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Article

Consumers' Preferences and Segmentation in the Digital Purchase of Iberian Ham

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Abstract: Iberian ham, a traditional Spanish meat product, is renowned for its unique nutritional and sensory attributes, garnering widespread appreciation both domestically and internationally. It is one of the most outstanding Spanish gastronomic treasures, with very special nutritional and sensory properties that make it highly appreciated throughout the world. Recent trends indicate a notable surge in its consumption, a pattern projected to persist. For an enhanced online shopping experience, understanding the specific characteristics and requirements of various consumer segments is crucial. This study aims to scrutinize national Iberian ham consumption patterns and, through survey methodologies, discern the preferences and needs of online consumers purchasing whole Iberian hams. The subsequent cluster analysis will empower suppliers with insights to pinpoint business prospects and craft segment-specific online marketing strategies.

Keywords: Iberian ham; digital purchase; segmentation; cluster; marketing strategies

1. Introduction

The Iberian ham is one of the most outstanding Spanish gastronomic treasures, with very special nutritional (vitamins, minerals,...) and sensory properties (smell, taste, fat,...) that make it highly appreciated throughout the world [2]. Moreover, Spain is the world's largest producer and consumer of cured Iberian ham [4], where one of the most important native livestock breeds is the Iberian pig. Within the pork sector, the autochthonous breed of pig from the southwest of the Iberian Peninsula represents 6% [5]. In addition, Iberian pork products are of great economic importance in the agricultural production of Extremadura and are the most accepted in international markets, thanks to the specific characteristics they possess, and the perception of quality held by end consumers [6].

On the other hand, today, online shopping is becoming increasingly popular and is expected to continue to grow as people embrace the convenience it offers. Several variables are what make up the advantages of this type of commerce, such as price, speed and time savings or the ease of obtaining information. As reported by Eurostat [8], in Spain, in the pre-pandemic years, the online shopping trend ranged from 43.46% to 46.93%, while in the post-pandemic years, this trend increased to 55.26%. Therefore, given the circumstances derived from the pandemic caused by COVID-19, online commerce has increased by an average of 12.5% [9]. One of the most demanded product categories is Food, with an average of 45.3% and the subcategory of food, beverages and household cleaning had a demand of 30.5%, on average, in the period from March to May 2020 and represented the largest increase in sales compared to 2019, with a rise of approximately 7 percentage points [10]. Regarding the percentage of buyers that constitute food products is 23.7%, or 5,753,218 buyers, highlighting that women and people between 35 and 44 years old, are those who make more purchases [11].

While it is true that online shopping has many benefits, such as the convenience of being able to buy from anywhere, the possibility of comparing prices or the ability to find specific products, it is often challenged by certain drawbacks inherent to online shopping, such as uncertainty about the quality of the product or the security of online transactions. This inconvenience still affects the case of the online purchase of Iberian ham in pieces. Nevertheless, there is a growing niche market for this type of product. It is therefore very interesting to be able to analyze the behavior of the different market segments in terms of the purchase of Iberian ham in pieces, since this is a meat product which, by habit, tends to be purchased in person, and it is therefore beneficial for the meat company to analyze acceptance, product quality, the online purchasing experience, the factors that influence the choice of a website for purchase, as well as to observe the impact of the opinions and comments of other buyers on the purchasing decision [12].

In this sense, some authors such as Ballco [13] talk about the existence of two segments differentiated from each other in terms of consumers of cured ham. On the one hand, the first cluster is made up, for the most part, of women over 55 years of age and with university studies. This segment gives greater importance to the familiarity of the brand and the naturalness of the piece of ham. The second cluster is also characterized by women, yes, younger, with university studies and differs from the first segment in terms of price, being more sensitive to this attribute.

Mesías et al. [4] point out that consumers, in general terms, give sufficient importance to Iberian ham with a Denomination of Origin (D.O.), even so they were able to demonstrate that the greatest importance was conferred on the price and type of ham, so they identified three segments, after carrying out several studies: pro-D.O. consumers, average consumers and price-sensitive consumers.

On the other hand, Fabra and Albisu [14] highlight the existence of two segments in terms of consumers of Teruel ham with D.O., identifying the first as "loyal consumers" and the second as "fewer faithful consumers." Therefore, the first segment refers to loyal customers, men over 35 years old, who frequently consume this ham. That is why this type of consumption is considered regular consumption, mainly buying whole pieces in small businesses. The second segment, unlike the first, is made up of young people, between 20 and 35 years old, buying said product for special occasions or for regular consumption, sliced and in large stores.

Royo and Pérez [15] highlight that when making a purchase, consumers do not give the same importance to the different attributes and therefore distinguish between two segments. The first of these, 19.8%, is made up of the population that prioritizes that the piece be certified with a Designation of Origin, the origin and the brand of the Iberian ham. This is a segment made up of consumers with great purchasing power. The second segment, 70.2%, is comprised of consumers with less knowledge, so the factors they take into consideration the most are flavor, texture, appearance and smell.

Considering this context, the objective of this study is to analyze online buyers of Iberian ham in pieces, to identify possible market segments that define their preferences and behaviors, in order to generate efficient online sales strategies for the product under analysis, useful for decision-making in the meat sector.

2. Materials and Methods

2.1. Sample Collection

The final sample examined included 451 purchasers of Iberian ham who had bought it at least once in the last year of the survey and who, in turn, had also bought food products through the online channel. The aim of this sample was to analyze the perceptions of these individuals regarding the purchase of Iberian ham in pieces according to these two characteristics: consumers of the product and purchasers of food products through the online channel.

To create a profile of participants as representative as possible, several sources of information have been used. According to data from the Ministry of Agriculture, Fisheries and Food [11] households consume 40% of Iberian ham in pieces, which translates into thousands of euros. However, the amount of Iberian ham consumed by households in pieces is 60% in volume (Kg). According to the age and gender distribution, the responsible for the purchase is approximately 50/50

between men and women. On the other hand, the B2C report by ontsi.red.es (2020) [16], which analyzes the composition and structure of online shoppers in the Spanish market, is the second aspect to be taken into account. 76.4 % of the total population buys food products over the Internet, and 23.7 % of that group do so in some way.

In addition, 27% of people have purchased food or beverages in stores or supermarkets through the Internet, according to 2020 data from the National Institute of Statistics, INE [17]. The distribution according to gender and age is shown in Table 1.

Table 1. People who have purchased through the Internet in 2020, food or beverages from stores or supermarkets, according to gender and age (%).

Total People	27.0%
Gender	
Man	25.4
Woman	28.6
Age	
From 16 to 24 years old	15.2
From 25 to 34 years old	25.8
From 35 to 44 years old	28.2
From 45 to 54 years old	28.7
From 55 to 64 years old	32.7
From 65 to 74 years old	36.2

Source: INE [17].

Two observations about the sample configuration stand out. First, it is important to remember that, although online shopping has grown in recent years, Iberian ham is not a traditional product that is purchased online. Therefore, familiarity with online food shopping has been considered as a criterion and it is always the consumers of Iberian ham, regardless of whether or not they buy it online. Secondly, it is important to note that the reference period for making purchases largely coincides with the pandemic period, which has generated uncertainty among consumers about purchasing in physical locations, leading to a large increase in online purchasing. This may have been beneficial to the study, as it is likely that the Iberian ham buyers surveyed incorporated more online shopping experiences than if it had been a regular, unrestricted shopping period.

The fieldwork was carried out during the month of March 2021 through a company specialized in market research, using simple random quota sampling distributed to a panel of consumers with the established profile. The fieldwork was completed with all the security, privacy and data quality filters required for research of this type, which were derived from the company's experience and research protocols.

2.2. Sample characteristics

The characteristics of the sample used in this study are shown in Table 2.

Table 2. Sample composition (%).

Gender	Man	49.9
	Woman	50.1
Age	18-34	33.7
	35-49	27.3
	50-65	27.3
	More 65	11.8
Household size	1	8
	2	28.4
	3	26.4
	4	28.4
	5 or more	8.9

Training	No education	1.3
	First Grade (School Certificate - EGB first stage)	3.1
	Second Grade - First cycle (School Graduate or EGB 2nd stage, 1st and 2nd ESO)	7.8
	Second Grade - Second cycle (FP, Baccalaureate, BUP, 3rd and 4th ESO, COU)	37.7
	Third Degree (University schools, technical engineering)	15.5
	Bachelor's degree or Bachelor's degree (Faculties, higher engineering)	22.2
	Master's Degree	10.4
Revenues	PhD	2.4
	Less 1,500 euros/month	28.4
	1.501-2.500	30.2
	2.501-3.500	18.4
	3.501-5.000	16.9
Size of municipality	Plus 5,000	6.2
	Less than 20,000 inhabitants	16.9
	20.000-150.000	34.4
	150.001-500.000	19.5
Type of household of residence	More than 500,000	29.3
	Young independents	5.1
	Young couples without children	10.0
	Couples with small children	17.1
	Couples with middle-aged children	15.7
	Couples with older children	20.0
	Single-parent households	5.5
	Adult couples without children	10.9
Employment status	Independent adults	9.1
	Retirees	6.7
	Unemployed	12.4
	Student	10.6
	Active	59.0
Consumption area	Retired	18.0
	Zone 1 (high consumption of Iberian ham: Andalusia, Murcia, Extremadura)	28.8
	Zone 2 (average consumption of Iberian ham: Catalonia, Basque Country)	20.6
	Zone 3 (low consumption of Iberian ham: Cantabria, Navarre, Canary Islands)	3.1
	Rest of Spain	47.5

2.3. Statistical Analysis

Therefore, the methodology used will consist, on the one hand, of the search for and analysis of information to be able to carry out the theoretical approach of the study, using both official primary and secondary sources, while, on the other hand, the data obtained through an online questionnaire on the characterization of Iberian ham will be used. The data provided by the MAPA [11] are particularly noteworthy. It is intended to survey a sample of individuals and the questionnaire is structured in 15 questions, after reviewing the existing literature. These questions were selected based on several authors [4,5,18,19] because they are related to the content blocks in which have structured the questionnaire. These blocks are:

- General knowledge and purchase of Iberian ham [18].
- Beliefs and values about Iberian ham [19].
- Purchase intention and willingness to pay more [4,18,19].
- Buy online [4,5,18,19].

Moreover, these questions have different types of scales and types of measurement, carrying out a multivariate analysis (segmentation analysis). A latent segmentation analysis has been carried out to determine possible customer profiles with respect to the characterization elements of Iberian ham.

The advantage of latent class models is that they allow the incorporation of variables with different measurement scales, whether continuous, ordinal, or nominal. In addition, the models often include independent variables that are used to describe the latent classes rather than to define or measure them. Covariates are these exogenous variables [18]. Based on the attributes (indicators) that characterize the composition of this product, this work analyzed gender, age, education level,

employment status, marital status, and income as complementary covariates to determine the profile of online consumers of Iberian ham.

Exploratory factor analysis, also known as multivariate factor analysis, was previously used to create the latent segmentation analysis and reduce the number of items of the variable in question, which made it possible to achieve the two proposed objectives.

After completing the factor analysis, the weighted means of the items were obtained from the factor loadings generated by the rotated component matrix. The values of the ham attributes were used as indicators of the latent segmentation analysis and the sociodemographic characteristics of the participants were used as covariates.

To carry out the data analysis, SPSS® software was used to calculate factors and Latent Gold® to calculate segmentations. The results corresponding to each of them are shown below, obtained from the statistical analyses mentioned in the methodology section.

3. Results and discussions

3.1. Preference for attribute levels in the online purchase of Iberian ham in pieces

The exploratory factor analysis (EFA) obtained four factors that allowed us to analyze the preferences of the participants according to the levels assigned to the different attributes of the product under analysis (Table 3).

The results prior to the AFE show that the Kaiser-Meyer-Olkin (KMO) statistic is meritorious (0.858), as it is higher than 0.8 [20], and Bartlett's test is highly significant (0.0000), indicating that the null hypothesis is rejected (i.e. the correlation matrix is an identity matrix). This demonstrates the validity of the factor analysis model and the acceptability of the model, allowing us to begin a factor analysis of the data [21,22].

Furthermore, when Cronbach's alpha values [23] are obtained, which are greater than 0.7 for each factor, it indicates that the factors extracted are reliable (Table 3). In summary, it is an acceptable and acceptable model that allows carrying out a factor analysis. After extracting the factors, a Varimax orthogonal rotation was performed on the factors with eigenvalues of at least 1.0, which made it possible to reduce the number of variables with high loadings on a specific factor.

Because all variables have a factor loading greater than 0.5 for the related factor [24], the exploratory factor structure is consistent. Table 3 shows the rotated component matrix with the corresponding factor loadings for each item analyzed after applying the Varimax rotation method. This allows us to simplify the interpretation of the factors obtained, as follows:

- Sensory attributes: odor (intensity and aroma), texture (hardness and moisture), flavor (intensity and persistence).
- Interior appearance of the piece: interior appearance of marbling, color, thickness of fat cover, infiltrated fat, rancid fat.
- External appearance of the piece: blackening, conformation, thickness of the shank, hoof color, color of the external fat.
- Additives: oleic acid, salt, sugar.

Table 3. Exploratory factor analysis on the preference for attribute levels in the online purchase of Iberian ham in pieces.

Items	FACTORS			
	F1. Sensory attributes	F2. Interior appearance of the part	F3. External appearance of the part	F4. Additives
Blackening of the part			0.568	
Conformation of the part			0.536	
Rod thickness			0.572	
Hoof shade			0.636	
Shade of external fat			0.597	
Veined interior appearance		0.692		

Interior color		0.574		
Thickness of fat in coverage		0.599		
Infiltrated fat		0.729		
Rancid grease		0.524		
Odor-Intensity	0.701			
Smell-Aroma	0.697			
Texture-Hardness	0.515			
Texture-Moisture	0.620			
Taste-Intensity	0.733			
Taste-Persistence	0.704			
Oleic acid				0.524
Salt				0.632
Sugar				0.602
Variance explained	30.842	10.094	9.009	7.735
Cronbach's alpha	0.751	0.658	0.573	0.536

Total variance explained: 57.680, KMO test: 0.858, Bartlett's test of sphericity: X²: 1769.499 df: 171 sig: 0.000.

3.2. Profile of the online buyer of Iberian ham in the piece, according to their preference for the level of the different attributes of the product

Next, the latent segmentation analysis is collected, which takes place after weighting the items by their factor loadings and finding the weighted average of the items for each of the four factors.

The selection of the ideal number of segments is the first step of the latent estimation, then the model is estimated from 1 (no heterogeneity) to 8 (8 segments exist). For the total sample of 451 participants, Table 4 shows a summary of the estimates and fit indices for each of the eight models.

Table 4. Summary of model results.

Number of clusters	LL	BIC(LL)	Npar	Class.Err.	It is	R2
1-Cluster	-1473.7634	3919.7883	110	0.0000	1.00	1.00
2-Cluster	-1405.1547	3820.9181	149	0.0299	0.89	0.91
3-Cluster	-1346.9493	3742.8545	188	0.0445	0.88	0.89
4-Cluster	-1306.8153	4000.9337	227	0.0626	0.86	0.86
5-Cluster	-1267.3021	4160.2545	266	0.0550	0.89	0.88
6-Cluster	-1155.6755	4175.3485	305	0.0265	0.95	0.94
7-Cluster	-1123.5336	4349.4120	344	0.0315	0.95	0.94
8-Cluster	-1094.2600	4529.2119	383	0.0321	0.95	0.94

LL=log-likelihood; BIC=Bayesian information criterion; CAIC=Consistent Akaike Information Criterion; Npar=number of parameters; Class.Err.=classification error; Es=entropy statistic (entropy R-squared); R2=R-squared (Standard R-squared).

The Bayesian information criterion, also known as BIC (Bayesian information criterion), is used to evaluate model fit. The best model is believed to be the one with the lowest BIC value. The sample was divided into three different groups of consumers of Iberian ham in pieces, who in turn are regular consumers of food products through the Internet. This showed the best alternative [25,26], as shown in Table 4.

The following indicators show that the model fits well: The entropy statistic (Es) and the R2 are close to 1; the L2 statistic, which indicates the number of observed relationships between variables that cannot be explained by a model, is not very high (Table 4).

The profiles of each of the groups obtained are shown in Table 5. The size and name given to each of the three segments obtained are indicated at the top. The Wald statistic is also shown in Table

5. All indicators have a significant p-value associated with this Wald statistic. This shows that each indicator statistically discriminates between the groups [18].

Table 5. Profile of the clusters obtained (Indicators).

	Cluster1 Sensory buyer	Cluster2 Functional buyer	Cluster3 Additive buyer	Wald	P-value
<i>Cluster size</i>	48.32%	36.08%	15.60%		
F1_Sensory attributes	3.6620	3.4680	3.5332	17.05 12	0.00020*
F2_Interior appearance	3.0218	2.9493	2.7871	6.618 3	0.037**
F3_External appearance	3.0565	3.1925	2.8105	24.35 18	5.2e-6*
F4_Additives	2.1721	2.2728	2.4720	25.59 88	2.8e-6*

Note: The largest relative importance per segment is shown in bold. *p-value < 0.001; **p-value < 0.05.

To complete the composition of the three segments created, the profiles of the resulting groups were analyzed using the data from the covariates included in the model, which were the participants' classification variables.

The composition of each group is shown in Table 6 according to the descriptive criteria used in the analysis. The contrasts related to the Wald statistic conclude that, according to all classification variables except age (not significant), there are significant differences of 99% between the three segments. This could be because age is a fixed variable, set as an entry quota when conducting the fieldwork (50 % male/female). At 95%, household size is significant.

Table 6. Profile of the clusters obtained (covariates).

Descriptive criteria	Cluster1 Sensory buyer	Cluster2 Function al buyer	Cluster3 Additive buyer	Wald	P-value
Gender (%)					
Man	50.92	50.08	46.24	0.8926	0.64
Woman	49.08	49.92	53.76		
Age (%)					
18_34	28.02	32.86	53.32	12.4907	0.0019*
35_49	31.71	22.74	23.99		
50_65	28.97	30.64	14.18		
66_+	11.30	13.76	8.51		
Revenues (%)					
Minus 1500	19.52	25.70	62.14	21.6858	2.0e-5*
1501-2500	25.38	32.33	33.75		
2501-3500	20.44	21.83	4.11		
3501-5000	27.54	12.47	00.00		
More 5000	7.12	7.67	00.00		

*p-value<0.01; **p-value<0.05.

The profiles of the three groups of online buyers of Iberian ham, according to their preferences on the different levels of attributes that make up the product, are shown below in Table 5 and Table 6, which have ordered from largest to smallest cluster size:

-The segment with the largest size (48.32% of the sample) is the "sensory buyer". If you look at the values of the indicators, ranging from 1 to 5, with 1 as the lowest score, it can be seen that the Sensory Attributes (i.e. odor-intensity, odor-aroma, texture-hardness, texture-moistness, flavor-intensity, flavor-persistence) have a value of 3.6620 and the attributes related to the Interior Appearance of the Piece (i.e. marbling, color, fat thickness in cover, infiltrated fat, rancid fat) have a value of 3.0218. Both attributes have high scores compared to the rest of the segments. This type of buyer is between 35 and 49 years old (31.71%) and has a salary between 3,500 and 5,000 euros (27.54%).

-Compared to the other two groups, the "functional buyer" represents 36.06% of the sample and obtains the highest value in the indicator of the External Appearance factor of the piece (i.e. blackening, conformation, thickness of the shank, hoof tone, tone of the external fat), with a value of 3.1925. 30.64% of the population is between 50 and 65 years old and 32.33% has an income between 1,501 and 2,500 euros.

-The "additive buyer" accounts for 15.60% of the sample. With a value of 2.4720, the factor indicator Additives (i.e. oleic acid, salt and sugar) obtained the highest scores compared to the rest of the segments. 53.32% of the buyers are young, aged 18 to 34 years and have an income of less than 1,500 euros (62.14%).

3.2. Discussions

The data indicate that online buyers of Iberian ham have been able to distinguish three groups of individuals:

- Sensory buyer: this group comprises about half of the sample. When buying Iberian ham online, this group prefers the sensory aspects and appearance of the ham. It is a middle-aged individual between 35 and 49 years of age. It is characterized by being active at work and receiving a high salary ranging between 3,500 and 5,000 euros.
- Functional buyer: more than a third of the sample focuses on the external appearance of the Iberian ham when buying online. An adult person (50 to 65 years old) with an average income of approximately 1,500 to 2,500 euros.
- Additive buyer: this cluster is the smallest in the sample and shows a greater preference for the attributes of Iberian ham related to the seasoning of the product, i.e., the percentage of oleic acid, salt, and sugar, compared to the two previous segments. This is a young buyer, between 18 and 34 years of age, with a lower income than the rest, less than 1,500 euros.

On the other hand, when analyzing the variables of gender, age and income, the following conclusions were reached:

- Gender: the purchase of Iberian ham in pieces online does not discriminate by gender when selecting the product according to their preferences, so there are no significant differences between the three groups.
- Age: cluster 1 of sensitive shoppers is composed of middle-aged people and people over 65, cluster 2 of functional shoppers is composed of mature people and cluster 3 of additive shoppers is composed of younger people.
- Income: buyers in cluster 3 have lower monthly incomes, while buyers in clusters 2 and 3 have similar incomes between €1500 and €2500. Clusters 1 and 2 have the same proportion of average incomes. Cluster 1 contains mainly high incomes.

4. Conclusions

This work shows that consumers consider four groups of attributes (sensory attributes, interior appearance of the piece, exterior appearance of the piece and additives) when making their purchases of Iberian ham. Moreover, this work proposes some recommendations for the online sale of Iberian ham, based on the profile study, on the one hand, the different attributes of the product should be differentiated by content blocks, as well as considering the existence of different profiles of individuals with different preferences. On the other hand, a small initial questionnaire on personal

characteristics could be established to obtain a product more adapted to the buyer's profile. In relation to the above, the informative offer should not discriminate according to gender, and products related to seasoning should be highlighted to younger people.

However, this work also has limitations, such as the fact that in terms of applicability and generalizability it falls short because the context of the analysis is very specific (Iberian ham in pieces) and cannot be used for other elements outside the scope, and also because it focuses only on Spain, it could represent a future line of research by considering the possibility of extrapolating the information to contemplate the online sale of Iberian ham to other countries, adapting the web page to each site, as well as the personalization of the product both within Spain and abroad. On the other hand, this study could be repeated year after year to obtain a longitudinal study to examine consumer changes or trends over time.

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