason for this could be that it is considered to be a healthy alternative to meat consumption. According to this view, scandals related to meat, like bovine spongiform encephalopathy (BSE), dioxins, foot and mouth disease, have changed consumers' attitude towards buying and consuming meat. However, this increase in fish consumption could not have been possible without an improvement in the logistic sector and also adequate traceability. Recently there are some news about the potential toxicity of salmon cultivated in fish factories. This chapter carries out an economic investigation based on the evolution of price and volume to clarify how different factors have modified the economic importance of fish within the food sector.

Frozen fish is not very popular in Madrid. Its consumption is below the national average. The species more consumed in 1999 were, hake and young hake, accounting for 47% of total frozen fish consumption (MAPA, 2000).

Canned fish consumption was 14,083 tones in 1999, which represents 12% of total fish consumption. Almost 50% of the canned fish is tuna or northern bonito. Moreover, canned sardines and mussels account for 12% and 8% of total canned fish consumption respectively (MAPA, 2000).

As in the rest of the country, most of the shellfish consumed is fresh. According to MAPA, 2000, the total amount consumed in 1999 was 27,428 tones, an increase of 17% with respect to the previous year. Shrimp and prawn are the most popular varieties, accounting for 28% of the total.

A frequent assumption is that the main factor responsible for consumers' acceptance or rejection of fish is their attitude towards the price, flavour and texture of the product itself. However, it is worth taking into consideration other variables such as demographic variables and socio-economic status. This sub-section attempts an exploratory investigation of the ways in which fish consumption is determined.

Despite the fact that food consumption has changed sharply, governments and retailers have promoted healthy eating for more than three decades. Among other things, these campaigns were focused on specific fish or products, disregarding to the country of origin, and were aimed primarily at increasing consumption.

MAPA (1998) gives a breakdown of the geographical and socio-economic status for fish consumption. Fish consumption is always higher in those households located in urban areas which have between 100,000 and 500,000 people. Those cities reach a value of 24.36 kg per capita per year, which is 1.175 kilos above the national value. On the other hand, towns where between 2,000 and 10,000 citizens live have the lowest consumption, 20.09 kg per capita. It should be mentioned that those values do not represent total fish consumption since they do not take into account the institutional and catering services consumptions. Moreover, the size and population of the city/town do not affect shellfish consumption.

With respect to the size of the household, it is not surprising that the smaller the household, the higher the fish consumption. Among other reasons, fish dishes require time to prepare them. Per capita consumption is higher than average in those households with less than four members.

Table 1: Fish consumption according the economic status of the household. (kg per person per year)

	Socio-economic status			
	Low	Medium/low	Medium	High
Fresh fish	14.33	11.23	10.51	10.65
Frozen fish	3.56	2.82	2.42	2.49
Canned fish	2.93	2.97	3.22	3.08
Seafood	5.59	5.22	5.47	5.92
Total	26.41	22.24	21.62	22.13

Source: MAPA, 1998

The quantitative research consisted of 519 face-to-face interviews carried out in the city centre and suburbs of Madrid. Each enumerator was given approximate quotas for what were considered to be the key socio-economic characteristics of respondents: age, gender and socio-economic group. The quantitative analysis is divided into two different sub sections. The first one refers to fresh fish and the second one to frozen fish.

The objectives of the consumers' survey were twofold:

- To identify differences in consumers' attitudes and perceptions regarding product attributes of fresh fish species.

- To establish further evidence regarding the eating frequency of fresh and frozen fish as an influential factor of the selection of the place to buy it.

Table 2: Importance rating of fish attributes (1=not at all important, 6=very important)

	Mean	Mode	Std dev
More nutritive food	4,58	6	1,89
Good taste	4,29	6	1,67
Good appearance	3,33	4	1,52
Traditional reasons	2,82	2	1,75
Good smell	2,55	3	1,43
Other reasons	1,93	1	1,86

- Nutritional value and taste were considered very important by 35.4% and 37.6% of respondents respectively.
- Good appearance was regarded as a very important factor by 20% of participant and not at all important by 5.1% of them.
- With respect to the smell and traditional reasons, they were not ranked as primary factors.
- In addition, respondents were asked to rank their preferences regarding different types of fish, including: (1) hake and young hake, (2) sardines, (3) trout, (4) salmon, (5) swordfish, (6) sole, (7) codfish and (8) others. Table 3 describes the results obtained.

Table 3: Popularity of fresh fish species (1=the last option, 8=the preferred option)

	Mean	Mode	Std dev
Hake and young hake	6,32	8	2,39
Sardines	5,00	7	2,36
Sole	4,79	7	2,25
Salmon	4,00	4	2,29
Trout	3,76	4	2,31
Swordfish	3,75	2	2,62
Codfish	3,55	2	2,20
Others	2,87	1	2,65

- Hake and young hake are the preferred species in almost 49% of the cases. This value is slightly higher than the one obtained by MAPA (2000), which states that hake and young hake accounts for 28% of the total fresh fish consumption. However, it is worth remembering that the value obtained in the survey refers to preferences, not to true consumption.
- Only 11.4% of respondents chose sardines as their first option; however, 22.5% ranked it as second option.
- Dover sole had a good acceptance among respondents; 9.1% ranked it in the first place and 18.4% in the second position.
- Trout, salmon, swordfish and codfish had a very similar acceptance; they were rarely ranked as the first option.
- At 7.7% level of significance, the survey confirmed that those who eat fresh fish two or three times per week prefer to buy it at the fishmonger or at the supermarket.
- Also, those participants who eat fresh fish once a week, once a month or on special occasions do not have any preferences regarding the purchasing place.
- Finally, there is evidence to suggest that there is dependence between buying fresh fish at the hypermarket and eating it less than once a month.
- At 5% level of significance, there is strong evidence to suggest that eating frozen fish two or three times per week is not independent of choosing the hypermarkets as the preferred place. However, only 3.2% of respondents do it.

- For those who eat frozen fish once a week there is strong evidence to suggest that eating it once a week is independent of the purchasing place.
- Finally, eating frozen fish less than once a month is not independent from shopping at the hypermarket.

The research confirmed that respondents connected positive attributes of fresh fish to the species itself. Taste and nutritional value were found to be the most appreciated attributes and the main factors influencing the purchase of the species considered.

In addition, the analysis suggested dependence relationship between eating frequency of fresh and frozen fish and the preferred place to buy it. Likewise, those who eat fresh fish on a regular basis regard fishmongers and supermarkets as the best place to shop. On the other hand, hypermarkets are regarded as the best place to shop by light fresh fish users. With respect to frozen fish, eating frequency was very low; however, hypermarkets were the preferred place to buy frozen fish.

3.2 Retail sector analysis

The retail food system has experienced deep and rapid structural changes over the last two decades in all European countries. Nowadays, the competition between retailers is getting more and more intense since low profitability, insufficient financial structure of retailers, and food market saturation make competition hard. In addition, frequent buying up between retailers has led to concentration, with huge retail firms emerging, wielding massive buying power.

For at least one and a half decades Spanish governments have encouraged the development of hypermarkets and supermarkets. The aim has been twofold. First, they used the development of self-service chains as an instrument to lower real food prices, and, second, they favoured mutual development of the food manufacturing industry and supermarkets and hypermarkets. Hence, self-service chains have made possible the modernization of food manufacturing. As a result, the industrialization of the food manufacturing process has enabled manufacturers to meet the rising retailers demands.

Accordingly, modern food retailing systems have been introduced in Spain. In ten years, the total number of traditional shops has decreased by 40% while hypermarkets have increased by 170%. Hence, food purchases in traditional shops shifted from 42% of total food volume in 1990 to 24% in 1997. In the same period of time, supermarkets and hypermarkets share increased from 25.9% and 5.8% to 36% and 31% respectively.

It should be added that both hypermarkets and supermarkets follow new marketing approaches different to the traditional ones. The objective of gaining market share is achieved by adopting the following strategies: 1) by developing aggressive marketing campaigns, 2) lowering prices and 3) offering own label products.

While only 24% of national food sales take place at small stand-alone establishments, in the fish and fish products sector the situation is somehow different. According to MAPA, in the metropolis of Madrid during 1998 the total volume of fish and fish products bought at fishmongers accounted for 65% of total volume, while supermarkets and hypermarkets accounted for shares of 20% and 10% respectively (MAPA, 2000).

There are around 500 independent retail fishmongers in Madrid distributed within 54 marketplaces (21 of them are “district marketplaces”, 28 are inside shopping centers and 5 are private markets) and several independent shops. Of particular interest is the evidence that the retail sector for fish has not adopted the global trend of losing market share in favour of supermarkets or hypermarkets. In this respect, the main reasons why consumers prefer to buy fish at the fishmonger deserve to be highlighted:

- High quality of the product.
- Good quality/price rate.
- Variety of products.
- High level of professionalism. People feel like they can rely on the advice the fishmonger gives.
- The fact that people appreciate the human treat received at the shop and they feel comfortable at the marketplace.
- Good appearance of the raw material.
- The marketplace is very convenient in terms of location.

- Traditional reasons and loyalty play a very important role. Housewives and old people tend to rely on the same fishmonger for a long time.

Fishmongers account for more than two thirds of the total volume of fish and fish products sold in Madrid, and are therefore the key players within the retail sector for fish. Nevertheless, endogenous and exogenous economic, demographic and lifestyle changes are affecting the performance of the sector. In this respect, it there has been observed a reduction of their market share by 3% since 1997 in favour of supermarkets and hypermarkets. On the other hand, there are opportunities and strengths the sector can take advantage of in order to maintain, or even increase, its market share.

The following SWOT matrix gives a clear brake down of the fishmonger sector in Madrid.(Viña 2001)

Table 4: SWOT matrix for the fishmonger sub sector in Madrid.

Strengths (endogenous factors)	**Weaknesses (endogenous factors)**
- Direct relationship between fishmonger and consumer, offering the former advices in terms of species of fish, recipes, freshness … - Development of loyalty feeling from the consumer. - Higher adaptation capacity due to a smaller organisation pattern. - The fishmonger has total control over his/her business.	- The market share tends to decrease. - Price is slightly higher and therefore, it is considered as a negative attribute. - Dependence on the municipal administration to offer certain services such as parking facilities, security, cleaning service, etc. - Incorporation of new technologies on the methods of payments or control of stocks. - Low managerial skills to run a business. - More often than not, fishmongers are not organised in associations or cooperatives. - Low investment in advertising and publicity.
Opportunities (exogenous factors)	**Threats (exogenous factors)**
- Increasing demand for healthy food as an attempt to recover the Mediterranean diet. - Very convenient for specific segments such as old people, students and housewives not working outdoors. - There is an increasing rejection towards new retailer structures (specially hypermarkets). - Consumers prefer to buy perishable products at the traditional shop. - Positive attitudes of the society to protect the traditional style of fishmongers. - High level of specialisation. - High professionalism level. - Possibility to identify the customer who is most profitable. - -	- Reduction of the share of total expenditure dedicated to food. - Due to a lack of time to do frequent shopping there is an ongoing trend to do a big shopping once a week or every two weeks. The car is essential for such a way of shopping and most of the times fishmongers cannot afford to offer parking facilities. - The price is becoming more and more important for consumers. Big retailers' chains take advantage of their purchasing power. - Development of new distribution approaches which are more concerned about consumers needs.

The quantitative research took the form of 272 face-to-face surveys focused on fishmongers operating in Madrid.

The objectives of the retailer survey were twofold:

- To identify those factors which determine the selection of supplier.
- To reveal fishmongers' attitudes towards the performance of the fish retail sector.

Respondents were asked to select the most appreciated attribute of their supplier and, consequently, the reason for their choice. These attributes referred to the ways in which the service was provided and whether the product offered by the supplier satisfied the fishmongers' expectations. Participants were requested to rank the following attributes: (1) tradition (has been serving for many years), (2) quality of the product, (3) port of origin of the fish and (4) price of the product. The results obtained are reported below:

Table 5: Importance rating of supplier's attributes (Importance on a scale from 1 to 4, where 4 is very important)(Viña 2001)

	Mean	Mode	Std dev
Quality	3.16	4	1.24
Price	2.52	3	1.10
Origin of the fish	2.39	2	0.87
Has served for many years	2.02	1	1.13

- Not surprisingly, quality of the product supplied was considered to be the most appreciated characteristic by 57.8% of respondents.
- Almost 21% of the fishmongers surveyed chose suppliers because of the price their supplier offered to them.
- For 14.5% of respondents, the reliability on the present supplier is the most important issue. They believe that long-term economic relationships guarantee quality and good service.
- Finally, only 7% selected them because of the origin of the fish.

In terms of the fish-retailing sector, the market share acquired by the fishmongers sector has remained almost the same over the last two decades. Several reasons for such circumstances have been pointed out in the present chapter; however, above all, it is essential to highlight that the main reason can be said to be consumers' positive attitudes towards fishmongers. In other words, consumers rely on the traditional fishmonger more than on any other retailer. Nevertheless, other factors like location and convenience of the marketplace, as well as quality, are seen as important factors too.

3.3 Wholesaler sector analysis

Madrid, the capital of the country, plays a strategic role within the distribution and commercial chain. At present, the biggest wholesaler of fish in Europe is located in Madrid; its name is Mercamadrid. It should be pointed out that in 1999, it accounted by itself for almost one third of the total volume of fish and fish products traded in the wholesaler sector in Spain (Mercasa, 2001). Nowadays, 169 fish wholesalers operate in it -the full list is shown in Appendix Six. This food distribution centre constitutes a important centre of logistic services and commercial wholesale distribution both for local and national consumption and the international market

With respect to the precedence of the merchandise, it should be stressed that Spain is a heavy importer of fish and fish products (OECD, 2000). According to Mercamadrid, (2000), the main international suppliers outside the EU are Chile, South Africa, and Morocco, although the increment of fish and fish products coming from other EU countries is significant. In terms of volume, in the year 2000, Mercamadrid imported 31.93% of the total volume traded; 12.5% came from non-European countries and 19.5% from EU members. In fact, France accounted for 5.88%, Italy for 4.83%, Denmark for 2.91% and the UK for 2.3%. In addition to this, within the Spanish provinces, Galicia provided the highest volume of fish to the wholesale market, accounting for 21.33% of the total volume.

Like the rest of food sectors, the wholesale sector for fish in Madrid has experienced several changes in terms of its structures due to the emergence of new forms of trade adopted by self-service chains. Supermarkets and hypermarkets try to gain market share by offering both good prices and additional services to consumers. On one hand, they take advantage of their purchasing power to obtain cheap supplies while; on the other hand, they avoid operating through wholesalers in order to reduce transaction costs. The latter is considered to be a serious threat for wholesalers since their role is minimal when the food retailer chain carries out the whole distribution process. In addition, self-service chains tend to be more cost effective by the adoption of the latest technological advances in terms of logistics and storage

Table 6: SWOT matrix for the wholesalers sector in Madrid.(Viña 2001)

Strengths (endogenous factors)	Weaknesses (endogenous factors)
- Over nine million people are the potential consumers. - Constant adaptation of the infrastructure by adopting the latest technological advances that guarantees the trazability of all fish and fish products. - Adoption of successful managerial techniques. - Mercamadrid made several improvements in order to meet the requirements for the environmental regulation ISO 14001. - Increasing interest to develop new relationships with different associations of retailers, organisations, cooperatives of purchasing. - Direct relationship between wholesalers and retailers. - Development of loyalty from the retailers.	- Dependence on the municipal administration to offer certain services - Low investment in advertising and publicity.
Opportunities (exogenous factors)	**Threats (exogenous factors)**
- Biggest wholesaler of fish in Europe - Increasing demand for healthy food as an attempt to recover the Mediterranean diet. - Strategically located in the capital of Spain, enjoying good road/train or plane infrastructures appropriated for national or international trade. - Very well reputed among national and international wholesalers. - Highly esteemed among consumers. - The town council is the major stockholder (51.13% of the total). -	- Reduction of the share of total expenditure dedicated to food. - High competition in the wholesales sector. - Prices are becoming more and more important for retailers. More often than not, wholesalers cannot beat the offers launched by those big retailers' chains which use alternative distribution methods. - Development of new distribution approaches which skip the role of the wholesaler. - Gradual reduction of the Spanish fleet in Moroccan waters. -

The framework for this analysis was a 86 face-to-face survey focused on the wholesalers operating in Mercamadrid

This subsection attempts to describe some significant features about wholesalers. Firstly, the orientation and specialisation of the wholesalers is analysed. Secondly, the source of the suppliers is considered. Thirdly, some account is taken regarding the areas where the product is traded and the market power of the wholesalers.

The vast majority of the wholesalers surveyed had their business orientated towards only fresh fish or fresh fish and shellfish. It should be mentioned that only 8% of wholesalers operate in the three sub sectors at the same time; that could be explained on the grounds that wholesalers tend to specialise in either fresh or frozen products due to the different requirements in terms of cold, storage and logistic issues.

Wholesalers operating in the fresh fish category accounted for 79%, the frozen fish and shellfish accounted for 34% and 40% respectively. These three figures do not add up to 100% because wholesalers operate in more than one category at the same time.

Taking into consideration all the above, it could be claimed that 61% of the wholesalers surveyed operate through importers. Nonetheless, it should be pointed out that only 17% rely on importers as the only supplier force. More frequently, wholesalers prefer to combine different suppliers.

In addition, buying the fish and fish products directly from the fishing companies is an approach that 12% of wholesalers adopted. This is a more direct channel and therefore cheaper, however, it requires having, or arranging, some logistic facilities in order to preserve the product under quality and freshness standards.

A longer commercialisation channel would be to buy the product from another wholesaler, however this is not a very popular one; according to the data available only 5% adopted it.

On the other hand, one third of the wholesalers surveyed only operate outside Greater Madrid; basically, they take advantage of Mercamadrid geographical situation to buy the merchandise there and, then, they distribute it to other provinces via road transportation in most the cases. Finally, it should be noted that almost one fourth of the wholesalers operate both in Greater Madrid and in other provinces within the country

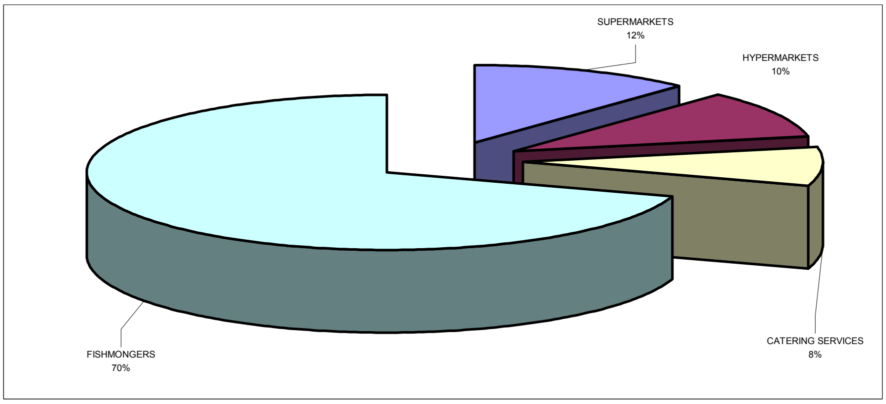

Figure 1. Wholesaler's clients. Source. Viñas. (2001)

4. Conclusions

Fish continue been a much appreciated food in the Spanish consumption. Due to serious restriction in the overseas fishing activities, fish supply is conditioned to imports from other countries, prices have been rising and fish factories are becoming important.

Mercamadrid is the biggest wholesaler of fish in Europe. It is considered to play a key role in the distribution of fish and fish products on both the national and international level. However, the emergence of supply chain competition has modified the traditional structures of the sector. Traditional wholesale markets have become less important as supermarkets and hypermarkets chains decided to provide with products directly in order to reduce transaction costs.

In Madrid, around 65% of the fish consumed is bought at the fishmonger. Hence, the role of the wholesaler is not minimised in the case of fish and fish products since fishmongers are the main clients of wholesalers.

From the quantitative research carried out one can notice some interesting findings. In the first place, the most popular method to obtain supplies is to buy at the harbour. More often than not, wholesalers prefer to operate without constraints; they prefer to be free to choose the supplier depending on the quality, price, freshness, etc. of the product. The fish obtained under this method is considered to be high quality product. In addition, fishmongers are considered to be the ones that offer the highest quality to consumers. The quantitative analysis made clear that there is a significant relationship between obtaining supplies at the harbour and delivering it to fishmongers. In fact, 71.6% of wholesalers buy the merchandise at the harbour and provide it to fishmongers. Similar findings were revealed in the case of those wholesalers who deliver to supermarkets; however, in this case, the percentage was only 4.1%. As a result, fishmongers and supermarkets could be considered the retailers who are more concerned about variety, quality and freshness of fish and fish products.

In addition, one can establish a dependence relationship between obtaining supplies of fish on offer and delivering it to catering services. This finding suggests that catering services are more concerned about price, since they use the product almost immediately and, therefore, there is no time for the product to go off and lose its quality.

It is necessary to increase quality control measures, and traceability is one of the main duels to be face in the coming years by the fish sector, in order to maintain the consumer's confidence

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