Consumer attitudes towards farm-raised and wild-caught fish: variables of product perception*

**Anna GAVIGLIO**, Eugenio DEMARTINI*

Abstract

Global and national fish sector trends require Italian operators to implement new marketing strategies for their production to evade foreign competition and exploit the Italian agro-food system synergies. This survey analyses customer purchase attitudes, especially towards farm-raised fish through a hierarchical clustering analysis performed on 300 buyers in traditional shops in Milan. The perception of the product seems to be tied to traditional customs. However, it is indicated that contemporary customers have the capacity to understand differences between fish products, consequently allowing for new communication approaches. In particular, wild-caught fish, purchased by hedonic and old customers, can be displayed through new labels stating the product origin, in order to merge sensory and cultural-empathetic consumption together. The fish farmers’ challenge is to enhance consumer loyalty to their product, through general communication campaigns related to the farm-raised fishes’ intrinsic and environmental properties to fill the gap between producers’ and buyers’ knowledge.

**Mots clé:** consommateurs, qualité, poissons.

Résumé

À la lumière des tendances nationales et globales du secteur de la pêche, les opérateurs italiens doivent élaborer de nouvelles stratégies de production pour faire face à la concurrence internationale et exploiter les synergies du système agro-alimentaire italien. Cet article analyse les attitudes des consommateurs en termes d’achats surtout de poisson élevé à travers une analyse hiérarchique sur 300 acheteurs dans des magasins traditionnels à Milan. La perception du produit est liée aux habitudes traditionnelles. Cependant, les consommateurs modernes sont capables de distinguer entre les différents produits. Voilà pourquoi il faut lancer des campagnes de communication liées aux propriétés intrinsèques et environnementales des poissons élevés.

**Mots clé:** consommateurs, qualité, poisson

**Key words:** consumer, quality, fish products.

1. Fish market: from global scenery to Italian trends

The FAO (2009) announced that human fish consumption has been steadily growing in the last four decades, rising from 9.9 kg per capita in the 1960s to an average of 16.4 kg in...
2. Methodology

Using a questionnaire, a survey was conducted among 300 consumers purchasing fish at three different types of traditional retailers in the town of Milan (fish shop, street, and local market). Data collection was conducted through face-to-face interviews, which gathered information effectively as the number of incomplete questionnaires is minimised.

The questionnaire (pre-tested on a small group of consumers) consists of 18 questions divided into 4 sections, chosen on the basis of a literature review. Below we describe the main issues, which correspond to the sections of the questionnaire:

1. Interviewee profile: the first section includes questions concerning the main socioeconomic characteristics of the sample respondents. As recommended by Gunter and Furnham (1992), general demographic variables were included in the questionnaire. Customers were asked about their age, gender, educational qualifications, and number of family members. It also asked consumers to indicate the average amount spent on fish products and the frequency of buying them—representing product-specific variables already used by Wedel and Kamakura (2000). The occupation of the head of household was considered to evaluate family income level; the method is still generally used, though not generally accepted in econometrics (Frank et al., 1972; McCann, 1974).

2. Product knowledge: these questions concern the level of fish product knowledge in terms of labelling, freshness, and rearing technique, themes also studied by Verbeke and Peniak (2005), Brucks (1985), Park et al. (1994), and ISMEA (2004). The freshness of the product is a major criterion of choice for the consumer (ISMEA, 2005; Verbeke and Brunso, 2006), so we wanted to verify whether the criterion is based on a real knowledge of the product or if it binds to a range of emotional prejudices. With respect to the distinction between captured and farmed fish, this section investigates the respondents’ knowledge of farmed species and the potential risks associated with the two different products.

3. Perception of farm-raised and wild-caught fish: we analyse consumer evaluation of fish attributes in relation to product purchase. The study starts from two analyses conducted at Italian (ISMEA, 2004) and European (Verbeke and Brunso, 2006) levels. They showed a large consumption of farmed fish, coupled with a stated preference for the wild-caught product. Our survey investigates this conflicting behaviour. Thus, consumers were asked if they consider caught fish the best product in terms of taste, hygiene, and nutrition; with reference to farmed fish, we focused on the consumer facing product “novelty” (cost, environmental sustainability, use of antibiotics, pollution of marine and inland waters, etc.).

4. Variables of choice: the last section assesses the customers’ level of consideration of price, degree of product transformation, fish species knowledge, trust in shop owners, geographic origin of the product, and the propensity for substitution of wild-caught fish with a similar farm-raised species. Interviewees expressed their opinion through Likert scales. Nominal variables have been equally labelled with progressive numbers for further analysis. Data processing
can be divided into two parts: initially, descriptive analysis has been carried out, besides a contingency table analysis\(^3\), which allows one to make assumptions about the sample behaviour to be tested with cluster analysis. In fact, especially with a large number of variables, contingency table analysis is unable to reveal realistic groups for the high number of correlation they can reveal, but they can successfully help to perform hybrid segmentation methods (Green, 1977).

The second phase consisted of a hierarchical clustering analysis, which aimed to determine the market segments composing the sample interviewed. According to Smith's market model (1956), indeed, a heterogeneous group of consumers is made up of smaller groups of consumers with similar habits. Since Smith has proposed his theory, the literature has been enriched by theoretical studies and practical uses of cluster analysis; an early overview is provided by Punj and Stewart (1983), presenting a summary of applications in different sectors, carried out using disparate statistical data and methods. Among the various models developed in statistics, the method of complete linkage clustering (included in hierarchical clustering techniques) has been used to perform the analysis. The function implemented calculates the distance between two clusters as the distance between each two farthest objects. A series of descriptive analysis has been performed to choose clustering variables and the number of clusters, involving a Chi-square test to reveal correlations between variables, which should be linked to a uniform pattern of consumption. To suit the purpose of the research, the sample was previously stratified, depending on the propensity to buy farm-raised fish, so that we started from two homogeneous consumer groups within their borders but different between themselves about the predisposition to buy farm-raised product.

3. Results and discussion

3.1. Socioeconomic characteristics of the sample

To describe the habits of costumers who purchase at traditional stores, we did 300 interviews at three sites: in a fish shop (100), at a local market (100), and at a street market (100) located in the city of Milan. The sociodemographic profile of the sample is then here presented in relation to modern distribution data, collected in a previous analysis (see Table 1). Female respondents comprised 61% of the sample (the value was the same for all three stores), representing a deviation from the modern distribution profile, where females were almost 73% of the sample. Considering age, traditional shops customers are well represented by a middle-age consumer, while young and old customers seem voted to modern distribution, in fact 68.33% of the whole sample (205 interviewees) was represented by people between 31 and 60 years old. The sample is representative of the northern Italian population, except for old people, less numerous here than in the present population (ISTAT, 2009), and male/female ratio, which is typically connected to female care of family food purchase.

A correlation was found between household head occupation, amount of purchase, and shop type. Looking at the fish shop and local market, customers had better occupations, bought fresh fish more frequently, and spent more than those purchasing at a street market. In this case, the data depict bigger families with less purchasing power compared with the modern distribution sample. For the rest, supermarket buyers appeared similarly distributed in the whole traditional retail channel sample. As expected, during preliminary data exploration, retail chain type analysis through a contingency table showed large correlations with other variables. However, the correlations did not involve a clear description of customer behaviour. This problem, also mentioned in the literature (see above-mentioned paragraphs), led to sample reunion to find realistic clusters with a stronger method. So, the next paragraphs present the rest of the descriptive analysis, considering the whole sample interviewed at traditional shops.

3.2. Sample knowledge and perception of fish products

Consumer perception was frequently different from real product knowledge. The aim of this part of the survey is to

---

\(^3\) The analysis is based on a Pearson's \(\chi^2\)-test of independence, used for categorical variables in order to verify the statistical independence between two of those (null hypothesis) or reveal their relationship when \(\chi^2\) probability is less than or equal to 0.05 (accepting alternative hypothesis).
reveal customers possibly evaluating mistakes and prejudices on fish product purchasing. Most of the respondents affirmed that they always (49.67%) or often (30.33%) read product labels (Fig. 1), so that in 80% of the cases, knowledge appeared to be medium-high to high (Fig. 2). Milan customers showed good knowledge about fish freshness parameters, demonstrating that they can differentiate among products in the bench, which is in line with frequent fish consumption trends found. Equally, they proved to have a good amount of knowledge about farm-raised species (more than 90% of the sample demonstrated medium-high to high degree of consciousness), showing that products from aquaculture are now fully established as part of consumer habits, whereas customers are less aware of the risks connected to farm-raised or wild-caught fish consumption.

Almost 40% of the respondents ignored the fact that farmed fish can contain traces of GMOs and 46% did not consider potential radioactive risks from wild-caught fish.

Considering the perception of fish products, majority of the respondents (91.33%) thought that wild-caught product tastes better than farm-raised ones. But, in 56.67% of the cases, they also admitted not being able to distinguish fish origin by taste alone (Fig. 3). This indicates one of the most common prejudices connected to farm-raised products. Consumers had even greater difficulty in recognizing the fish origin on site; the fact seems to be especially related to the Milan market where wild-caught fish is normally sold separately by size. That probably prevents 78.67% of the consumers to understand the provenance of the product, even if, theoretically, it is easy to distinguish from farmed fish. Considering quality properties of fresh fish, respondents did not exhibit a sure preference for the wild-caught product; on the contrary, only 15% of the sample respondents confidently identified differences in terms of hygienic aspects. Moreover, as to nutritional value, the interviewees were evenly distributed between those who preferred wild fish and those who did not. Respondents seemed to be more conscious of farm-raised fish. They agreed with the general opinion that it costs less than wild-caught fish, and that it could be help fish resource conservation efforts. But, at the same time, they showed some reservations on the use of antibiotics in fish-raising activities. Almost half of the sample respondents thought that it can pollute marine and inland waters.

So far, the survey revealed the consumers’ profound knowledge of “typical” fish characteristics, such as degree of freshness, fish species available in the market, and their possible origin. At the same time, when interviewees evaluated the quality of the product or the production process, their perception seemed partly tied to preconceived notions possibly due to inadequate information reaching the consumers; this is probably linked to the fisheries’ and aquaculture sector’s marginalised size. Some results will show also that some of these aspects relate to particular behaviour, reflecting different “psychological” types of customers.

### 3.3 Most important variables related to choice of fish products

The last section of the questionnaire touched on a set of product attributes that can influence consumers’ choice. First, respondents said that knowledge about the fish species is important. Obviously, the more it is known, the more they are disposed to buy it. Forty-five percent of the respondents believed that it is a “fundamental” characteristic, 26% regarded it “very important,” and only 8.67% considered it “irrelevant.” They also stated also that Italian (in 72.67% of cases) or European (69.33%) origin is an essential characteristic (this appears at least contradictory, considering the large amount of fish imported from non-EU countries and normally sold in Milan stores). This reflects a confusion among customers, whose purchasing habits are not based on real knowledge of the fish product.
What came out of the perception analysis was that the customers’ answers to the choice variable reflected a “traditional” consumption behaviour, which implies a preference towards a non-portioned product. In fact, more than 70% of the sample respondents declared to be insensitive to any fish preparation, whereas 75% strongly wanted gutted fish, and 55.66% even liked it to be a ‘non-cleaned’ product. This is linked also to the amount of trust in they have on the fish sellers, still an important factor related to fish purchase. The price influence on the choice appeared evenly distributed – 45% of respondents affirmed price as “fundamental” or “very important,” while more than half considered it “quite important” to “irrelevant”.

Descriptive data showed an interesting feature: the customers demonstrated a positive and considerable disposition to replace a well-known but endangered wild species with a similar farm-raised product (Fig. 4). In most cases, they declared that they will not buy the wild product if sellers propose as alternative a farm-raised fish; on the other hand, only 30.34% will not accept the proposed alternative.

The results confirmed the market trend displayed by international and national data. While aquaculture products are steadily acquiring a new market share, the perception analysis seems to indicate that wild fish is losing some of its attractiveness, in favour of farm-raised fish, thereby overcoming initial resistance previously encountered.

### 3.4 Sample segmentation by hierarchical clustering

In a changing scenario, the challenge is to understand if it is possible to distinguish between groups of consumers still tied to a traditional product or consumption behaviour and those more attentive to market trends, in order to forecast their evolution and point out unused marketing opportunities for fish products. As the main target of this survey is to analyse the reasons behind farmed fish purchase or non-purchase, the sample respondents have been divided into two over-clusters, representing, respectively, consumers who are averse (91 persons) to buying or are predisposed (209 persons) to buy farm-raised product; clustering analysis has been performed separately on the two groups.

Considering people averse to farm-raised fish purchase (Table 2), we found two representative clusters. The biggest one refers to “hedonic consumers;” it had 70 middle-aged consumers, who belonged to small families and therefore have greater purchasing power. The cluster shows a high consciousness of the fish product, but consumers do not seem to recognise better quality properties of wild-caught fish. They are informed and their purchase of the captured product must be linked to the hedonic experience of consuming traditional dishes. They typically do not care about the price of food, but they have a demand for specific products that they are used to eating. Hedonics probably represent the future resource for fishery, so, looking at their characteristics, fishermen organisations could profit from their inclination to stick to traditional food, communicating product origin and quality or creating denomination labels where possible.

The second cluster included only 21 persons, representing exclusively old pensioners. They absolutely considered wild-caught fish better than farm-raised fish, but they are not aware of the potential risks connected to fish consumption. Their opinion seems based on such deeply rooted prejudices that they buy...
more expensive wild fish, even affirming that price is a fundamental product characteristic that affects the choice of purchase. The cluster, whose members we called “traditionalist consumers”, personifies an old generation of fish consumers. Even if it does not play a key role in the evolution of the fish sector (because of its size and low purchasing power), it has a constant choice behaviour that represents a little but sure share of the market. Old consumers typically keep ancient cooking customs, so marketing strategies will be less effective here. Nevertheless, wild-caught fish operators need to consider their steady demand.

The largest group of sample respondents had 209 customers who are disposed to buy farm-raised instead of wild-caught fish. The cluster analysis on this market segment led to three different clusters representing three groups with varying purchasing behaviour. The first fraction included 64 “price-forced consumers” (Table 3). The term reveals the obligation to purchase farmed species as linked to the cheapness of the product, even if their preference is for wild-caught fish. In reality, they would want a traditional product, orienting their choice to well-known species and shops. These characteristics were highly relevant to this cluster, settled by middle-aged and young pensioners buying mainly at street markets, with small families, and medium-low educational qualification. So, price restriction seemed to be confirmed by the socioeconomic profile of the consumers. This group can be exposed to adequate communication strategies that aim to make them conscious of the quality of farm-raised product. Filling this gap will help them accept the product that they seem to dislike, thus creating a new confidence with it.

The second cluster was composed of “trend-influenced consumers.” They are young, have medium to high purchasing power, not affected by low product price, and buy at the local market and fish shops. The appellation refers to their vulnerability to messages coming from mass media, often creating new purchasing behaviour. They stated a preference for wild-caught products and, even with a good knowledge of farm-raising activity risks, their disposition towards new products is affected by new reservations and old prejudices. This creates a new type of hedonic consumer, admitting food novelty on the condition of good communication, which aims to justify the choice. Farm-raised products must be linked to environmental protection and nutritional quality, which will tie sensory consumption with the whole meaning of a “future” fish product.

The last group consisted of 88 persons. Though not clearly depicted, the cluster seemed to reflect the “market-attentive consumers.” The phrase is derived principally from their socioeconomic characteristics, which portray young families with one or two children and high level of farm-raised fish knowledge. This reflects a predictable sensitiveness to food issues, leading consumers to search for real information and make conscious choices. In fact, no product characteristics restrict their choice, indicating that they can distinguish between products on the market, that any fish attribute can be positive or negative depending on the selection process. They are prepared to spend an adequate amount for all the products, but they need to be reassured on their choices with clear and helpful labels.

Table 3 – Segmentation results for consumers averse to farm-raised fish purchase.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Hedonic consumers</th>
<th>Traditionalist consumers</th>
<th>Pearson’s y² square Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>2.83</td>
<td>5.00</td>
<td>0.006</td>
</tr>
<tr>
<td>Educational qualification</td>
<td>High school</td>
<td>Middle school</td>
<td>0.006</td>
</tr>
<tr>
<td>Head of the family occupation</td>
<td>Distributed</td>
<td>Pension</td>
<td>0.006</td>
</tr>
<tr>
<td>Family members (mean)</td>
<td>3.03</td>
<td>2.52</td>
<td>0.008</td>
</tr>
<tr>
<td>Farm-raised fish knowledge degree</td>
<td>High</td>
<td>Medium-Low</td>
<td>0.011</td>
</tr>
<tr>
<td>Wild-caught fish knowledge degree</td>
<td>High</td>
<td>Medium-Low</td>
<td>0.038</td>
</tr>
<tr>
<td>Wild-caught fish is better for hygienic properties</td>
<td>Partially</td>
<td>Completely</td>
<td>0.015</td>
</tr>
<tr>
<td>Wild-caught fish is better for nutritional quality</td>
<td>Distributed</td>
<td>Completely</td>
<td>0.005</td>
</tr>
<tr>
<td>Farm-raised fish is better for fish resources conservation</td>
<td>Completely</td>
<td>Partially</td>
<td>0.015</td>
</tr>
<tr>
<td>Aquaculture is dangerous for asthmatic are</td>
<td>Partially</td>
<td>Distributed</td>
<td>0.009</td>
</tr>
<tr>
<td>Price relevance as choice</td>
<td>Irrelevant</td>
<td>High</td>
<td>0.024</td>
</tr>
</tbody>
</table>

Sample distribution by clusters 70 21 Total = 91

Table 4 – Segmentation results for consumers disposed to farm-raised fish purchase.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>Pearson’s y² square Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price-forced consumers</td>
<td>Street market</td>
<td>Local market and fish shop</td>
<td>Street and local market</td>
<td>0.000</td>
</tr>
<tr>
<td>Trend-influenced consumers</td>
<td>3.30</td>
<td>2.57</td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>Market-attentive consumers</td>
<td>3.30</td>
<td>2.81</td>
<td>3.30</td>
<td>0.021</td>
</tr>
<tr>
<td>Retail channel type</td>
<td>4.23</td>
<td></td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>Age (mean)</td>
<td>Medium-Low</td>
<td>Medium-high</td>
<td>Medium</td>
<td>0.000</td>
</tr>
<tr>
<td>Educational qualification</td>
<td>White collar, pensioner</td>
<td>Self-employed, manager, white collar</td>
<td>Distributed</td>
<td>0.003</td>
</tr>
<tr>
<td>Head of the family occupation</td>
<td>2.75</td>
<td>2.81</td>
<td>3.30</td>
<td>0.014</td>
</tr>
<tr>
<td>Family members (mean)</td>
<td>2.75</td>
<td>2.81</td>
<td>3.30</td>
<td>0.021</td>
</tr>
<tr>
<td>Farm-raised fish knowledge degree</td>
<td>Medium</td>
<td>Medium-High</td>
<td>High</td>
<td>0.000</td>
</tr>
<tr>
<td>Wild-caught fish tastes better than farm-raised</td>
<td>Completely</td>
<td>Completely</td>
<td>Partially</td>
<td>0.000</td>
</tr>
<tr>
<td>Aquaculture pollutes more than fishing</td>
<td>Partially</td>
<td>Partially</td>
<td>Not at all</td>
<td>0.004</td>
</tr>
<tr>
<td>Aquaculture is dangerous for antibiotic use</td>
<td>Completely</td>
<td>Partially</td>
<td>Partially</td>
<td>0.004</td>
</tr>
<tr>
<td>Price relevance on choice</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>0.000</td>
</tr>
<tr>
<td>Fish species knowledge relevance on choice</td>
<td>Fundamental</td>
<td>Distributed</td>
<td>Medium</td>
<td>0.000</td>
</tr>
<tr>
<td>Fish product processing relevance on choice</td>
<td>Low</td>
<td>Irrelevant</td>
<td>Medium-Low</td>
<td>0.000</td>
</tr>
<tr>
<td>Trust in retailer relevance on choice</td>
<td>Fundamental</td>
<td>Fundamental</td>
<td>Medium-High</td>
<td>0.021</td>
</tr>
</tbody>
</table>

Sample distribution in the clusters 64 57 88 Total = 209

Data source: our survey. Values referring to “Age”: 1= until 30 years, 2= 31-40, 3= 41-50, 4= 51-60, 5= 61-70; 6= more than 70 years
Conclusions

The two different sectors of the Italian fish supply chain reflect two different economic conditions. While fishers suffer from scarce marine resources and fuel prices, fish farmers gain more market shares every year, taking advantage of the increasing fish demand. On the other hand, fish quality perception appears tied to ingrained habits, which prevent consumers to either to follow or understand new market trends. Operators should therefore design a product diversification plan that would disseminate more information to customers and possibly justify the preference for Italian products.

Our survey highlights the characteristics of fish consumers who use traditional retail channels to assist fish operators in planning new marketing strategies. The method enabled us to differentiate between customers on the basis of their attitudes and to describe similar behaviours. Maintaining the difference between customers who are disposed and averse to farm-raised fish purchase, we first divided the sample in two parts. The farm-raised averse group, which counts for almost one-third of the whole sample, is composed of two clusters, one representing hedonic and the other, old-generation consumers. Both represent a sure resource for fishers, but, probably, only the hedonic cluster can be profitably exploited through marketing strategies describing traditional products, possibly by means of new labels, brands, and eventually a denomination of origin.

The group disposed to purchase farm-raised fish has been segmented into three clusters. The price-forced consumers are those who prefer wild-caught product but instead buy farm-raised fish for its low price. They are probably not totally satisfied with their choice, so operators must reduce the gap between the two products as soon as possible, pointing at the farm-raised product’s intrinsic quality. The second cluster includes trend-influenced consumers, those who prefer wild-caught product and demonstrate attention to seller’s opinion. This seems to indicate a certain inclination to a new type of hedonic consumption, contemporaneously linked to traditional customs and market issue evolution. So the cluster could be attracted by the “novelty” of farm-raised fish, such as the ecological potential, which really is a major strength. The last cluster refers to new typical consumers, the market-attentive ones, who can distinguish between different goods, showing the ability to recognise different prices for each product. This necessitates that Italian producers restate the information profile of their product to strengthen the relationship with customers.

Even if some different attitudes have been found, the study generally shows a confused fish product perception, which presents a great risk for Italian fishery and aquaculture. In fact, the Italian fish sector suffers more from the competitiveness of foreign products rather than from low market prices. Operators must internalise the need to diversify production in order to evade direct competition and exploit the synergies offered by the Italian agro-food sector.

References


ISMEA, 2006. Verso un sistema di regole comuni per la pesca nel bacino del Mediterraneo, Roma.


