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Determinants of Tunisian Consumers' Willingness to Pay for Organic Cereal Products

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Abstract-Investigating Tunisian consumer attitudes about organic cereal products and the factors influencing their willingness to pay a premium price for them are the goals of this paper. Based on a face-to-face exploratory survey of Tunisian household heads, a descriptive analysis and a binomial logistic regression model were used to investigate the factors that would influence Tunisian consumers' willingness to pay more for sustainable organic cereal purchases. According to the study, 20% and 31% of the consumers surveyed indicated that they would be willing to pay an extra 10% or 5% on top of the initial purchase price to buy an organic product, respectively. The outcomes of the binary logistic regression model demonstrate that several factors are influencing. Factors such as consumer sustainability value, desire to pay more for quality, quality/price relationship, health value, and economic value determine customers' willingness to pay a premium price for organic cereal products. These elements must be taken into consideration by producers and processors of organic cereals while making managerial choices.

Keywords— cereal, consumer attitude, conventional products, organic products, logistic regression, willingness to pay.

I. INTRODUCTION

The 20th century saw an intensification of agriculture that was driven by an economic rationality. However, factors such as climate change, air pollution, lack of fresh water, and the extinction of species and habitats, have sometimes irreparably harmed the environment, endangering the food security of many countries. Sustainability issues, used to only influence agricultural production systems, now touch the entire agri-food system, raising concerns among consumers. In response to this dilemma, many industries have adopted creative concepts like green marketing, green customers, green products, and sustainable products like organic products.

They have also implemented trade policies that are more considerate of customer awareness of environmental issues while maintaining market competitiveness. The potential to develop a new strategic axis sustainability, which many firms are already integrating into their long-term planning system, has been made possible by this understanding among producers and distributors [22]. This became a reality with the introduction of organic, eco-friendly, and socially responsible items to the market. However, these items haven't yet enjoyed the level of market success that was predicted, according to some authors [14]. Organic products have an additional cost compared to the conventional product, which typically influences the purchasing price for the consumer. Price resistance is a significant barrier to market demand because these products are typically more expensive [10]. In order to convince the customer, more product information or more cheap prices are needed.

Several studies have investigated how a farm or company considers sustainability at the strategic management level and the effects this has on its activities. [4, 20, 23]. Conversely, researchers have shown less interest in studies on the attitudes and actions of purchasers of sustainable goods such as organic products. Indeed, these investigations are a challenging since they deal with several psychological, sociological, and cultural issues. Focusing on organic products as an example of sustainable products in Tunisia, we note that these products are at an early phase of its development; most of the produce is exported to developed countries and national market share is limited. In fact, the areas of organic agriculture reached about 326 thousand hectares in 2019 against 18,600 hectares in 2002 and the number of operators increased from 481 in 2002 to 7190 in 2019. Most of it is dedicated to arboriculture and especially the olive tree, but other organic crops are growing, such as cereals [5].

Focusing in the grain sector, one of the main pillars of the national economy, there are varying proportions of land used for organic cereal crops, with occasionally noticeable annual changes, rising from 485 ha in 2017 to 1595 ha in 2018. The three main grains farmed organically are wheat, barley, and oats. There are two organic grain manufacturers targeting a very small

market [5]. These actors in organic mode need to understand the factor affecting the purchase and willingness to pay for organic derivatives of cereal to penetrate the Tunisian market, design their commercial strategy, and improve their profitability.

Therefore, this paper intends to understand Tunisian consumer attitudes about organic cereal products and the primary variables influencing their willingness to pay a premium price for them. For this purpose, it is first necessary to establish a few key terms about willingness to pay concept. Second, we will explain the methodology for data collection and analysis. The primary findings are then examined.

II. FOCUS ON WILLINGNESS TO PAY (WTP) CONCEPT AND ITS DETERMINANT FACTORS FOR ORGANIC PRODUCTS

Many aspects of marketing management (choosing prices or developing new products) depend on knowledge of potential customers' willingness to pay for a product. The amount that represents the disparity between consumers' surplus before and after the introduction of a product or the improvement of food product attributes is known as willingness to pay [18,15, 9].

Many motivating factors, including environmental concerns, health concerns, perceptions, awareness, as well as others, are revealing of consumers' willingness to pay for organic food products [3, 15].

Consumers are continuously looking for food safety and are willing to pay more for safe, nutritious products. Numerous studies conducted worldwide examined consumers' WTP for factors related to food safety and quality. Many of them provide WTP coverage exclusively for organic food. Organic goods are also seen as advantageous due to their minimal pesticide residue concentration [9, 15, 24].

Several studies showed that customers are concerned about healthy and nutritious food, safer production methods, and health care, which are vital factors for the consumption of organic food. Aspects like flavor and nutrition are important as well [17, 25].

Also, sociodemographic factors especially income levels have been studied as WTP predictors for organic food products, but empirical findings on the association between income levels and WTP are controversial and conflicting [15].

The following factors can be viewed as general barriers to buying organic food: high prices, scarcity, product category scarcity, and mediocre product appearance. Several consumer surveys discovered that a lack of information, lack of taste, culinary challenges, and a lack of knowledge can be barriers to purchasing goods from organic agriculture. The most main obstacles to purchasing organic food products should be noted as being higher product prices and lack of availability in supermarkets [11].

From the perspective of consumers, the price of organic food constitutes a significant barrier to the organic food industry due to the huge gaps between WTP and premium price. According to Rui Li & al [19] consumers agreed that price is a determinant indicator in organic food purchase decision. Even though organic products are healthier, many respondents are unwilling to pay a premium price for them [15]. Consumers' environmental beliefs had a significant impact on the explanation of their behavior in buying organic products [15, 16, 21]. People like to support ecologically friendly items and prevent any behavior that causes environmental damage or pollution [13, 15]. Additionally, customers are willing to pay more for organic products because they believe they have a superior nutritional value [15].

Khanal [9] and Ali and Ali [1] submit that marketing factors such as product price, communication, distribution, advertisement, availability, etc. and consumer's psychological factors (consumer perceived values, knowledge and awareness), and behavioral beliefs (willingness to pay more for quality, sensibility to the quality/price ratio) determine organic food purchase decisions and willingness to pay a premium price for organic product.

This literature revue indicates that, in addition to sociodemographic parameters, several factors affect customers' willingness to pay. Consumer awareness to the quality/price ratio, desire to pay more for quality, and values such as sustainability, health, economic worth, and conditional values all play a role. Therefore, this research aims to confirm this assertion in the case of the Tunisian market.

III. METHODOLOGY

A. Data collection

For this purpose, a face-to-face survey with Tunisian consumers was conducted. A sample of 173 consumers responsible of the household's agri-food purchases were studied. The fact that 123 women (71.10%) and 50 males (28.90%) were among the 173 people interviewed only serves to highlight how important women's purchasing decisions are. Our sample is geographically distributed as follows: 30.6% in the center, 30.6% in the south and 38.7% in the north. In terms of age, it was found that most respondents were in the 30-40 age group (26% of the sample). This explains the fact that most respondents are married (73.41%). 14.5% have a secondary level of education and 4.6% have a primary level or are completely illiterate. In addition, the largest proportion (31.8%) of those surveyed have a monthly income of 1000 to 1500 Tunisian Dinars (TD), 24.3% have an income between 500 and 1000 TD/month, 22% have an income between 1500 and 2000 TD/month and 12.14% have an income of more than 2000 TD/month, and finally 9.83% are those who hold less than 500 TD/month (Euro =3.35TND). A total of 36.42% of the respondents in our sample are employed, 20.23% are managers and have higher-level occupations, 19.65% are housewives, and the other respondents are retirees, job seekers, artisans, and other workers.

This is an in-person investigation that typically lasts 20 minutes, divided into five sections with 25 questions. The first part covers knowledge of organic products and preferences for organic cereal products. The second part concerns the purchasing habits of cereal products, as well as the frequency, the places of purchase and the different consumption situations. Simple and multiple-choice questions are used in these two parts. The third part examines the factors that affect consumer preferences and cereal product purchases using the Likert scale. In the fourth part, further research is done on how customers

view the three pillars of sustainability and their willingness to pay for sustainable goods. Based on the literature review on sustainability assessment methodologies for the consumer link, many of the indicators are qualitative and subjective and largely depend on how consumers perceive the three dimensions of sustainability. The last section deals with the socio-demographic characteristics of the consumers interviewed.

B. Data analysis

Primarily, a descriptive analysis has been proposed via simple sorting and cross-checking of different questions, followed by an explanatory factor analysis using the SPSS software (version 26) to identify the different dimensions or factors influencing the purchasing act of organic cereal products.

To determine the principal dimensions among the variables, 20 items were factor-analyzed, using principal component analysis (PCA) with the Varimax rotation method to establish the different dimensions of quality. The Varimax rotation was used to maximize the differences between the components extracted and to maintain correlation within the components. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and the Bartlett's test were used to determine the fitness of the data. Values of 0.6 or above from the KMO measures indicated that data are adequate for PCA. The items factor-analyzed set out details about the different consumer values (sustainability, health, economic and conditional value values), their sensibility to the quality/price ratio and their willingness to pay more for quality.

Secondly, the Willingness to Pay (WTP) for organic cereal products was investigated. It refers to the amount of money that a consumer is willing to pay for a new good or service or for a change in the attributes of a product that already exists on the market [7]. According to Louviere and Islam [12], the WTP can be calculated through the marginal substitution relationship between two attributes, one monetary and the other non-monetary, thus obtaining the implicit prices for each of these characteristics.

WTP xj=
$$\beta$$
xj / β price (1)

For the case of the organic label attribute:

$$WTP = \beta \text{ organic } / \beta \text{ price}$$
(2)

Thirdly, a binary logistic regression was performed to evaluate a model whose dependent variable is "willingness to pay for organic cereal products" (a dichotomous variable « 1=yes » and « 0=no ») using the generated factors influencing the purchase behavior of organic cereal as independent variables. All predictor variables evaluated are continuous.

IV. RESULTS

A. Organic knowledge and choice between cereal products

Cereal products are the basis of the Tunisian food ration. Most participants buy conventional cereal products. It should be noted, in the table 1, that the most consumed organic cereal products are pasta, couscous and "Bsissa" (typical Tunisian cereal meal for breakfast).

TABLE I. CONSUMPTION OF CONVENTIONAL AND ORGANIC CEREAL PRODUCTS

Cereals products	Conventional	Organic (%)		
Big bread	100	0		
Special bread	97,1	2,9		
Semolina	93,6	6,4		
Flour	91,3	8,7		
Biscuits	89,6	10,4		
Corn flakes	89	11		
"Bsissa"	82,6	17,4		
Couscous	82,6	17,4		
Pasta	82,1	17,9		

Regarding consumers identification of organic products, 96% of the sample reported that they identify it by the mention of Organic Agriculture label, while only 4% of the sample mentioned the sustainable label in their statements. In fact, only 28.32% of the interviewed reported that they are very well informed about organic product and label. Problems with identification and information are notable. Maintaining a healthy lifestyle, searching the good taste and quality of organic foods, and contributing to environmental conservation are the key arguments for selecting an organic diet (table 2). Conversely, consumers are reluctant to use organic products because of their high cost, scarcity, and difficulty in spotting them at retail locations (Table 3).

TABLE II. REASONS FOR EATING ORGANIC CEREAL PRODUCTS

Motivating factors	%
Preservation of health	29
Quality/ taste of organic	24
Preservation of the environment	19
Health problem	14
Special diet	9
Follow a mode effect	5
Reflect a standard of living	0

TABLE III. CAUSES OF RELUCTANCE TO CONSUME ORGANIC (IN %)

Barriers	%
High price	25
Lack of availability	21
It's challenging to find in stores	18
No information on organic label	14
Changes in eating habits can be challenging	11
Lack of awareness of their benefits	7
Lack of credibility of the organic products	4

B. Purchase patterns of cereal product consumption

With rates of 56% and 39% respectively, corn flakes and "Bsissa" are the least-bought products among Tunisians with striking variations in frequency of cereal products purchases. For example, 57% of respondents said they buy flour once a month. 38.73% of respondents said that they buy pasta every week and almost 33% of the sample buy it every two weeks.

Moreover, 34.69% buy couscous every month, 27% every two weeks and 26% every week. Regarding the places of purchase, interviewed consumers chose several combinations of places of sale, except for breads that consumers prefer to purchase from supermarket and grocery shops. During the purchase process, 53% of respondents indicated that they always read the products labels. The cut-off date, the date of manufacture and the origin of the product are the main evaluation criteria that consumers would like to see on the packaging of cereal products.

C. Factors influencing the purchase decision of organic cereal products

Many factors influence the purchase decision of conventional and organic cereal products, including consumer values (sustainability, health, economic, conditional values), consumer willingness to pay more for quality and consumer sensibility to the quality/price ratio. A total of 20 items were scored to understand factors that influence the purchase decision of Tunisian consumers. It should be noted that items with a score above 3,9/5 are related to the quality and price of these cereal products. Price is a determining factor in the purchasing decision-making process. Generally during the process of purchasing a product, the consumer compares the quality/price ratio of the various brands available on the market, but he can pay more for a product of better quality and especially for organic products (Table 4).

TABLE IV. SCORING OF FACTORS INFLUENCING THE PURCHASE DECISION OF ORGANIC CEREAL PRODUCTS

Items	Mean	Std. Deviation
1. I buy if the product respects fair trade.	2,91	,914
2. I buy if the product is not wasted.	2,95	,945
3. I buy if the product is sustainable.	3,07	1,032
4. I buy if the product is environmentally friendly.	3,22	1,342
5. I buy if the product is organic.	3,42	1,479
6. I pay more if the product is environmentally	2,90	1,308
7. I pay more if the product is labeled.	3,10	1,337
8. I pay more the product is organic.	3,43	1,258
9. I buy my favorite product at any price.	3,33	1,258
10. I always compare the quality/price ratio of different brands.	4,16	1,183
11. I often buy the cheapest product.	3,20	1,497
12. I pay more if the product is of better quality.	3,94	1,235
13. I buy if the product does not contain pesticides.	3,99	1,110
14. I buy if the product does not contain preservative additives.	3,95	1,101
15. I buy if the product is cheap.	3,60	1,324
16. I buy if the product is high priced.	4,47	,811
17. I buy if the product is subsidized.	3,70	,749
18. I buy if the product is Tunisian.	3,58	,959
19. I buy if the product is being advertised.	3,74	,932
20. I am looking for new and different products.	3,69	1,038

D. Factor analysis of variables influencing the purchasing decision of organic cereal products

The 20 variables introduced in the principal component analysis (PCA) showed several correlations between them (> 0.5) with a very significant Bartlett test and a good Kaiser-

Meyer-Olkin index (KMO). The exploratory factor analysis with Varimax rotation of the 20 variables result edit a six-factor solution with an eigenvalue higher than 1 that explains 74.40% of the variance (table 5).

The first dimension is well represented by the values of sustainability (fair trade/ not wasteful/ sustainable/ respectful of the environment and organic), thus constituting a dimension qualified as "Sustainability value" and it explains 18.18% of the total variance.

The second dimension, identified as "willingness to pay more for quality," is represented by pricing values (I pay more for a product that respects the environment, is labeled, or organic, and I buy my favorite product regardless of its price). It explains 15.88% of the total variance.

The third dimension is related to the quality/price relationship (I compare the quality/price ratio of the different brands/ I often buy the cheapest product/ I pay more for a product of better quality), allowing to characterize a dimension titled "Sensibility to the quality/price ratio" that explains 11.05% of the total variance.

The fourth dimension, explaining 10.42% of the total variance, is represented by health values (product that does not contain pesticides or additives). The fifth dimension is represented by economic values (cheap or high price/Tunisian product/subsidized product) and it explains 9.91% of the total variance. The sixth dimension is represented by conditional value (advertised product, new and various products), it explains 8.93% of the total variance.

E. Factor determining Tunisian consumers' willingness to pay a premium price for an organic cereal product

Analysis of the results revealed that 41% of the sample hesitated to pay a premium price to buy an organic product, indicating that customers are unwilling to spend more for an organic cereal product. While 20% are willing to pay 10% more and 31% are willing to pay 5% more on top of the original price of the product to purchase an organic version, respectively. Therefore, it's interesting to investigate the effect of the six factors previously identified on the consumers intention to pay a premium price for organic cereal products.

Thus, a binary logistic regression was generated to evaluate a model whose dependent variable is "willingness to pay a premium price for organic cereal products" (a dichotomous variable « 1=yes » and « 0=no ») using the established factors influencing the purchase behavior of organic cereal as independent variables. All predictor variables evaluated are continuous.

Kaiser-Meyer-Olkin (KMO) Measure of sampling adequacy					,857	5		
	Bartlett's test	Approx. chi square df			2694,245			
	for sphericity	Sig.				,000		
	Factors	1	2	3	4	5	6	
ity value	I buy if the product respects fair trade.	,918	,165	,164	,119	,112	,130	
	I buy if the product is not wasted.	,902	,192	,170	,112	,114	,168	
ıstainabil	I buy if the product is sustainable.	,893	,189	,166	,171	,114	,025	
Factor1. Su	I buy if the product is environmentally friendly.	,670	,372	,044	,286	,026	,037	
	I buy if the product is organic.	,497	,262	,379	,398	-,071	,158	
ay more for	I pay more if the product is environmentally friendly.	,268	,871	,020	,149	,088	,120	
ness to p ıality	I pay more if the product is labeled.	,251	,847	,018	,115	-,003	,149	
Willing	I pay more the product is Organic.	,159	,757	,270	,239	,036	,098	
Factor2.	I buy my favorite product at any price.	,118	,618	,291	,084	,287	-,052	
or3. Sensibility to the quality/price ratio	I always compare the quality/price ratio of different brands.	,126	,079	,828	,135	,117	,015	
	I often buy the cheapest product.	-,180	-,147	-,786	-,019	-,130	-,029	
Fac	I pay more if the product is of better quality.	,219	,498	,579	,111	,190	,117	
lth Value	product does not contain pesticides.	,236	,205	,125	,888	,173	,083	
Factor4. Heal	I buy if the product does not contain preservative or additives.	,264	,243	,085	,881	,129	,065	
Factor5. Economic value	I buy if the product is cheap.	,073	,093	,069	,043	,860	,055	
	I buy if the product is high priced.	-,011	-,094	-,027	-,055	-,639	,345	
	I buy if the product is subsidized.	,093	,053	,305	,116	,566	,360	
	I buy if the product is Tunisian.	,222	,084	,237	,259	,503	,292	
rt6. rel value	I buy if the product is being advertised.	,079	,066	,093	,050	-,053	,854	
Facto Conditionr	I am looking for new and different products.	,145	,166	-,028	,076	,095	,757	

 TABLE V.
 Factor analysis results of consumption values' items (Varimax rotation)

The logistic regression could use two indicators such as Cox and Snell R2 and Nagelkerke R2 that estimates the contribution of predictor variable to the variability of dependent variable. We used the Nagelkerke R2 indicator to analyze the contribution of all predictor variables to the variability of the dependent variable. Knowing that Cox and Snell R2 indicator usually underestimates the real value, the test results could explain in 67.6% the effect of the environment on the artefacts. The results from the classification table showed that the mathematical model predicts 82,7% of cases correctly, so we could conclude that it is a good performing model, and its regression coefficients (β) are shown in "Variables in the equation".

Except for the conditional value, which is not significant and has a negative influence, table 6 demonstrates that all included variables are significant and have a positive impact on the intention to pay a premium price for organic cereal products.

The model indicates that the "Sustainability value", as a predictive variable with a Wald test of 8.9, is significant at p<0.05 and positively affects the intention to pay more for organic cereal products. Indeed, interviewees aware of the concepts of sustainability with its economic, social, and environmental pillars and of sustainable production, distribution, trade, and consumption modes are more likely to pay more for organic cereal products.

The "Willingness to pay more for quality" variable, with a Wald test of 34, positively influences the intention to pay more for organic cereal products. In fact, respondents who can pay more to buy a labelled product or ecofriendly product also tend to pay more to buy an organic cereal product.

Customers "sensibility to the quality/price ratio" has a positive impact on the willingness to pay a premium price for an organic cereal product with a Wald test of 25.30 and a significance of 5%.

Consumers with health concerns are looking for healthy products (without pesticides or preservative additives). They are more likely to pay more for organic cereal products with a Wald test of 15.99 and significant à 5%.

The "Economic Value" variable presents a Wald test of 8.5 and positively influences the intention to pay more for organic cereal products. Indeed, the results show that respondents tend to pay more for organic cereal products if (1) they are relatively cheap, (2) of Tunisian origin and (3) subsidized products.

Finally, the "conditional value" indicates a Wald test 0.57. This variable is not significant and negatively affects the intention to pay more for organic cereal products.

TABLE VI. THE BINARY LOGISTIC REGRESSION OF THE WILLINGNESS TO PAY A PREMIUM PRICE FOR AN ORGANIC CEREAL PRODUCT

Factors	A	<i>E.S.</i>	Wald	ddl	Sig.	Exp(B)
Sustainability value	,823	,275	8,935	1	,003	2,277
Willingness to pay more for quality	2,328	,399	34,041	1	,000	10,259
Sensibility to the quality/price ratio	1,503	,299	25,301	1	,000	4,496
Health Value	,983	,246	15,991	1	,000	2,673
Economic value	,717	,246	8,498	1	,004	2,049
Conditional value	-,063	,261	,057	1	,811	,939
Constant	,763	,261	8,518	1	,004	2,144

V. CONCLUSION

This article employs a binomial logistic regression model and descriptive statistics to measure consumers' willingness to pay a premium for organic cereal products and factors influencing them. For Tunisian consumers, six factors are determining the purchase decision of organic cereal products: sustainability value, willingness to pay more for quality, quality/price relationship, health value, economic and conditional value.

The findings showed that 41% of the sample were hesitant to spend more money on an organic product, proving that consumers are averse to pay more for an organic cereal product. While 20% and 31%, respectively, are willing to pay 10% and 5% more on top of the original price of the product to buy an organic version.

In accordance with the results of Chen [3], Nandi et al. [15], Rodríguez [17], the results of the binomial logistic regression model show that all these factors are significant and have a positive impact on the willingness to pay a premium price for organic cereal products, except for the conditional value, which is not significant and has a negative influence.

Producers and processors of organic cereals must take the above factors into account when developing their business plans and carrying out their commercial activities, particularly when determining sale prices that maintain a reasonable quality-price ratio. They must also emphasize the three pillars of sustainability (environmental, social, and economic) as well as the product's attributes, health advantages, and other relevant information.

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