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Shaping Consumer Preferences: The Role of a Portuguese State-Owned Company in Fish Nutritional Education

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Abstract

A fundamental human need is ensuring an adequate diet for energy and metabolic function. This paper examines Docapesca – Portos e Lotas, SA, a Portuguese state-owned company in the fish sector, highlighting its proactive role in consumer nutritional education, a strategy with significant marketing and economic implications. Portugal's high fish consumption, ranking third globally, underscores the importance of this initiative, given fish's rich nutritional profile including high-quality protein, essential vitamins A and D, and vital Omega-3 fatty acids. While Docapesca's core functions include organizing the first sale of fish on mainland Portugal and supporting the fishing harbor sector, a key objective is to influence consumer preferences through nutritional education and knowledge transfer regarding healthy food and diet. This encompasses social responsibility, quality assurance, societal cooperation, and environmental stewardship as integral to its mission. Drawing on privileged state information and in-depth interviews with key decision-makers, this study analyzes Docapesca's strategies. Findings, based on data from the entire Portuguese population with a focus on younger generations (16-34 years old), reveal a profound shift in consumer perception: Portuguese consumers now view fish as more than a commodity, recognizing its enhanced value stemming from Docapesca's educational efforts. This demonstrates how state-led initiatives can positively shape market demand and consumer behavior for health-promoting products.

Keywords: Consumer Behavior, Nutritional Marketing, Public Policy, Food Economics, Brand Perception, State-Owned Enterprises, Fish Market

Introduction

Who is Docapesca and why is it's work so relevant?

This paper is based on data collected by Docapesca – Portos e Lotas SA, a State-Owned company that provides the public service of organizing the first sale of fish (on mainland Portugal) and supports the fishing harbour sector. But Docapesca does more than this; the company's main objectives also include consumers' education, nutritional education and knowledge transfer on healthy food and diet. Social responsibility, quality guarantee, cooperation with society and environmental and civic responsibility are also part of its mission. The company was a pioneer in trying to educate youngsters. For a long time Docapesca has studied fish consumption by targeting the whole Portuguese population but in the last few years, the company has given special attention to the young consumers, trying to educate consumers' preferences regarding seafood.

Culture and its habits are deeply rooted in the food experiences of children; so the formation of children's food habits is of major interest. Docapesca's strategy intends to educate the country's population, starting with the education of its children. The constant investment in the inclusion of fish into children's meals had a very positive outcome: children's domestication of fish into their eating habits. Fish and Seafood are present in children's meals, not just at home, but also in all kinds of school meals.

It is of extreme importance for children to see it (eating fish) as something normal, consumed all the time, by their parents, family and teachers and also very important, consumed by their peers.

Why is it so important for countries to invest in campaigns to increase fish consumption?

Human beings share a common need to meet certain fundamental conditions for survival. The ways in which these similar requirements are met are hugely diverse (Fieldhouse, 1986), but a human common need is the security of an adequate diet, which will provide energy and the various nutrients necessary for metabolic functioning. There are many ways in which careful planning of the daily balance in our various foods can improve our health and many consumers know that there are benefits on having a "daily spoon" of fish liver oil. In a special way, the sea may give us these polyunsaturated fatty acids and lessen our overreactions to the stresses in our lives on land. The protein quality of fish assessed in terms of net protein utilization (the proportion of nitrogen intake that is retained in the body) is lower than for eggs but similar to that in chicken, meat, milk, and cheese (Holt, Sidney, 1978). Most fish contains around 15 to 20% protein by weight (Kent, 1987).

Portuguese consumers give value to fish because the market system created that value and sustained it as part of Portuguese traditions. It is this knowledge and relevance given by the market that makes consumers perceive the product as more

than just fish. It is a part of Portuguese identity and a way that helps consumers understand themselves in the world. Fish give a big contribution to the alleviation of malnutrition in many parts of the world and, according to Sørensen (1996), fish provides security and it is considered a healthy product. Fish is generally free of contaminants, particularly of the kinds of chemicals, which are sometimes used to produce meat (Schell, 1984). Fish provides preformed vitamin A and vitamin D if its oil is ingested. Fish bones, which may be eaten in small fish such as sardines, are particularly rich in calcium. Marine species are the best source of iodine (Masayoshi, 1984). Of course the appropriateness of fishery products for alleviating any sort of nutrition deficiency depends on particular local circumstances, taking into consideration issues such as their acceptability, availability, and cost in relation to alternative sources of the required nutrients (Kent, 1987).

Almost any attempt to replace some of our foods with seafood products seems likely to alter our average diet in a beneficial manner. Fish contains a very powerful, almost panacea-like nutrient-called Omega-3 fat. When eaten regularly, these fats improve physical and mental health and prolong life. We know that humans once ate much more fish and other sources of 0mega-3 (wild animals, nuts, berries) than we do today. They remained largely free from many of the ailments that plague us today, such as heart diseases, cancer, arthritis, psoriasis, Alzheimer's disease, diabetes, and even mental illness. Often called good fats, Omega-3 is found in seafood and flaxseed products and, to a lesser extent, in certain oils and nuts. Omega-3 fats are considered essential fats, because our body cannot manufacture them, we can get them only from foods we eat. Omega-3 are used to create signalling molecules called prostaglandin that direct blood vessels to dilate, encourage blood to stay fluid, and reduce the inflammation response associated with ailments such as heart disease and psoriasis. Omega-3 also becomes embedded in various cells throughout the body, making them healthier and more pliable.

Most people in Western industrialized countries tend to consume more calories than their bodies use, and these extra calories accumulate in the form of fat and cholesterol (Lands, 1986). One of the attractions of replacing meat with fish is the opportunity to decrease the amount of total fat and saturated fatty acids in the diet (Kent, 1987). Consumers should try to alter the composition of polyunsaturated fatty acids (table 1) to balance eicosanoid[1] formation, while at the same time cutting the total caloric intake and the percentage of calories in the form of saturated fat

[1] Eicosanoides- A term designating any of a large family of hormonelike compounds, which contain twenty carbons, for which the most common precursor is the 20-carbon acid, arachidonate. The eicosanoids include two major types of biologically active agents: prostaglandins (Prostaglandins are type of compound derived from a polyunsaturated fatty acid by oxidation and rearrangement. Prostaglandins contain a five-member ring of carbon atoms and three or more oxygen atoms) and leukotrienes (is a class of polyunsaturated eicosanoides, that is formed following the action of a lipoxygenase. These compounds have their double bonds rearranged to adjacent locations within the carbon chain and do not have the cyclic ring system that is present in prostaglandins.

Table 1: Polynsaturated fatty acidsin fish - Expressed as grams per 100 grams of food

Fish	Total fat
Tuna (albacore)	6.8
Anchovy	6.4
Herring	6.2
Mackerel	9.8
Salmon	13.2
Tuna (blue fin)	4.7
Halibut (Pacific)	2.0
Flounder	1.2
Cod	0.73
Haddock	0.66

Source: Kifer and Miller (1969)

Oil from the livers of large fish is high in vitamin A, and can be taken in capsule doses. Traditionally, cod liver has been used for this purpose, but the liver oil from other species can be used as well. In some cases synthetic concentrated vitamin A may be provided in capsule form. Fish protein concentrate is a stable protein supplement prepared from whole fish, usually fish of low market value (Kent, 1987). A research project from the Cambridge University (2002) discovered that eating oily fish such as mackerel or salmon regularly could protect against asthma. It is the latest in a long list of benefits ascribed to this type of fish. *" Oily fish has already been linked with protection from heart disease, arthritis, psoriasis and dementia, (…) and it is safe to say that eating oily fish in moderation every week as part of a well-balanced diet could help reduce the risk of asthma*" ;"*As asthma has become more common (in the UK) the amount of oily fish in the diet has declined*" Dr. Bipen Patel[1]. Fish is for sure a healthier food than sugar and sweets, or meat with hormones and fat. It has many advantages to a healthier life, it reduces cholesterol and breathing problems, it has vitamin A and so on, and is for sure one possible ingredient in a healthier diet. One can be positively certain that fish helps preventing obesity (Thorsdottir et al., 2008), as well as other major health problems like arrhythmia, blood clot, bad cholesterol, asthma, Alzhaimer (table 2). And when comparing the nutritional values and contaminant levels in other protein sources, fish becomes a better and safer option.

[1] Clinical epidemiologist at Cambridge University. British Thoracic Society.

Table 2: Advantages of Omega -3 fats – Resume

Research has shown that Omega-3 fatty acids:
Decrease risk of sudden death and arrhythmia
Decrease thrombosis (blood clot)
Decrease triglyceride levels
Decrease growth of atherosclerotic plaques
Improve arterial health
Lowe blood pressure
Lowe the levels of bad cholesterol
Protects against asthma
Lowe risk of dementia (including Alzheimer's)
DHA (essential for building nerve cells in the brain)

The need for Consumers Nutritional Education to fish products

Institutional feeding meals (kindergartens, pre-schools, high schools, universities and hospitals feeding programs) are a fantastic mean for helping youngsters eat fish. Without spending a lot of money, simply by directing it to more fish than normally, government can make a big impact in the population's diets. It is for sure agreed by everyone that the food served in public places should be healthier to eat than the food that it is sold at fast food restaurants - not less safe (Schlosser, E. 2001, pg. 263). Governments (through its start owned companies like Docapesca) should insist upon the highest possible food safety standards from every company that supplies food to schools or other public food suppliers. Public feeding cantinas should be the first one following the public founded campaigns. Seafood should be no exception. It is the government and its public feeding institutions that have the responsibility, power, duty and social function to change it, by educating their citizens. If the authorities want consumers to eat more fish, they have to teach them first. Directives should be given as to include (at the least) fish twice a week. Young people spend most of their time in schools, so it is only natural that schools should be used as one of the pivots for the "normal inclusion" to occur. The Council of Europe and World Health Organization (World and Health Organization) has given the topic high priority and has opened a debate on the importance of healthiness and institutional feedings, since it is also through the food supplied by the schools cantinas that many of the future adult's preferences and habits are being formed.

Portuguese students spend 5 days a week in school, which makes improvements in food diet and nutrition at schools an important element in a strategy towards healthier eating among children and adolescents (Mikkelsen, 2006 pg 8). The food offered available to children will be, in the future, part of the individuals' mental classification of the acceptable options. Government should have in consideration that

educating a nation's eating is in its hands. And please, stop blaming the bones; children can be taught to like the taste of fish not minding the bones. The school's influence in transmitting a message with the importance of fish is huge. School activities already include nutritionists talking about healthy food - with fish included-, and children pay attention and enjoy the lecture. And it becomes instilled from childhood. It is not when they are adults that suddenly someone comes and says that fish is fantastic; it has to be while they are creating habits. Starting soon, in their education, will make it normal.

It is also a fact that children have a growing influence in family decision making – they actually choose the products they want. They are influenced by and influence the parents; if they learn in school that fish is good, they will ask the parents to do it at home. Children end-up affecting the food choices at home.

Young generations and consumption - Alvin Toffler´s point of view

Alvin Toffler was a visionary. Probably one of the last "real" gurus of modern times. According to him, we live in a fast and extremely unstable world - we might even use the term turbulent if we follow Alvin Toffler' thoughts. He mentioned that somewhere in the future there would be a generation that had to live in permanent adaptation if they wanted to survive. In his capacity to predict the future, Toffler taught us (25 years ahead) the rule for surviving: constantly adapt to the immense changes that occur in the world. To him, change is the process by which the future invade our lives. To the XXI century generations, change is… normal. This is because the world is now an open system (with people, raw materials, interest rates, trends, social campaigns, environmental statements, etc.). And so Toffler recommends new generations to be extremely vigilant, always aware, always in contact with everything and everyone (Coelho et al., 2019). Following Toffler's permanent adaptation survival rule, it is vital to the food supply chain (in our case, seafood and fish) to rapidly understand that the future of consumption is in the hands of the new generations. What are their preferences regarding fish, how is that they buy fish products, how is that they consume fish, how is fish perceived and included into their meals? For sure the way fish is perceived, bought and consumed has changed drastically when comparing with their grandparents and parents; Docapesca has analysed that changed and interpreted the new ways of understanding and consuming fish.

And so, following Toffler's permanent adaptation survival rule, it is vital to seafood dealers and national governments to rapidly understand that the future of consumption is in the hands of the young generations. Acknowledging that, Docapesca has, for many years, given a special focus on building a support for the coming generations, towards the *Consumers Nutritional Education*, which focus on fish and seafood products (Coelho et al, 2018). The *Consumers Nutritional Education* focus especially on young Portuguese consumers, and, for this specific paper, especial attention will be given to consumers with ages between 16 and 34, through a 1 year

evolution. We are going to understand how (if) consumers' perception of seafood has changed during that year, and look at the differences within the general population.

Methodology

To write this paper we have had access to privilege State information and we have made an exhaustive detailed analysis of the different strategies implemented by Docapesca – Portos e Lotas, SA (in-depth interviews to key decision makers in the company were the way to reach all this exclusive data). Findings showed that, as a result of all the work that has been made towards educating consumers on fish, Portuguese consumers perceive fish as more than just fish. This paper studies two analysis made by Docapesca: comparison between 2 specific years (2017 vs 2018) for the young generations and also the comparison between the young generations and the total of the Portuguese population (2017 vs 2018).

Procedure and sample

To analyse the evolution of the Fish sector in Portugal we used Docapesca Portos e Lotas S.A's data. Two surveys were conducted (each with 1000 respondents - representative of general of the Portuguese population), one in 2017 and the other one in 2018, using plenty of variables that turned out to be extremely valuable data to market analyses and allowed a very strong comparative analysis.

Data was collected using quota sampling, representative of Portuguese population according National Statistics Institute (INE), as non-probability sampling technique, by using a socio-demographic variable such as sex (49,1% Male and 50,9% Female), age (16/24 years with 9,1%, 25/34 years with 16,8%, 35/44 years with 18,5%, 45/54 years with 18,1%, 55/64 years with 16,6%, 65 years or more with 20,9%), and region according to Nuts II (35,2% of North, 25,0% of Centre, 27,7% of Lisbon, 8% of Alentejo, 4,1% of Algarve). In terms of the descriptive statistics it represents a demographic profile with following Education level 2017 vs 2018: Primary (19,2% vs 13,8%), Secondary (48,8% vs 48,2%) and Higher (32,0% vs 38%).

Since the *Consumers Nutritional Education* had a special focus on young people, for better understanding the impact, we made a filter for young people (16/34 years). Comparison analyses was made considering one-year evolution in young generation perception about seafood and also looking at the difference with population in general.

The questionnaire about seafood consumption patterns was anonymous in order to guarantee a higher level of participation and honesty. Each question was debated by a multidisciplinary team composed of nutritionists, marketing and survey specialists, representatives of commercial companies, statisticians, and people experienced in the seafood sector. Furthermore, the attained preliminary questionnaire was sent to a group of twenty individuals outside the expert group with the purpose of assaying the clarity, simplicity, and appropriateness of the various questions. During this

process, several alterations were introduced, but the overall architecture of the five sections was kept in the final form of the questionnaire. The fish products were chosen on the basis of consumption importance in Portugal.

In order to reach a large universe and different ages and geographical regions of the country, a telephonic medium was the natural option.

Statistical analysis

Statistical analysis was carried out using the SphinxIQ software (Sphinx Company, Montréal, Canada), which enabled to analyse the overall distribution of respondents as well as the consumption preferences and frequencies affected by the independent variables. The difference of means between pairs was resolved by using confidence intervals in a Tukey HSD test. Level of significance was set for $p < 0.01$.

Results and Discussion

Concern about the origin of the fish

Young Portuguese people, as well as population in general, are more and more careful with the origin of the fish they consume. Concern ranged 2,75 and 3,27 by 5-point Likert type scale with 34,4% and 48,6% respectively for TOP 2 boxes (agree/totally agree) answers in 2017 vs and 3,37 and 3,62 with and 48,1% and 59,3% respectively for TOP 2 boxes in 2018 (p = 0.00 Khi2=231.63, dgl=4(MS)). Noticing that the attention that young Portuguese people pay to origin of the fish, grows quicker than for population in general.

Perception of the Portuguese fresh fish

Portuguese young consumers aged 16 to 34 perceive Portuguese fish as the best fish in the world, ranged 3,83 by 5-point Likert type scale with 63,1% for TOP 2 boxes (agree/totally agree) answers in 2017 vs 4,37 with 81% for TOP 2 boxes in 2018 (p = 0.00 Khi2=1158.19, dgl=4(MS)). Noticing that in 2017 Portuguese population in general gave a higher score to Portuguese fish (4,05) than young people (3.83), showing a gap in perception between different generations. In 2018, Portuguese perception of fresh fish grew significantly (in general), and even then, it became almost the same for different generations (4,37 for population in general vs 4,3 for young people), showing an impressive result of Consumers Education Campaign conducted by Docapesca in one year only.

Portuguese waters are abundant in different devalued species. Based on creating sustained value for society concerns it becomes important to understand the sustainability issue for different species, by giving proper Consumers Nutritional Education about fish species of higher stock (Docapesca, 2018)*. It becomes especially challenging, when it comes to Portuguese* population, a population that is very traditional regarding fish consumption (Coelho et all, 2018).

Availability for transfer of consumption for fish of higher stock

The data reveals that young Portuguese population shows bigger availability of transfer of consumption of fish of lower stock, ranged 3,07 by 5-point Likert type scale with 39,3 % for TOP 2 boxes (agree/totally agree) answers, in 2018 vs 2,91, 32,9 % for TOP 2 boxes for population in general ($p < 0.01$, Khi2=39.51, dgl=4(MS)). Noticing that in 2018, after a Horse Mackerel Campaign, 50,1% of young people recognized that they started to purchase Mackerel more often and, in 2017, 40% confirmed that they were buying more horse mackerel after the campaign.

Knowledge about the fresh fish market in the Portuguese population

In 2017 only with 23% for TOP 2 boxes (agree/totally agree) answers, young people considered themselves fish connoisseurs, ranged 2,73 by 5-point Likert type scale against 3,24 with 38,9 % TOP 2 boxes for population in general (p = 0.00 Khi2=177.43, dgl=4(MS). Even less of Portuguese population considered themselves fish connoisseurs in 2018, ranged 3,14 by 5-point Likert type scale with 37 % for TOP 2 boxes, when we notice increase among young people with 2,74 and 25,8% for TOP 2 boxes.

*Another relevant information taken from the analyses is that 28,5% of young people confirm that they discover new things about Mackerel after the 2018's Campaign and 20% about Horse Mac*kerel after the 2017's Campaign.

Various market reports indicate that population in Portugal often look for healthy food solutions and perceive seafood as a fundamental part of it (Coelho et all, 2018); that is why it is so important that *Horse Mackerel is* recognized by young people as "good for health" (3,8) in 2017 and with even significantly better results about Mackerel in 2018 (4,47 *by 5-point Likert type scale*).

*However, Mackerel and Horse Mac*kerel are *considered by young people as suitable for varying their meals ranged 3,8 and 3,35 respectively.*

It is very important to continue to pay attention to the education of the Portuguese population regarding seafood – with focus on young generations – since almost 50% of them actually enjoy cooking and enjoy being creative in the kitchen; 7.7% love to cook and consider themselves as experts; 31.1% simply do not mind cooking - it's just one of the things they do. On the other hand, less than 12% do not like to cook (it's an annoyance) (p<0.01, Khi2=174.69, dof=3(VS)).

The global world brought new products into our tables and created new interpretations of what a meal is and young people are like to explore new fish preparation solutions (3,18). This is why it is so important to give them the best source of information.

The best source of information about seafood

People that today have 34 years, make part of the first wave of the digital generation born into the world of technology. They are highly qualified in digital knowledge therefore it is easy for them to quickly acquire the use of new tools and devices in ICTs (Bencsik et al., 2016). The data collected indicates that for young people social media

(Facebook, Instagram e etc.) become the most important source of information regarding seafood for young generations with 56,3% in 2017 vs 65,8% in 2018, when for population in general, TV continuous to be the one with 60.1% in 2017 vs 61,7% in 2018. *(p = 0.00 Khi2=9852.88, dgl=20(MS)*.

Place of purchase of the fresh fish in the Portuguese population

Concerning place of purchase of the fresh fish, the universe of young respondents clearly continuous to prefer supermarkets as well as population in general, 67,4 and 54,1% respectively in 2017 vs 52% and 49,8% respectively in 2018 ($p < 0.01$, Khi2=632.44, dgl=3(MS) – even though it is possible to notice a slight purchase transfer from supermarkets to local markets, which goes in line with fresh food purchase, in general. This transfer is noticeable for younger generations. Preference for local markets grew 7% in one year (from 12% in 2017 to 19%in 2018).

Conclusions

Docapesca, a Portuguese state owned company, has implemented many national fish campaigns, and has helped forming food preferences of young consumers. This State Owned Company has taken under its wings the role of educating consumers on fish, a product that helps preventing many diseases like thrombosis, arrhythmia, dementia (Alzheimer's), asthma, and many more. Therefore, it should be a known fact that fish should be more consumed world-wide (especially in the Occidental modern world full of fast food and processed foods. Taking into account the quantitative contributions collected, this papers shows how, from one year to the other, changes have occurred when it comes to young people's knowledge, attitudes, perceptions and intentions associated to fish products. One thing that this paper illustrates is that there is an impact when consumers are exposed to fish campaigns, and that it is possible to mould young consumers' food habits. Fresh new data on young consumers (16 to 34 years old) regarding p*erception of fresh fish,* availability for transfer of consumption for fish of higher stock, k*nowledge about the fresh fish market in the Portuguese population,* the best source of information about seafood and *place of purchase of the fresh fish in the Portuguese population where some of the concepts analysed and that show obvious change.*

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