



Decision Tree Analysis of Consumers' Intentions to Purchase Coffee in Glass Flasks

Sezgin Irmak¹ 

Mehmet Özer Demir² 

| Karar Ağaçları Kullanılarak Tüketicilerin Cam Ambalajda Kahve Satın Alma Niyetlerinin Analizi | Decision Tree Analysis of Consumers' Intentions to Purchase Coffee in Glass Flasks |
|--|--|
| <p>Öz</p> <p>Bu araştırma, tüketicilerin cam ambalajda sunulan hazır kahve tüketimi niyetlerini belirlemeye dönük olarak algılarını ve karakteristiklerini tanımlamayı amaçlamaktadır. Bu bağlamda çalışma, tüketicilerin cam ambalajda sunulan içilmeye hazır kahve konusundaki beklentilerini belirlemek için, gıda ile ilgili yaşam tarzı ve paketleme seçimi ölçeklerini değerlendirmektedir. Çalışmada karar ağaçlarını yapılandırmak ve elde edilen en iyi karar ağacını görselleştirmek için CHAID algoritmasından yararlanılmıştır. Satın alma niyeti hedef değişken olup, 16 faktör değişkeni ve 12 demografik değişken de tahmin edici değişkenlerdir. Sonuçlar, tüketicilerin cam ambalajda sunulan içilmeye hazır kahve alma niyetlerinin doğru korma, çekicilik, sağlamlık ve kahve türü tercihi değişkenleri ile belirlenebileceğini göstermektedir. Karar ağacı modeli satın alma eğilimlerine göre tahmin edici değişkenler bakımından tüketici profilini ortaya çıkarmaktadır.</p> | <p>Abstract</p> <p>The aim of this research is to determine the perceptions and the characteristics of consumers to determine their intentions to purchase ready to drink coffee in glass flasks. In this context, this study assesses the food-related lifestyle, and the packaging choice scales to investigate consumers' expectations about ready to drink coffee offered in glass flasks. The study operationalizes CHAID algorithm to build decision trees and visualizes the best obtained decision tree. Intention to purchase is the target variable, 16 factor variables and 12 demographic variables are predictive features. Results suggest that consumers' intentions to purchase ready to drink coffee in glass flasks can be determined by correct preservation, attractiveness, healthiness, and the type of coffee preferences. Decision tree model reveals the consumer profiles in terms of the predictive variables.</p> |
| <p>Anahtar Kelimeler: Karar Ağaçları, Tüketici Niyeti, CHAID, Kahve Ambalajlama</p> | <p>Keywords: Decision trees, Consumer Intentions, CHAID, Coffee Packaging</p> |
| <p>JEL Kodları: C10, C38, M31</p> | <p>JEL Codes: C10, C38, M31</p> |

| | |
|--|---|
| <p>Araştırma ve Yayın Etiği Beyanı</p> | <p>Bu çalışma bilimsel araştırma ve yayın etiği kurallarına uygun olarak hazırlanmıştır.</p> |
| <p>Yazarların Makaleye Olan Katkıları</p> | <p>Çalışmanın tamamı iki yazar ile birlikte oluşturulmuştur. Bununla birlikte birinci ve ikinci bölümler Mehmet Özer Demir; yöntem, analiz, modelleme ve bulguları içeren üçüncü, dördüncü ve beşinci bölümler Sezgin Irmak; altıncı bölüm olan Sonuç ise her iki yazar tarafından yapılmıştır.</p> |
| <p>Çıkar Beyanı</p> | <p>Yazarlar açısından ya da üçüncü taraflar açısından çalışmadan kaynaklı çıkar çatışması bulunmamaktadır.</p> |

¹ Doç. Dr., Akdeniz Üniversitesi, Uygulamalı Bilimler Fakültesi, Yönetim Bilişim Sistemleri Bölümü. sezgin@akdeniz.edu.tr

² Dr. Öğr. Üyesi, Alanya Alaaddin Keykubat Üniversitesi, Mühendislik Fakültesi, İşletme Mühendisliği Bölümü. mehmet.demir@alanya.edu.tr

1. Introduction

Food and beverages industry is a dynamic sector which is forced by changes in consumers' preferences and lifestyles to find new ways of offerings. Packaging has become an important marketing tool and this tool enables food industry to develop new product offerings in new and innovative ways. This could be possible if only companies know and understand the type of packaging tips affecting consumers' purchasing decisions (Küster, Vila, & Sarabia, 2019). The food packaging industry is a very innovative sector and companies in this sector should direct some part of their efforts to identify trends in consumer needs and requirements. Lifestyle is one of the most important factors which offers food packaging manufacturers opportunities through the added value offered to consumers through packaged products (Cholewa-Wójcik, Kawecka, Ingraio, & Siracusa, 2019). Food package design and material increases the value of a product by meeting the needs of consumers, because the properties of packaging can be improved by taking sensory and non-sensory characteristics into account to meet consumer expectations in a variety of functional, aesthetic, economic and ecological ways (Rodríguez-Parada, Mayuet, & Gámez, 2019).

The food package can be defined as a container that holds, protects, preserves and identifies the product and facilitates usage, storage, and commercialization (Eldesouky, Pulido, & Mesias, 2015). Packaging also plays a major role in attracting consumers' attention and affecting consumer purchasing decisions (Rundh, 2005). Packaging in a food & beverage retailer is the last chance for companies to convince consumers to buy their products. Therefore, all packaging elements must be combined to attract the consumer when purchasing the product (McNeal & Ji, 2003).

Packaging also works as a differentiation tool, helping consumers to choose from a wide range of products and to encourage them to purchase the product (Wells, Farley, & Armstrong, 2007). Therefore, the package should be considered one of the most important factors affecting the consumers' purchasing decisions and should be taken as a competitive advantage element to attract consumers and to convey the product benefits directly in the food industry (Dantas et al., 2011).

The essence of the packaging lies in expressing the needs of consumers through visual design that can enhance and highlight the image of the product and the brand. The more the visual image is transferred to the package, the easier it is for the consumer to understand it. Researchers found out that the advantages of the brand can be exploited and the visual design of the packaging can be divided into six components: color, text, graphics, layout, structural modeling, and materials (Ansari, Usama, & Siddiqui, 2019; Tu, Chang, & Chen, 2019). Packaging can be developed to convey desired messages to the consumer more clearly and consciously.

Packaging has become an important extrinsic quality mark, providing information about not only food but also brand image and lifestyle. However, the role of packaging and presentation format in shaping consumers' preferences should be comprehensively assessed. In this study, the complex aspects of the consumer/packaging relationship are discussed on coffee sold in a glass flask. Ready to drink cold packaged coffee target consumers that time scarcity is an important driver for food choices. Researchers studied the preferences of consumers and their

willingness to pay for reduced food preparation times, and segmented the consumers as quickies, who are willing to pay a premium for saving time; the 'foodies', who receive utility in cooking; and the 'indifferent', for whom the time needed to prepare meals is not a choice factor (Casini et al., 2019). In refreshing beverages, many consumers do not have the patience to effectively search and process in-depth information, such as nutritional facts or ingredients, but instead, automatically and spontaneously make intuitive decisions. Today, many brands are becoming increasingly homogeneous in quality and taste, so brands cannot rely solely on taste to create consumer value and loyalty, and must find creative ways to differentiate from the competitors.

Despite the importance of packaging, there is not much study published about its impact on consumer preferences when it comes to coffee sold in a glass flask. In addition, it is a new product offer in Turkey. The coffee offered in glass flasks is also important for glass producers as much as coffee producers. From an international marketing point of view, if the product is exported, the glass flask is also exported. In this context, it is imperative that the important factors associated with a glass flask and consumer attitudes towards coffee consumption in glass flask in the purchasing process are important for both coffee producers and glass manufacturers. The findings of this study suggest suitable directions for coffee companies and manufacturers of a glass flask can use it as a tool to conduct preliminary research on new packaging properties or packaging materials. The information obtained is of great importance for the coffee and glass industries when planning to develop new forms of packaging or targeting markets.

Although, current literature on packaging conducted in Turkey is widespread, literature lacks consumer segmentation and profiling studies. Most of the papers deploy conventional statistical methods, such as frequency analysis, independent samples t-test and one-way ANOVA, and the papers aim to investigate the relationships between variables or differences within demographic variables. The current literature lacks consumer profiling studies and the methodologies suitable for profiling. Thus, the contribution of this paper is two-folds. First, this study profiles the purchasers of ready to drink coffee offered in glass flask, which is missing in the literature. Second, the paper introduces a consumer profiling method using the CHAID algorithm, one of the decision tree algorithms from the machine learning family.

2. Literature Review

The literature on market segmentation suggests four segmentation bases which are demographic, psychographic (lifestyle), behavioral, and geographic bases (Kanta, 2017). The variables are chosen to capture demographic segmentation, psychographic segmentation, and behavioral segmentation. Geographic segmentation is not included in the study, because it is incompatible with the aim of the study. Thus, this study covers three of the four segmentation bases.

2.1. Food-Related Lifestyle

Although it has no theoretical foundation, within a commercial setting consumer activity, interests and opinions are used to classify consumers into lifestyle segments (Anderson Jr & Golden, 1984). As an alternative approach, Food-Related Lifestyle (FRL) considers lifestyle as a mental structure connected to personal values and is the process by which people try to reach

their values through various modes of expression, including food purchase and consumption (Saba et al., 2019). Based on the models of cognition and behavior that stem from psychology proposes that the use of abstract humanitarian values on the top and product attributes on the bottom, and lifestyle as an intervening mechanism between cognitive structures (or personal values) and product perceptions can be used (Grunert, 1995). FRL is a "psychographic" or lifestyle segmentation used to segment the market by identifying consumers' values in relatively homogeneous groups is a more effective way to predict consumer behavior compared to demographics-based segmentation. Food-related lifestyle is shown to be helpful in separating consumer segments for marketing purposes (Jetsadalak & Suwunnamek, 2019). Lifestyle segmentation often uses data reduction techniques such as factor analysis, multidimensional scaling, or correspondence analysis of lifestyle groups or divisions, followed by a cluster analysis based on the dimensions captured by the questionnaire-based data collection tool. Food-related lifestyles expected from the consumers are Ways of shopping, Cooking methods, Quality aspects, Consumption situations, and Purchasing purposes (Scholderer, Brunsø, Bredahl, & Grunert, 2004).

Ways of shopping refer to routes people follow when they are shopping for food products. It captures whether people are shopping with an impulsive decision-making mechanism or an intense examination mechanism, whether people read labels and product information, or they consider the advice of a friend or sales representative, and the kind of shops they prefer for their food shopping. In This study the ways of shopping dimension includes 5 sub-dimensions as the importance of product information, attitudes to advertising, specialty shops, price criteria, and shopping list.

Cooking methods capture the way the purchased products converted into meals, the time spent preparing the meals, the amount of care given to the preparation, social aspect of meals (family or business oriented), and whether meals are scheduled or spontaneous. In this study cooking methods dimension has 3 sub-dimensions as interest in cooking, looking for new ways, and convenience.

Quality aspects refer to the attributes of food in general, not the quality of a specific food. Examples captured by quality aspects dimension are healthy, natural, fresh and tasty food attributes. Quality aspects are studied under 5 sub-dimensions as health, price/ quality relation, organic products, taste, and freshness.

The consumption situations factor captures the importance of eating at home or outdoors and spreading food over the day. Consumption situations consist of meals against snacks and social events, which in this study studied as a social event.

The purchasing motives dimensions indicate the relative importance of the social aspect, hedonism, tradition, and security. Since it is influenced by factors of self-fulfillment in food security and social relations, purchasing motives size is captured in 2 sub-dimensions.

FRL instrument is a 69-item survey capturing 23 lifestyle dimensions in five main living areas, such as shopping, cooking methods, quality aspects, consumption status and purchasing motives (Bisp, 2014; Grunert, 1995; Scholderer et al., 2004). FRL instrument has been tested in several European countries and other western food cultures for its cross-cultural validity and

its intra-cultural stability (Saba et al., 2019). Thøgersen (2017) tested the FRL scale in terms of validity and reliability in ten European countries covering five regions of North, South, East, West and Central Europe, and found that the factor structure of all FRL dimensions is invariant according to the identified factor structure and factor loadings. Although segmentation structure is found to differ across Europe, it is stated that 23 FRL dimensions suggest a meaningfully identified five-segments, three-country classification solution. Van Huy, Chi, Lobo, Nguyen, and Long (2019) operationalized FRL to identify three organic food market segments as “The Conservatives” characterized by the health and natural aspects of food products, “The Trendsetters” who are interested in healthy food, liked to cook, and with a positive attitude toward organic and local food products, and “The Unengaged” are not concerned about food-related issues.

In this study, an adapted version of the FRL instrument composing of 48 items under 16 sub-dimensions to capture attitudes towards glass packaged coffee consumption is used as the data collection tool, the remaining 7 subdimensions are not related to the aims of the study.

2.2. Sensory Aspects

Sensory marketing is an emerging topic in marketing which is defined as “marketing that engages the consumers’ senses and affects their perception, judgment, and behavior” (Krishna, 2012, p. 332). Research on sensory marketing emphasizes that subconscious triggers affect consumers more than traditional triggers because sensory information is ambiguous (unclear) and therefore open to different interpretations. Researchers have shown that non-diagnostic sensory tips often affect cognitive evaluations, such as the weight of the product packaging. Packaging; through the assessment of the perceived flavor and flavor of the causative chain, the desire for food and beverage and ultimately define the willingness of consumers to pay. Product packaging serves different functions and affects how consumers respond to different product offerings. The researchers discussed the effects of food and beverage packaging design, and reported that tangible properties, such as the package weight, effects flavor and taste of the beverage and hence consumers are able to meet their consumption and consumption requests, and the increase in packaging weight is reported to affect the willingness to pay for the product (Kampfer, Leischnig, Ivens, & Spence, 2017).

Product packaging can be considered as a combination of various elements blended with a holistic design to achieve a specific sensory effect or result. It is built on the design that appeals to the multi-layered product packaging (Krishna, 2012). In this study sensory packaging is studied under 7 dimensions: (a) Easy to open and close/Resealable package, (b) Correct preservation, (c) Transparent/not hiding the product, (d) Adequate size, (e) Practical/convenient, (f) Sufficient information, and (g) Attractiveness (Eldesouky et al., 2015).

3. Method

The aim of this study is to uncover the influence of a glass flask in the consumers’ purchase decisions toward glass packaged ready to drink coffee consumption using decision tree techniques. Coffee in a glass flask is the objective of this study because it is a new product offered

to the Turkish market. Previous coffee offers were metal, paper and plastic packaging. The findings of this study can be used as an initial approach to research purchasing intentions of coffee offered in a glass flask.

The validity and reliability tests are calculated for four scales; food-related lifestyle scale, sensory aspects scale, attitudes towards coffee packaging scale. The study operationalizes the "Intention to Buy" dimension with three items capturing intention to buy glass packaged coffee as the dependent variable.

3.1. Participants

373 respondents participated in the study, 196 (%52,4) female and 177 (%47,3) male. The age range is between 16 and 60, and the mean age is 29,59. 216 (%57,8) of the respondents are single no child, 9 (%2,4) single with child, 25 (%6,7) married no child, 124 (%33,2) married with a child. 241 (%64,4) of the respondents do not have a child, 57 (%15,2) one child, 46 (%12,3) two children, 24 (%6,4) three children, and 6 (%1,6) more than three children. The average monthly income is calculated as 3810,50 TL and the median is 2500 TL. 86 (%23) of the respondents are high school graduates, 20 (%5,3) are vocational high school, 227 (%60,7) have university degree, and 41 (%11) are post-graduates. 38 (%10,2) respondents reported that their wives/husbands do the shopping, 164 (%43,9) respondents reported that they do the shopping themselves, 9 (%2,4) respondents reported that their parents do the shopping, 27 (%7,2) respondents reported that they do the shopping together with their spouses, 59 (%15,8) respondents reported that they shop as a whole family, 47 (%12,6) respondents reported that their mothers do the shopping, and 30 (%8) respondents reported that their fathers do the shopping. The monthly shopping frequency range is between 1 and 30, the arithmetic mean is calculated as 4,63 and the median is 4 per month. Average coffee consumption frequency per week is calculated as 2,63 and the median is 2. 121 (%32,4) respondents reported that they consume coffee more than once per day, 100 (%26,7) reported one per day, 53 (%14,2) consume coffee 2-3 times per week, 34 (%9,1) consume coffee 4,5 times per week, 18 (%4,8) consume coffee one per week, and 45 (%12) consume coffee less than once per week. 115 (%30,7) Respondents report they consume coffee in glass, 198 (%52,9) in cup/porcelain, 38 (%10,2) in paper cup, 10 (%2,7) in foam cup, and 9 (%2,4) in other cups. 131 (%35) respondents report that they consume instant coffee/soluble coffee, 58 (%15,5) filter coffee, 148 (%39,6) Turkish coffee/coffee pot, 25 (%6,7) coffee machine, and 3 (%0,8) other. Participants are from 67 different towns from Turkey, and 49 of them are foreigners.

3.2. Food-Related Lifestyle Scale

Exploratory Factor Analysis (EFA) with Promax rotation is conducted for the food-related lifestyle scale (Table 1). Hair et al. (2010) suggest that factor loadings greater than 0.40 are considered as significant for interpretative purposes. Shopping List item no 3 (Usually I do not decide what to buy until I am in the shop/I have a tendency to buy a few more things than I had planned.) is dismissed because of a low factor loading. Price/quality relation and Price criteria items are placed under the same dimension. Price is used as a name for this new dimension. The remaining factor structure complies with the literature.

Table 1: EFA Factor Loadings of Food-Related Lifestyle Scale

| Items | Components | | | | |
|-------------------------------------|------------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 |
| Price_1 | ,784 | | | | |
| Price_2 | ,742 | | | | |
| Price_3 | ,717 | | | | |
| Price_4 | ,705 | | | | |
| Price_5 | ,604 | | | | |
| Price_6 | ,460 | | | | |
| Health_2 | | ,906 | | | |
| Health_1 | | ,785 | | | |
| Health_3 | | ,782 | | | |
| Importance of Product Information_2 | | | ,889 | | |
| Importance of Product Information_3 | | | ,767 | | |
| Importance of Product Information_1 | | | ,677 | | |
| Attitudes to Advertising_1 | | | | ,832 | |
| Attitudes to Advertising_3 | | | | ,832 | |
| Attitudes to Advertising_2 | | | | ,547 | |
| Shopping List_2 | | | | | ,879 |
| Shopping List_1 | | | | | ,737 |

3.3. Sensory Aspects Scale

Exploratory Factor Analysis (EFA) with Promax rotation is conducted for the food-related lifestyle scale (Table 2). Organic products dimension, Taste dimension item no 3 (It is more important to choose food products for their nutritional value rather than for their taste), and Interest in cooking dimension item no 1 (I like to have ample time in the kitchen for coffee preparation) are removed. Social event and Social relationships items are factored under the same dimension, a new name is given as the Social Aspects of Coffee. Freshness and Taste items are factored under same dimension, a new name is given as the Freshness/Taste.

Table 2: EFA Factor Loadings of Sensory Aspects Scale

| Items | Components | | | | | | |
|---------------------------|------------|------|------|------|-------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Social Aspect of Coffee_1 | ,852 | | | | | | |
| Social Aspect of Coffee_2 | ,802 | | | | | | |
| Social Aspect of Coffee_3 | ,785 | | | | | | |
| Social Aspect of Coffee_4 | ,739 | | | | | | |
| Social Aspect of Coffee_5 | ,645 | | | | | | |
| Social Aspect of Coffee_6 | ,616 | | | | | | |
| Freshness/Taste_1 | | ,831 | | | | | |
| Freshness/Taste_2 | | ,774 | | | | | |
| Freshness/Taste_3 | | ,750 | | | | | |
| Freshness/Taste_4 | | ,741 | | | | | |
| Freshness/Taste_5 | | ,559 | | | | | |
| Convenience_1 | | | ,946 | | | | |
| Convenience_2 | | | ,908 | | | | |
| Convenience_3 | | | ,685 | | | | |
| Looking for New Ways_1 | | | | ,742 | | | |
| Looking for New Ways_3 | | | | ,728 | | | |
| Looking for New Ways_2 | | | | ,615 | | | |
| Specialty Shops_2 | | | | | ,796 | | |
| Specialty Shops_3 | | | | | ,742 | | |
| Specialty Shops_1 | | | | | -,598 | | |

| | |
|-----------------------|------|
| Interest in Cooking_2 | ,887 |
| Interest in Cooking_3 | ,828 |
| Novelty_1 | ,804 |
| Novelty_2 | ,722 |
| Novelty_3 | ,562 |

3.4. Attitudes Towards Coffee Packaging Scale

Exploratory Factor Analysis (EFA) with Promax rotation is conducted for attitudes towards the coffee packaging scale (Table 3). As it could not pass validity and reliability tests, the Environmental dimension is removed from the scale. In relation to this, researchers have shown environmental concern was not significantly related to attitude (Nguyen, Phan, Nguyen, Dang, & Nguyen, 2019). Practical/Convenient dimension items, Easy to open and close dimension items and Sufficient information items are factored under the same dimension, a new name is given as Practical & Informative. Transparent/Not hiding the product are factored under the Correct preservation dimension.

Table 3: EFA Factor Loadings of Attitudes Towards Coffee Packaging Scale

| Items | Components | | | |
|-------------------------|------------|------|------|------|
| | 1 | 2 | 3 | 4 |
| Practical&Informative_1 | ,813 | | | |
| Practical&Informative_2 | ,768 | | | |
| Practical&Informative_3 | ,745 | | | |
| Practical&Informative_4 | ,692 | | | |
| Practical&Informative_5 | ,516 | | | |
| Practical&Informative_6 | ,429 | | | |
| Correct Preservation_1 | | ,839 | | |
| Correct Preservation_2 | | ,790 | | |
| Correct Preservation_3 | | ,750 | | |
| Correct Preservation_4 | | ,606 | | |
| Correct Preservation_5 | | ,572 | | |
| Attractiveness_3 | | | ,894 | |
| Attractiveness_2 | | | ,859 | |
| Attractiveness_1 | | | ,742 | |
| Attractiveness_4 | | | ,562 | |
| Adequate Size_2 | | | | ,860 |
| Adequate Size_1 | | | | ,824 |
| Adequate Size_3 | | | | ,751 |

EFA with Promax rotation yield a one-factor solution for Intention to Buy dimension, suggesting validity.

3.5. Reliability Analysis

Cronbach's Alfa Coefficients are calculated and given in Table 4, to ensure the reliability of the scales.

Table 4: Cronbach's Alpha Coefficients for Validated Factor Structure.

| Dimensions | Cronbach's Alpha | Number of Items |
|-----------------------------------|------------------|-----------------|
| Price | ,802 | 6 |
| Importance of product information | ,751 | 3 |
| Attitudes to advertising | ,641 | 3 |
| Shopping list | ,715 | 2 |
| Social Aspects of Coffee | ,850 | 6 |
| Freshness/Taste | ,795 | 5 |
| Convenience | ,806 | 3 |
| Looking for new ways | ,698 | 3 |
| Specialty shops | ,078 | 3 |
| Interest in cooking | ,699 | 2 |
| Novelty | ,513 | 3 |
| Practical | ,865 | 6 |
| Preservation | ,847 | 5 |
| Attractiveness | ,833 | 4 |
| Adequate_size | ,824 | 3 |
| Intention to Buy | ,864 | 3 |

The Specialty Shops dimension and Novelty dimension are removed as they did not pass the reliability test.

4. Decision Tree Modeling

Decision trees (DT), introduced as a part of data mining toolset in the 1960s, are one of the most widely used methods as they are simple, neat, and robust. Advantages of DTs' ability to explain relationships in data by revealing significant interactions between variables make them popular specialized tree-building techniques for classification purposes and an efficient way to segment populations into meaningful sub-groups or segments.

Decision Trees can be used to determine predictor importance of the input variables. After the related significant variables are defined, DT methods can be used to formulate hypotheses and research which variables play major roles on dependent variable. As a rule of thumb, the more records a variable influence, the greater the importance of the variable.

This study executed the CHAID algorithm, a non-parametric procedure that makes no assumptions about basic data to develop decision tree models. CHAID, one of the most popular DT algorithms, is a fast, statistically versatile DT algorithm that quickly and efficiently analyzes data and creates segments and profiles the target group. CHAID algorithm determines how continuous and/or categorical independent variables best combine to predict a binary result based on the "if-then" rules by splitting each argument into mutually exclusive sub-nodes based on the homogeneity of the sample. However, CHAID algorithm requires several decisions to be made, including the node splitting criteria, tree depth, and the level of significance. For this study, the response variable is the intention to buy ready to drink coffee in a glass flask, more than 4 points are encoded as "More Likely" to buy coffee ready to drink in a glass flask which is binary coded as "More Likely" and "Less Likely" to buy coffee in a glass flask.

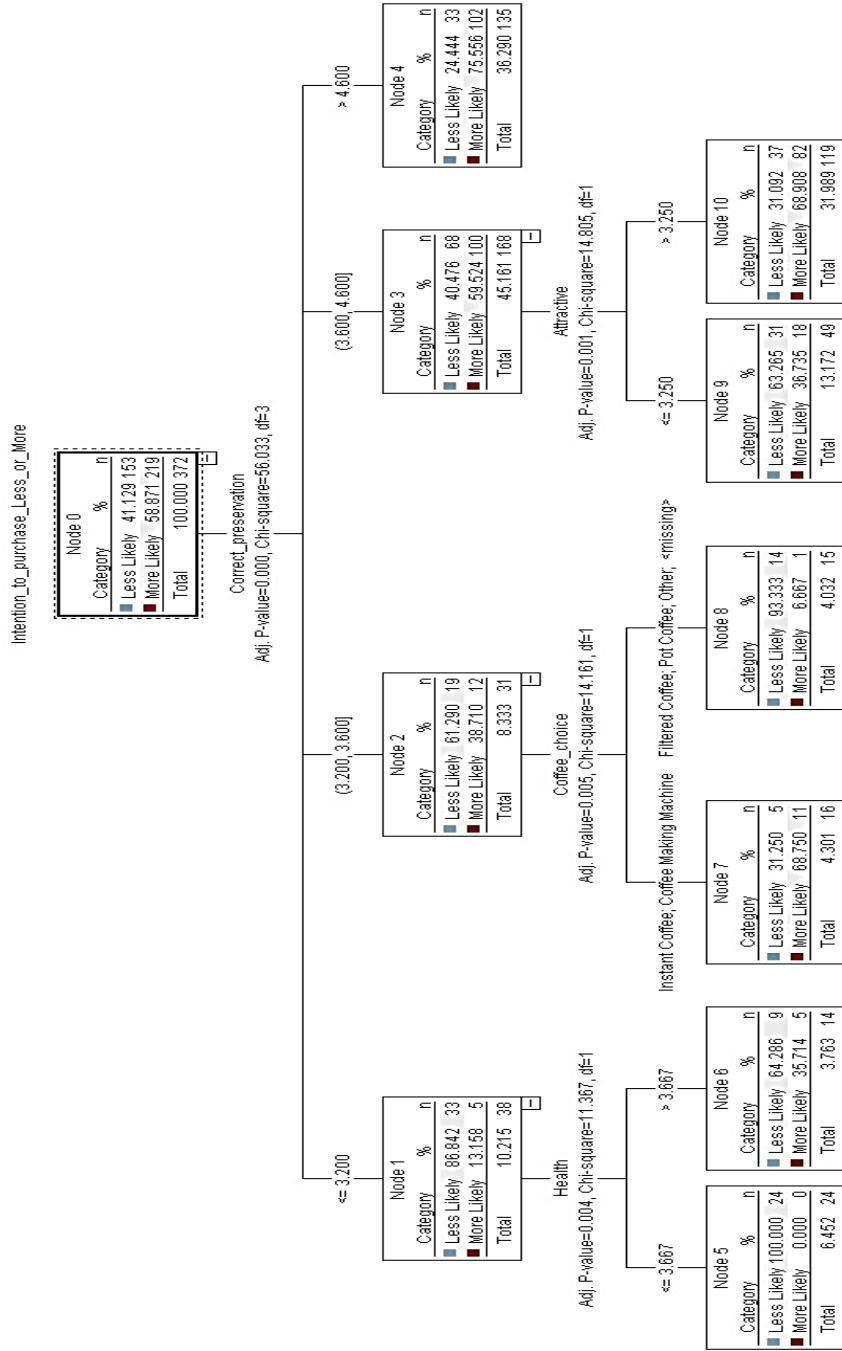
DT methods split nodes into sub-nodes creating a tree-like hierarchy of branches. Beginning from the root node to the terminal node, each path or branch represents a classification decision rule which can be notated as "if-then" rules. For example, "if condition 1 and condition 2 and condition ... and condition k occur, then outcome j occurs". The CHAID algorithm works using a series of merge, split, and stop steps. In DT methods complexity can be achieved with the cost of robustness, thus to avoid overfitting and underfitting it is important to set stopping rules. Stopping rules can be defined with the minimum number of samples in terminal nodes, the maximum number of levels the tree can grow, and the minimum number of cases that any node must contain to split. In this study, maximum tree depth is set to two, as more than two levels are difficult to report, and the most important variables are partitioned in two levels. As the stopping rule minimum records in the parent branch is set to 2%, and 1% in child branch. Significance for splitting and merging is set to 0,05 significance level. Pearson chi-square method is operationalized. Missing values are involved as missing in the model, no replacement is done.

In each of the resulting sample partitions, the sample proportions of the Intend to buy were used to derive the predicted possibilities of the purchase intention for all situations in that group.

5. Results

The "food-related lifestyles" instrument, "sensory aspects" scale, "attitudes towards coffee packaging" scale are related to the "intention to purchase" ready to drink coffee in a glass flask to illustrate the building of a decision tree model. The goal of the analysis was to identify the most important factors from a pool of 16 dimensions and demographics including gender, age, income, education, marital status, shopping pattern, etc. The decision tree model generated from the dataset is shown in Figure 1.

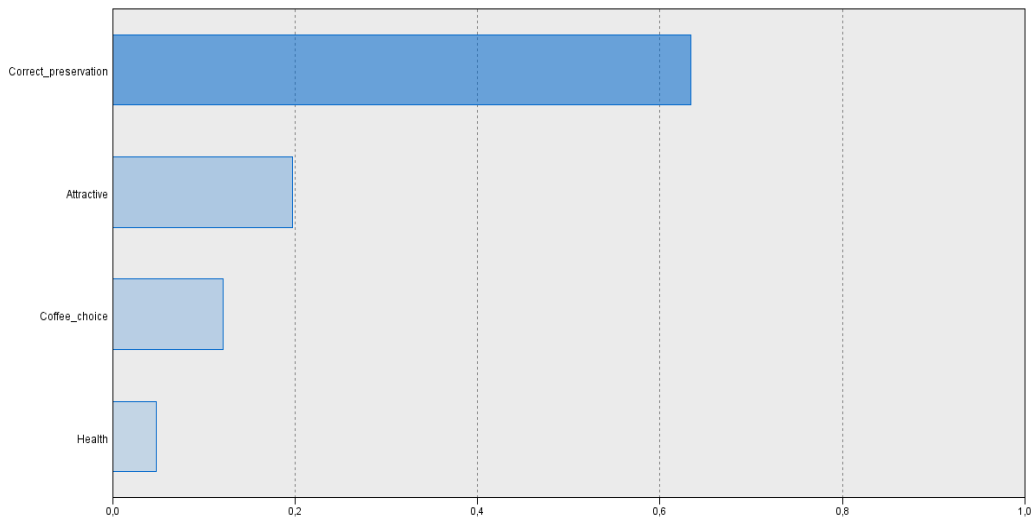
Figure 1: Decision Tree Predicting the Intention to Buy Coffee in Glass Flasks



All individuals were divided into 10 subgroups from the root node to leaf nodes through different branches. The decision tree model helps to identify the combinations of factors that constitute the highest (or lowest) probability of intention to buy ready to drink coffee in a glass flask. For example, respondents who score low ($\leq 3,667$) on the health dimension and who score low ($\leq 3,200$) on correct preservation dimension may not show any intent to buy coffee in a glass flask (100% Less Likely, 0% More Likely). In a similar approach, respondents who score high ($> 3,667$) on health dimension and who score low ($\leq 3,200$) on correct preservation dimension may have intent to buy coffee in a glass flask (64,296% Less Likely, 35,714% More Likely). In another word, if a consumer has no interest in health issues, and no interest in correct preservation, thus, he has no interest in a glass flask ready to drink coffee.

The CHAID algorithm segmented the data into statistically significant subgroups that were mutually exclusive and detailed. The tree analysis in Figure 1 shows the 2 level CHAID tree with a total of 10 nodes, of which 6 were terminal nodes. All the predictor variables reached predictor importance or significance to be included in this model including correct preservation (0,63), attractiveness (0,20) coffee choice (0,12) and health (0,05), items (Figure 2). This model had an overall ability to detect intention to buy at 73,39% (273 correct, 99 wrong out of 372 respondents).

Figure 2: Predictor Importance Levels



The intentions about buying ready to drink coffee in glass flasks of this sample was 41,129 percent “Less Likely”, and 58,871 percent “More Likely”. The first level of the tree was split into four initial branches. The correct preservation was shown to be the best predictor variable for splits in the first level ($p=0,000$; $\chi^2=56,033$; $df=3$). The subset of subjects categorized by correct preservation score less than or equal to 3,20 had a Less Likely prevalence of intention to buy (86,842%) than More Likely (13,158%). In the subset of subjects with correct preservation score higher than 3,20 and lower and equal to 3,60, 61,290% of the respondents are Less Likely to purchase ready to drink coffee in a glass flask, and 38,710% More Likely to purchase ready to drink coffee in a glass flask. In the subset of subjects with correct preservation score higher

than 3,60 and lower than and equal to 4,60, 40,476% of the respondents are Less Likely to purchase ready to drink coffee in a glass flask, and 59,524% of the respondents are More Likely to purchase ready to drink coffee in a glass flask. In the subset of subjects with correct preservation score higher than 4,60 24,444% of the respondents are Less Likely to purchase ready to drink coffee in a glass flask, and 75,556% of the respondents are More Likely to purchase ready to drink coffee in a glass flask.

In the subset of subjects with a correct preservation score less than or equal to 3,20, the next split is based on Health which is less than or equal to 3,667 and greater than 3,667 ($p=0,004$; $\chi^2=11,367$; $df=1$). In the subset of subjects categorized by lower health sensitiveness scores, 100% of the respondents are Less Likely to purchase ready to drink coffee in a glass flask. In the subset of subjects with a correct preservation score greater than 3,667, 64,296% of the respondents are Less Likely to purchase ready to drink coffee in a glass flask, and 35,714% of the respondents are More Likely to purchase ready to drink coffee in a glass flask.

In the subset of subjects with a correct preservation score greater than 3,200 and less than or equal to 3,600, the next split based on a coffee choices variable ($p=0,005$; $\chi^2=14,161$; $df=1$), which is a categorical variable. The next split has branches of (1) Instant coffee and Machine made instant coffee drinkers, and (2) Filtered coffee, Pot coffee, and other coffee choices. Consumers who prefer Instant coffee and Coffee machine coffee are 31,25 percent Less likely to purchase ready to drink coffee in a glass flask, and 68,75 percent More Likely to purchase ready to drink coffee in a glass flask. Consumers who prefer Filtered coffee, Turkish coffee, and other kinds of coffee are 93,333 percent Less Likely to purchase ready to drink coffee in a glass flask, and 6,667 percent More Likely to purchase ready to drink coffee in a glass flask.

In the subset of subjects with a correct preservation score greater than 3,60 and less than or equal to 4,60, the next split based on the Attractiveness dimension of less than or equal to 3,25 and greater than 3,25 ($p=0,001$; $\chi^2=14,805$; $df=1$). Consumers who do not favor attractive packaging ($\leq 3,250$) are 63,265 percent Less likely to purchase ready to drink coffee in a glass flask and 36,735 percent More Likely to purchase ready to drink coffee in a glass flask. Consumers who favor Attractive packaging ($> 3,250$) are 31,092 percent Less Likely to purchase ready to drink coffee in a glass flask, and 68,908 percent More Likely to purchase ready to drink coffee in a glass flask.

The subset of subjects with a correct preservation scores greater than 4,60 are 24,444 percent Less Likely to purchase a ready to drink coffee in a glass flask, and 75,556 percent More Likely to buy it.

6. Conclusion

Consumers' choice of food has gone beyond the issue of taste, security or convenience. Other features, such as health-related features and ethical features, can also affect consumers' food preferences. This study aims to fill in the gaps in the literature by clarifying the role of a glass packaging in predicting the intention to purchase. The study demonstrating a DT model for the intention of purchasing ready to drink coffee in a glass flask. The model was derived using a CHAID algorithm based on the presence or absence of intention to purchase ready to

drink coffee in a glass flask as the target variable and “food-related lifestyles” instrument, “sensory aspects” scale, “attitudes towards coffee packaging” scale and demographics including gender, age, income, education, marital status, and shopping pattern as its predictors.

The CHAID model illustrates multilevel interactions among correct preservation, health, coffee choice, and attractive factors to identify pathways to detect the intention to purchase ready to drink coffee in a glass flask. The four variables (correct preservation, health, coffee choice, and attractive) were included as predictors of the target variable, intention to purchase.

The findings suggest that the most important factor in determining intention to purchase ready to drink coffee in a glass flask is the correct preservation. The other predictor variables are coffee choice, attractive packaging and health. The findings are congruent with the literature. Nian, Shi, Gao, and Zhao (2019) found out that potential consumers who are willing to pay more for healthy food labels and ethical labels are also the consumers who recycle in daily life, and exercise in daily life, in other words, if the consumer is involved in health, and correct preservation, he is more likely to prefer glass packaged coffee.

In their study, Jetsadalak and Suwunnamek (2019) identified three groups when purchasing organic food products, sensory organic eaters, organic eaters, and unhealthy conventional organic eaters. Consumers can be segmented according to their level of health sensitiveness, so it is a problem of degree. Results of this study suggest a similar pattern, glass packaged coffee consumers are segmented into four groups according to the correct preservation scores, which means that conventional consumers, which have less health sensitivity, may not prefer glass packaged coffee, but health-oriented high correct preservation sensitive consumers.

Cholewa-Wójcik et al. (2019) stated that among all socio-economic needs and requirements posed to food packaging, food security is the most critical need for consumers. The results of this study also suggest that correct preservation is the most important splitting factor. Other packaging properties such as convenience and legal requirements fulfillment are not of importance when it comes to coffee consumption in glass, but attractive packaging. Also, pot coffee consumers do not favor ready to use coffee offered in a glass flask, but instant and coffee machine prepared coffee consumers do.

Consumer expectations and interests when buying food and beverages are important factors that need to be analyzed to improve the industry. Even with the current lifestyle of the century, it has been noticed that there is a constant change in the search for nutritional habits and healthier products (Gadioli et al., 2013). Therefore, to develop new offers or develop existing products, consumers’ perceptions and expectations about innovative products and packages, the attractive power of new offers and packages, the information looked for on the package during purchase, and the acceptability of the new products and packaging offered to the current and potential consumers should be researched (Kähkönen, Hakanpää, & Tuorila, 1999). The packaging is a source of product recognition (van Dam & van Trijp, 1994), especially as it serves as an external quality sign and provides information on consumers' brand image and lifestyle (Eldesouky et al., 2015).

Proposed model suggests that packaging should be characterized by correct preservation, health, attractiveness, and coffee choice in a glass flask offer. The ready to drink coffee offered

in a glass flask should target instant coffee drinkers, with high food security and safety perceptions, with an attractive package design. The packaging industry needs to identify and understand the consumer preferences towards coffee in a glass package which is a valuable source of information useful when developing improvements.

The methodology and the results of this study are supposed to contribute to the current literature on market segmentation by introducing the use of a machine learning algorithm to reveal the consumer profiles. The findings of this study also suggest ready to drink coffee producers in deciding packaging strategies according to the targeted consumer segments. However, only the purchasers of ready to drink coffee in glass flasks are focused in this study. The future studies may benefit the methodology conducted in consumer profiling.

References

- Anderson Jr, W. T., & Golden, L. L. (1984). Lifestyle and psychographics: A critical review and recommendation. *Advances in consumer research*, 11(1).
- Ansari, A., Usama, M., & Siddiqui, D. A. (2019). Packaging Features and Consumer Buying Behavior Towards Packaged Food Items. *Global Scientific Journal*, 7(3), 1050-1073.
- Bisp, S. (2014). Food-related lifestyle: development of a cross-culturally valid instrument for market surveillance. *Values, lifestyles, and psychographics*, 337.
- Casini, L., Boncinelli, F., Contini, C., Gerini, F., Scozzafava, G., & Alfnes, F. (2019). Heterogeneous preferences with respect to food preparation time: Foodies and quickies. *Food quality and preference*, 71, 233-241.
- Cholewa-Wójcik, A., Kawecka, A., Ingraio, C., & Siracusa, V. (2019). Socio-economic requirements as a fundament of innovation in food packaging. *Journal of Entrepreneurship, Management and Innovation*, 15(1), 231-256.
- Dantas, M. I. S., Nakajima, V., Rosa, D. D., Andrade, F. O., Canzian, C., & Martino, H. S. D. (2011). Guava Jam packaging determinant attributes in consumer buying decision. *Food Science and Technology*, 31(3), 567-570.
- Eldesouky, A., Pulido, A., & Mesias, F. (2015). The role of packaging and presentation format in consumers' preferences for food: an application of projective techniques. *Journal of Sensory Studies*, 30(5), 360-369.
- Gadioli, I. L., Pineli, L. d. L. d. O., Rodrigues, J. D. S. Q., Campos, A. B., Gerolim, I. Q., & Chiarello, M. D. (2013). Evaluation of packing attributes of orange juice on consumers' intention to purchase by conjoint analysis and consumer attitudes expectation. *Journal of Sensory Studies*, 28(1), 57-65.
- Grunert, K. G. (1995). Development and testing of a cross-culturally valid instrument: food-related life style. *ACR North American Advances*.
- Hair J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis*, 7th Edition, Pearson, UK.
- Jetsadalak, N., & Suwunnamek, O. (2019). Thai Consumer Organic Food-Related Lifestyle (FRL), Attitude and Perceived Value Segmentation: A Discriminant Analysis Approach. *Asian Journal of Scientific Research*, 12, 112-119.
- Kähkönen, P., Hakanpää, P., & Tuorila, H. (1999). The effect of information related to fat content and taste on consumer responses to a reduced-fat frankfurter and a reduced-fat chocolate bar. *Journal of Sensory Studies*, 14(1), 35-46.
- Kampfer, K., Leischnig, A., Ivens, B. S., & Spence, C. (2017). Touch-flavor transference: Assessing the effect of packaging weight on gustatory evaluations, desire for food and beverages, and willingness to pay. *PLoS one*, 12(10), e0186121.
- Kanta, M. (2017). A Comprehensive Note on "Chapter Eight-Identifying Market Segmentation and Targets". In *Book: Marketing Management, Sixth Edition*, Editors: Philip Kotler, Kelvin Lane Keller, Swee Hoon Ang, Chin Tiong Tan, pp.263, Pearson, UK.
- Krishna, A. (2012). An integrative review of sensory marketing: Engaging the senses to affect perception, judgment and behavior. *Journal of consumer psychology*, 22(3), 332-351.
- Küster, I., Vila, N., & Sarabia, F. (2019). Food packaging cues as vehicles of healthy information: Visions of millennials (early adults and adolescents). *Food research international*, 119, 170-176.
- McNeal, J. U., & Ji, M. F. (2003). Children's visual memory of packaging. *Journal of Consumer Marketing*, 20(5), 400-427.
- Nguyen, T. T. M., Phan, T. H., Nguyen, H. L., Dang, T. K. T., & Nguyen, N. D. (2019). Antecedents of Purchase Intention toward Organic Food in an Asian Emerging Market: A Study of Urban Vietnamese Consumers. *Sustainability*, 11(17), 4773.
- Nian, Y., Shi, L., Gao, Z., & Zhao, R. (2019). Is People's Daily Lifestyle Consistent with Their Food Purchasing Behavior? 2019 Annual Meeting, July 21-23, Atlanta, Georgia 290680, Agricultural and Applied Economics Association.
- Rodríguez-Parada, L., Mayuet, P. F., & Gámez, A. J. (2019). Custom Design of Packaging through Advanced Technologies: A Case Study Applied to Apples. *Materials*, 12(3), 467.
- Rundh, B. (2005). The multi-faceted dimension of packaging: marketing logistic or marketing tool? *British food journal*, 107(9), 670-684.
- Saba, A., Sinesio, F., Moneta, E., Dinnella, C., Laureati, M., Torri, L., . . . Gasperi, F. (2019). Measuring consumers attitudes towards health and taste and their association with food-related life-styles and preferences. *Food quality and preference*, 73, 25-37.

Scholderer, J., Brunsø, K., Bredahl, L., & Grunert, K. G. (2004). Cross-cultural validity of the food-related lifestyles instrument (FRL) within Western Europe. *Appetite, 42*(2), 197-211.

Thøgersen, J. (2017). Sustainable food consumption in the nexus between national context and private lifestyle: A multi-level study. *Food quality and preference, 55*, 16-25.

Tu, J.-C., Chang, H.-T., & Chen, S.-B. (2019). Factor Analysis of Packaging Visual Design for Happiness on Organic Food—Middle-Aged and Elderly as an Example. *Sustainability, 11*(12), 3267.

Van Dam, Y. K., & van Trijp, H. C. (1994). Consumer perceptions of, and preferences for, beverage containers. *Food quality and preference, 5*(4), 253-261.

Van Huy, L., Chi, M. T. T., Lobo, A., Nguyen, N., & Long, P. H. (2019). Effective segmentation of organic food consumers in Vietnam using food-related lifestyles. *Sustainability, 11*(5), 1237.

Wells, L. E., Farley, H., & Armstrong, G. A. (2007). The importance of packaging design for own-label food brands. *International Journal of Retail & Distribution Management, 35*(9), 677-690.