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Interdisciplinary Faculty of Economic and Administrative Sciences

RESEARCH

Identification of attitudes and attributes among people from Sonora regarding non-industrialized coffee beans

Identificación de actitudes y atributos por parte de los sonorenses en relación con el café de grano no industrializado

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Abstract

The seed of the coffee tree, oval in shape, rounded on one side and with a longitudinal groove on the other, which is about a centimeter long and is greenish-yellow in color; In its many transformations, it is marketed roasted in different degrees and also ground. Its harvesting process can be carried out industrially with the help of specialized machinery, or without the use of machines, which means collecting it by hand, which allows harvesters to select the best coffee beans. The proposed research reveals, and also evaluates, attributes and attitudes that predominate in non-industrial coffee consumption by the inhabitants of Hermosillo, Sonora. It is exploratory research, with a literary review, and later with qualitative parts where in-depth interviews and focus groups were carried out, and quantitative with contrasting variables, which allowed giving a content and apparent validity to the hypotheses of the conceptual model. Notable findings on intrinsic attributes such as color, aroma and aroma, and extrinsic attributes such as price, brand, and packaging are noted.

Keywords: Coffee, consumer motivation, intrinsic, extrinsic and reliance attributes.

JEL Classification: Q13

Resumen

La semilla del cafeto, de forma ovalada, redondeada por una cara y con un surco longitudinal en la otra, que mide alrededor de un centímetro de largo y es de color amarillo verdoso; en sus numerosas transformaciones se comercializa de manera tostada en diferentes grados y también de forma molida. Su proceso de cosecha se puede realizar industrialmente con ayuda de maquinaria especializada, o sin uso de máquinas, lo que significa, recogerlo a mano, mismo que permite a los cosechadores seleccionar los mejores granos de café. La investigación planteada revela, y también evalúa, atributos y actitudes que predominan en el consumo de café de manera no industrial por los habitantes de Hermosillo, Sonora. Es investigación exploratoria, con una revisión literaria, y posteriormente con partes cualitativa donde se efectuaron entrevistas a profundidad y grupos de enfoque, y cuantitativa con contrastación de variables lo que permitió darle una validez estadística y aparente a las hipótesis del modelo conceptual. Se señalan hallazgos destacables sobre atributos intrínsecos como el color, aroma y aroma, y atributos extrínsecos como el precio, marca y el empaque.

Palabras clave: Motivación de consumo, atributos intrínsecos, extrínsecos y de creencia, café

Código JEL: Q13

Introduction

Coffee is a highly desired beverage due to its organoleptic characteristics, making it one of the most consumed drinks in the world. It contains an immense variety of chemical compounds responsible for its sensory quality and physiological effects, such as caffeine, which is a well-known stimulant of the central nervous system and impacts an individual's alertness (Gotteland et al., 2007).

Simón, L. (2014), states that coffee processed in a traditional way (i.e., not industrial or at least not in mass industry) is hand-picked, allowing harvesters to select the best coffee beans. Moreover, the coffee is sun-dried instead of being dried in industrial silos. The transformation of coffee is done through traditional methods and not in a mass-production manner.

To define craftsmanship and distinguish it from industry, Eutimio Tovar Rodríguez, in "La artesanía su importancia económica y social," (UNAM, México. 1964) proposed the following definition of craftsmanship: "Any creative manual technique used to individually produce goods and services." For many people, craftsmanship lies halfway between design and art. One of the main challenges of craftsmanship is competition from low-cost industrial products that resemble handcrafted goods but are lower in price and quality.

The research objectives are set out below:

General Objective:

To determine the intrinsic, extrinsic, and belief-based attributes that most influence the purchase intention of non-industrialized coffee beans among middle-upper class C+ residents of Hermosillo, Sonora.

Specific Objectives:

a. To evaluate the intrinsic attributes that prevail in the purchase intention of non-industrialized coffee beans among C+ residents of Hermosillo, Sonora.

b. To determine the extrinsic attributes that prevail in the purchase intention of non-industrialized coffee beans among C+ residents of Hermosillo, Sonora.

c. To identify belief-based attributes that influence the purchase intention of non-industrialized coffee beans among C+ residents of Hermosillo, Sonora.

Characteristics of the coffee bean, commonly known as "coffee"

Aroma: The pleasant and penetrating fragrance of the beverage, attributed to the natural essences of coffee, captured by olfactory receptors during cupping (Becker y Freytag, 1992).

Flavor: The organoleptic qualities like acidity and body, in different degrees and intensities, complement each other and give each cup a unique flavor depending on the variety and origin (Menchù, 1967).

Acidity: This gives the drink a fruity taste and indicates high-quality coffee (Becker y Freytag, 1992).

Body: The result of multiple perceptions experienced during cupping, including a sense of fullness and consistency, and the amount of dissolved particles in the brew (Menchù, 1967).

Coffee cupping: The sensory analysis of roasted and ground coffee is a complex process requiring extensive experience and exclusive facilities with strict cleanliness and order (Becker y Freytag, 1992).

Coffee bean varieties and production in Mexico

According to Subsecretaría de Agricultura de la SAGARPA (2017), Mexico's national coffee production in the 2016–2017 cycle reached 3,385,552 bags of green coffee. In the previous cycle (2015–2016), it was 2,346,084 bags (60 kg each). Chiapas is the leading producer, accounting for 39% of national output, followed by Veracruz (30%) and Oaxaca (13%). Other significant producers include Puebla, Guerrero, Hidalgo, Nayarit, and San Luis Potosí.

SAGARPA reported that Chiapas harvested 207,052 hectares, producing 1,317,011 bags of green coffee, with an average yield of 2.032 tons of cherry coffee per hectare. Veracruz harvested 115,630 hectares and produced 1,029,219 bags of gold coffee, averaging 2.844 tons/ha. Oaxaca harvested 111,754 ha and produced 438,130 bags, with an average yield of 1.252 tons/ha. Mexico exports coffee to 42 countries, with over 50% going to the United States.

López-García et al. (2016) summarize that in Veracruz, coffee (Coffea arabica L.) is mostly grown under shade. Main varieties: Typica, Bourbon, and Caturra, with low average yield per plant compared to other countries. Their study evaluated cherry coffee production, cherry-to-parchment yield, and beverage quality across 20 cultivars over five production cycles (1998–2003).

The study can continue, stating that the varieties with the highest average fruit production (coffee cherry) over those five years were: Catuai Amarillo (23.8 kg/plant), Caturra Rojo (22.6 kg/plant), Colombia Brote Café (23.2 kg/plant), and Colombia Brote Verde (22.5 kg/plant). The variety with the highest agro-industrial cherry-to-parchment yield was Pluma Hidalgo 177 with 237.3 kg. The parchment-to-gold yield was better for Colombia Brote Verde (54.7 kg) compared to Garnica Tres Cruces Porte Alto (59.3 kg). The proportion of flat beans was high for Caturra Amarillo and Blue Mountain, with 86.2% and 83.2% respectively. Pacamara had the lowest fruit production but showed the highest proportion of beans suitable for European preparation; this cultivar also showed the best attributes in aroma, acidity, and body. For an American-style coffee preparation, the Bourbon Salvadoreño and Bourbon Tres Cruces varieties had the appropriate bean size. (López-García, et. al, 2016).

Harvesting method

Ocampo-López, O. et Al. (2017) in an article titled "Nuevo método estándar para la recolección selectiva de café" from the Universidad Autónoma de Manizales, Colombia, mention that Colombian coffee is one of the smoothest and highest quality in the world due to the cultivated varieties, environmental conditions, manual selective harvesting, and the processing and industrialization methods. The tool used in the traditional harvesting method consists of a plastic container attached to the harvester's waist. The Centro de Investigaciones del Café (CENICAFÉ) developed the Canguaro 2M, an innovative device to assist with harvesting, consisting of two sleeves joined to a backpack strapped to the harvester's waist and shoulders.

Ocampo-López, O. et al. (2017) continue to mention that their study includes a comparison with the traditional method and an analysis of harvesting indicators in terms of efficiency, effectiveness, quality, and losses. The results allow the conclusion that adopting the new standard method for selective coffee harvesting leads to better performance in effectiveness, quality, and loss indicators, compared to the traditional method (The traditional system is commonly used in Colombia; it consists of a plastic container with a capacity of 10 to 12 kilograms, attached to the harvester's waist with a strap), without significant changes in the process efficiency.

Working hypothesis; Literature review

Kreuml, M. et al. (2013) mention that for coffee manufacturers, it is essential to know the expiration date of the packages and the importance of taking it into account. Coffee sensory evaluation studies demonstrated that coffee quality is affected after 9 months of bean storage; after 18 months, its oxidation increases (examples of these characteristics include a burnt, woody, earthy, hay-like smell and a bitter taste).

Among the coffee attributes that motivate consumption, the main ones are known to be color and aroma. Studies reveal that both factors vary depending on their chemical transformation due to physical changes caused by the humidity and temperature conditions of the place where the coffee roasting process takes place. It is important to emphasize these aspects because there is a possibility of differences in the sensory quality of the final product. In the present research, the information provided is useful because the coffee in question is artisanal, its preparation method is manual, and it is vital to be aware of these data since flavor and aroma may vary. (Kreuml, M. et al., 2013).

Aroma is a special quality for humans; it is one of the main attributes evaluated in the culinary area by customers and can be decisive at the time of purchase. Coffee is one of the most aromatic products and is mainly consumed for the pleasure provided by its organic components (which are studied in this research). (Andorfer, V. et al., 2014).

The aforementioned authors addressed a natural field experiment in the actual purchase of fair trade coffee in three supermarkets in Germany. The collected data indicate that sales reflect real ethical purchasing behavior and avoid the problems of social desirability. However, they also note that consumers' decisions to buy a product are mainly influenced by external behavioral constraints such

as consumers' budgets and product price. It is also worth noting that this similarly applies to coffee products. (Andorfer, V. et al., 2014).

According to Kang et al. (2011) in their study on changes in coffee consumption behavior in Korea, their results confirmed that the congruence of self-image with a coffee shop directly influences a positive attitude toward the store, and they recommend that marketers improve the appearance by referencing the store's brand to match the image of their target customers.

McCarthy, K. et al. (2017) in their research aim to understand consumers' perception of liquid milk. Their primary objectives were to determine the extrinsic attributes that drive product purchases, and secondly, to determine the personal values behind purchases to better understand why particular attributes matter. Surveys were conducted with 702 dairy consumers. The results showed that fat content was the most important attribute for beverages, followed by package size and label claims. This research also considered that a future innovation for these beverages should include the development of lactose-free milk that also appeals to consumers with a specific taste.

Bogue et al. (2009) mentioned that new product development plays an important role in the rapidly evolving food supply chain where companies aim to use new and innovative ingredients to meet the growing needs of consumers for healthier foods. Beta-glucan, a new soluble fiber, is of great interest to global food companies for its ability to increase food and beverage functionality by increasing soluble fiber content. Intrinsic and extrinsic attributes that maximize consumer acceptance of Beta-glucan were determined. Three hundred consumers rated 22 hypothetical products using a nine-point Likert scale. Key attributes that determined consumer preferences for these enriched products were identified and four viable consumer segments were found. It was concluded that customer knowledge should be managed during the new product development stage, and that this can help companies overcome customer acceptance issues associated with innovative functional ingredients and encourage them to respond to the new market, thus creating opportunities throughout the food supply chain. (Bogue J. et al. 2009).

Corso, P. et al. (2015) in their study aimed to identify the most important packaging attributes for the purchase of a product not yet available in the Brazilian market: antioxidant-rich instant coffee, a blend of roasted and green coffee. Five types of packages of the same brand of antioxidant-rich instant coffee marketed in different countries were evaluated through a focus group.

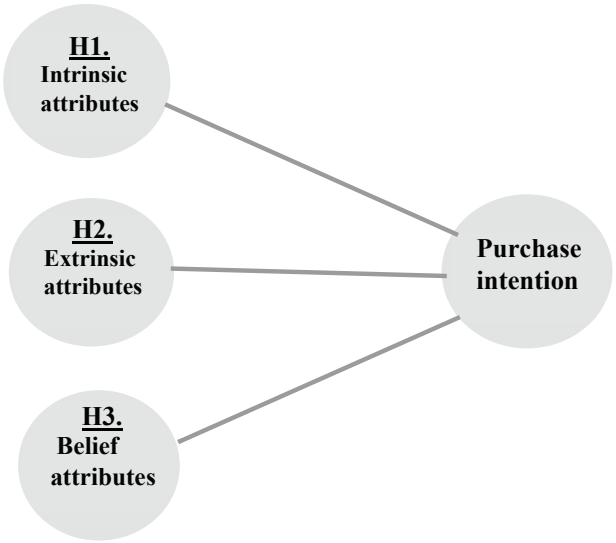
Attributes such as the shape of the jar, lid color, label, information, and brand were selected for the quantitative study. Purchase intention based on the package images was assessed using a conjoint analysis. In general, higher purchase intention was verified for more modern packaging such as hexagonal-shaped glass jars, and also browner labels indicating roasted coffee. (Corso, P. et al. 2015).

Consumers preferred the image of green and roasted coffee next to a cup of coffee and valuable information about product differentiation (origin, type, amount, and functions of antioxidants) presented in explanatory tables on the back of the package. (Corso, P. et al. 2015).

Proposed conceptual model

Based on the literature reviewed and analyzed above, the following hypotheses can be established, leading to the proposed conceptual model in Figure 1.

Figure 1. Proposed conceptual model



Source: Own elaboration based on literature review (2018).

Based on the previously reviewed and analyzed literature, the following hypotheses can be formulated (see Figure 1):

H1 *- The intrinsic attributes: color, flavor, aroma, and texture of non-industrialized whole bean coffee,*

positively and significantly influence the purchase intention of residents of Hermosillo, Sonora, with a C+ socioeconomic level.

H2 *- The extrinsic attributes: brand, price, and packaging of non-industrialized whole bean coffee, positively and significantly influence the purchase intention of residents of Hermosillo, Sonora, with a C+ socioeconomic level.*

H3 *- The belief attributes: health and trust, of non-industrialized whole bean coffee, positively and significantly influence the purchase intention of residents of Hermosillo, Sonora, with a C+ socioeconomic level.*

Research methodology

A qualitative and quantitative type of research was carried out, that is, a mixed research approach. The research followed an exploratory cross-sectional approach, which according to Sampieri (2006), consists of studies conducted when the objective is to examine a little-studied topic or research problem, about which there are many doubts or it has not been previously addressed. Exploratory studies serve to familiarize ourselves with relatively unknown phenomena, obtain information about the possibility of carrying out more complete research within a specific context, investigate new problems, identify promising concepts or variables, establish priorities for future research, or suggest statements and propositions.

Qualitative methodology

To collect qualitative data within the research, two methods were used: in-depth interviews and focus group sessions. For the implementation of both instruments, 7 guiding questions were written focusing on the core theme: reasons for coffee consumption. The criteria for selecting participants were age range and regular coffee consumption. Likewise, 3 focus groups were conducted using the same guiding questions.

The in-depth interviews revealed that most participants cited flavor as the main motivation for coffee consumption, and energy from the beverage was also mentioned, as well as the habit of drinking coffee. In a hypothetical question about whether they would be willing to taste non-industrialized roasted coffee beans, their response was affirmative, as they believe it is perceived as healthier and were curious to try it. Regarding the aroma and color of the beverage, it was concluded that these aspects are vital and determine product consumption. Respondents conceived a hypothetical package in a rustic style, made of recycled material, aligned with an environmentally friendly and healthy concept. It should be noted that the interviews were conducted with four men and four women, following the criteria mentioned above.

As a result of the focus groups, with a total of 15 participants divided into three sessions ranging from 15 to 25 minutes, the following findings were described:

Table 1. Results on relevant variables

Focus group 1

Technique	Focus group
Participants	5
Place	Hermosillo, Sonora
Variables found	Intrinsic: Flavor, aroma, color
	Extrinsic: Fabric-style packaging, simple packaging design
	Belief attributes: Energy
	Consumption influence: Type of coffee, location, weather, social setting

Source: Own elaboration based on fieldwork (2018).

Table 2. Results on relevant variables

Focus group 2

Technique	Focus group
Participants	5
Place	Hermosillo, Sonora
Variables found	Intrinsic: Aroma and flavor are more important than color
	Extrinsic: Brand is the main influencing factor, packaging in paper or fabric, representative label
	Belief attitudes:
	Consumption influence: By consumption references

Source: Own elaboration based on fieldwork (2018).

After analyzing the results of the 4 interviews and the 3 focus group sessions, it was concluded that the main factors for coffee consumption are flavor, aroma, and color. Energy is also considered, along with the brand. Price is a determining factor in the consumption decision. Most participants stated that they would consume artisanal coffee out of

Table 3. Results on relevant variables

Focus group 3

Technique	Focus group
Participants	5
Place	Hermosillo, Sonora
Variables found	Intrinsic: Color is the main aspect to consider, followed by aroma and flavor
	Extrinsic: Price as a relevant attribute for coffee consumption, packaging made of clary or glass
	Belief attributes: Energy
	Consumption influence: Purchase accessibility, weather, product origin

Source: Own elaboration based on fieldwork (2018).

curiosity to try something new and to support the producers.

Quantitative methodology

Sample design: Simple random sampling without replacement

The sample is essentially a subgroup of the population and is used for statistical purposes. Its use is necessary because, in many cases, the study universe is too large. The sample modality in this research is by cluster: according to Malhotra (2004), this is used when it is not possible to obtain a list of all elements of the population; the size of the universe is known, but a listing is not available. Its use is appropriate if the population is very large and dispersed. Clusters are characterized by being homogeneous among each other but internally presenting a high degree of heterogeneity among their components. In this research, the type of sample to be used is finite since the exact data of the population to be measured is known.

In this research, the following finite population formula by Fisher and Navarro (1996) was used to determine the sample size, which resulted in 382, as shown below:

$$n = \frac{NZ^2\, p\,(1-p)}{(N-1)\,E^2 + Z^2\, p\,(1-p)}$$

Where:

n = Sample size

N = Population size

Z = Confidence level

p = Proportion of successes

(1- p) = Estimated proportion of failures

e = Estimation error between the actual proportion and the sample proportion

Data:

N = 69,721 inhabitants

Z = 1.96 with a 95% confidence level

p = probability in favor of 50% (0.5)

(1 – p) = probability against of 50% (0.5)

e = estimation error of 5% (0.05)

n = people to be surveyed

$$n = \frac{(69721)(1.96)^2\,(0.5)\,(0.5)}{(69721-1)\,(0.05)^2 + (1.96)^2\,(0.5)(0.5)} = \frac{66,960.0484}{175.2604}$$

n = 382 surveys to be conducted

Analysis and interpretation of results obtained from the quantitative methodology

The methodology used for the statistical analysis of the data was the Structural Equation Models (SEM) based on components/variance, applying the statistical software package SmartPLS 2.0 (Ringle, Wende, and Will, 2005).

To verify the individual reliability of the indicators as part of a reflective construct, the criterion of Hair et al. (1999) was considered, where the factor loading (λ) must be equal to or greater than 0.550. The factor loadings show that the shared variance between the construct and its respective indicators is greater than the error variance. Considering the acceptance criterion (λ ≥ 0.550).

In a first statistical round, the following indicators were removed: VE-1: *"The coffee packaging determines its quality" (λ = 0.423; λ2 = 0.179); VE-6: "The brand is the least important factor when buying coffee" (λ = -0.416; λ2 = 0.173)*; VC-2: *The consumption of artisanal coffee improves people's quality of life" (λ = 0.495; λ2 = 0.245)*; VC-4: *"I would consume artisanal coffee because it doesn't harm the environment " (λ = -0.331; λ2 = 0.110)*; VI-2: *"The color of the coffee must motivate me to acquire it" (λ = 0.021; λ2 = 0.0004)*; VI-4: *"I buy coffee when I like its texture" (λ = -0.516; λ2 = 0.266)*; VI-6: *"I buy coffee when I find its smell pleasant" (λ = 0.194; λ2*

= *0.038)*; In a second statistical run, the indicators were retained based on the previous acceptance criterion *(λ ≥ 0.550)*.

Table 4. Construct reliability

Casual Model of Quality Attributes on Purchase Intention of Sonoran residents regarding non-industrialized whole bean coffee.

Construct Indicators	Cronbach's alpha (α)	Composite reliability (ρ_c)	Average Variance Extracted
Belief attributes (AC-1; AC-2; AC-3)	0.484	0.713	0.636
Extrinsic attributes (VE-1; VE-3; VE-5; VE-6; VE-7)	0.625	0.655	0.71
Intrinsic attributes (VI-1; VI-3; VI-5; VI-7)	0.761	0.797	0.579
Purchase intention (VC-4; VE-2; VE-4; VE-8; VI-2; VI-4; VI-6; VI-8;)	0.822	0.824	0.652

Source: Own elaboration based on statistical data analysis (2018).

To calculate the internal consistency of the indicators that determine the reflective constructs, construct reliability was analyzed through the Cronbach's Alpha (α) measure and the Construct Composite Reliability Coefficient (ρc).

Table 5. PLS analysis results – Structural model

Casual Model of Quality Attributed on Purchase Intention of Sonoran residents regarding non-industrialized whole bean coffee.

Hypothesis	Hypothesis sign	Standardized path coefficients (β)	t- value (Bootstrap)
H1: Belief attributes→Purchase intention	+	0.049	4.420
H2: Extrinsic attributes →Purchase intention	+	0.050	13.095
H3: Intrinsic attributes→Purchase intention	+	0,.058	0.809

Source: Own elaboration based on statistical data analysis (2018).

In the table above, it can be observed that the t-value (Bootstrap), which must be greater than 1 to be significant, is so for the Belief Attributes and contrasts with the Extrinsic Attributes.

Final considerations:

The conclusions regarding the objectives considered in the research, which helped guide this project, are as follows:

Specific objective one:

To evaluate the intrinsic attributes that predominate in the purchase intention of Sonoran consumers regarding non-industrialized whole bean coffee within a C+ socioeconomic level (upper-middle class). Once the in-depth interviews and focus groups were conducted, the intrinsic attributes considered significant were flavor, color, and aroma.

Specific objective two:

To determine the extrinsic attributes that predominate in the purchase intention of Sonoran consumers regarding non-industrialized whole bean coffee within a C+ socioeconomic level. According to the information gathered through qualitative research, the attributes considered significant were price, brand, and packaging.

Specific objective three:

To identify the belief attributes that predominate in the purchase intention of Sonoran consumers regarding non-industrialized whole bean coffee within a C+ socioeconomic level. The results indicated that the safety-related attributes were significant. Since price was the primary concern among interviewees, a differentiation strategy will be implemented, considering that prices for this type of manually processed product are usually high. The brand will be positioned with a stylized design, distinguishing it from all others.

To conclude the model presented in this research, the contrast between the hypotheses: H1: Belief attributes -> Purchase intention, and H3: Intrinsic attributes -> Purchase intention, leads to the inference, after analysis, that indicators such as safety and trust, along with brand, price, and packaging, are significant based on the indicators referenced by previously cited authors.

Entrepreneurs marketing non-industrialized whole bean coffee should consider obtaining the socially responsible company designation, which, according to Berman (1997), refers to companies that help people understand that they are intimately connected to the well-being of others, and to the social and political world around them. This creates a meaningful difference in daily life, supported by individual choices and values, enriching lives across various cultures and ethnicities. In this way, current and potential consumers of this type of coffee would fully identify with the company and its product.

Limitations and future lines of research:

This study does not aim to generalize the results beyond the previously studied context. It is characterized by providing an overview of a set of identified variables intended solely for scientific dissemination and potential commercial use, such as in advertising campaigns and other aspects of various fields and sciences that may benefit from it.

There are multiple factors, variables, and attitudes that dominate the purchase process of any product, and this study proposes variables based on an exhaustive literature review and previously established models. Likewise, the findings are not intended to be generalized, and the research opens the door for future exploration of new characteristics and variables that future researchers may propose as knowledge and exploration of the topic deepen.

Each research methodology has characteristics that make it more appropriate for obtaining certain information and, at the same time, introduces limitations in its application. These results are conditioned accordingly, and had different methods been used, the conclusions presented might have been different.

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