Market Projection and Neurovisual Evaluation of a Honduran Cold Brew Coffee in Tegucigalpa

María Celeste Ortez Amador[1]; Martín Alberto Leal Plata[2]; Marvin Josue Calix Morales[3]; Carlos Ramón Varela Pinto[4]

[1,4] Universidad Zamorano, Honduras, *maria.ortez@est.zamorano.edu, mleal@zamorano.edu, mjcalix@zamorano.edu, cvarela@zamorano.edu*

***Abstract–** This study integrated market analysis and neuromarketing techniques to evaluate the commercial potential of Café Nativo's cold brew in Tegucigalpa. Structured surveys were applied to coffee consumers, alongside a sales trend analysis, competitive benchmarking, and eye-tracking experiments to assess visual and emotional responses to the product's packaging. Results showed high familiarity with cold brew, with taste, packaging, and convenience as key drivers of purchase decisions. A total of 56 % of respondents indicated a definite purchase intention, and the adjusted annual demand, considering behavioral correction and early adoption (Rogers' model), was projected at 1.88 million units. Emotionally, female participants showed higher joy toward the product design. These findings support the commercial feasibility of the cold brew and guide its gradual introduction into the Honduran market.*

***Keywords:** consumer behavior, sensory analysis, purchase preferences, visual attention, emotional perception.*

I. Introduction

In recent decades, the coffee industry has evolved in response to changes in consumer preferences, fostering the demand for innovative brewing methods such as cold brew and promoting the incorporation of new processing techniques, novel products, and an increased focus on quality and sustainability [1]. The global cold brew coffee market has experienced sustained growth, with a projected compound annual growth rate (CAGR) of 23% through 2031. The market size for cold brew coffee was valued at USD 2.59 billion in 2023 and is expected to increase from USD 3.16 billion in 2024 to USD 16.22 billion by 2032, exhibiting a CAGR of 22.67% during the forecast period [2].

In Honduras, domestic coffee consumption has shown a remarkable increase, rising from approximately 20,000 quintals a decade ago to between 370,000 and 390,000 quintals in 2024, evidencing greater acceptance of the product in the national market [3].

The rise of cold brew coffee is attributed to various factors. Researchers at the UC Davis Coffee Center have reported that the lower acidity and smoothness of this beverage have been fundamental to its growing popularity [4]. Additionally, its high caffeine content reinforces its appeal among consumers seeking an energizing drink with sustained release. According to a study by The University of Newcastle (Australia), this preparation contains approximately 2,240 mg of caffeine per liter, ranking as the second highest concentration method after espresso [5]. Furthermore, its lower caloric content compared to other commercial coffee options and its ready-to-drink format have been key drivers in the expansion of its market [6].

In this context, Café Nativo, one of the most renowned coffee shops in Tegucigalpa for its product quality, has consolidated its brand both nationally and internationally, ranking 42nd in the prestigious *The World's 100 Best Coffee Shops* competition held in Madrid in 2025 [7]. Its success stems from a commitment to quality, innovation, and sustainability, which are fundamental aspects in an increasingly competitive market. Building on this positioning, the company seeks to expand its portfolio with a new product: a cold brew offered in three flavors caramel, mocha, and vanilla crafted from diverse concentrates, making it an attractive and innovative proposal in the growing ready-to-drink (RTD) beverage market.

This project focuses on analyzing the potential acceptance and demand for Café Nativo's cold brew in Tegucigalpa, aiming to generate useful insights for its positioning and commercial strategies. Accordingly, the following objectives were defined:

- Identify consumption and competitive factors that influence the development of the cold brew market segment in Tegucigalpa to recognize opportunities for differentiation and commercial consolidation.
- Evaluate consumer acceptance of Café Nativo's cold brew in Tegucigalpa to identify differentiating attributes, preferences, and positioning opportunities relative to similar beverages.
- Project the potential demand for Café Nativo's cold brew in Tegucigalpa to support its commercial viability and guide its market introduction.
- Analyze visual perception of the product's packaging design and the emotions associated by consumers to identify opportunities for improvement and strengthen its impact at the point of sale.

II. Methodology

This research was conducted under a mixed-methods approach with an exploratory and descriptive scope, aimed at understanding consumer preferences and estimating the potential demand for Café Nativo's cold brew in Tegucigalpa. The study employed a simple cross-sectional design, as data were collected at a single point in time. Both qualitative and quantitative tools were used, including structured surveys to measure purchase intention and neuromarketing analyses using eye-tracking technology. This combination enabled the development of a demand projection grounded in actual perceptions of the target market.

A. Target Market Analysis (Exploratory Phase) mixed-method approach

To guide the research design, a problem audit was developed through interviews with Café Nativo's owners, a review of consumption statistics, and an exploratory market analysis. This audit enabled the delimitation of the Administrative Decision Problem (ADP), defined as the need to introduce a competitive cold brew product into the Tegucigalpa market, and the Marketing Research Problem (MRP), focused on understanding consumer acceptance profiles, purchase intention, and visual preferences. Based on the problem audit, the Administrative Decision Problem (ADP) and the Marketing Research Problem (MRP) were more clearly defined, guiding the study's overall approach.

Administrative Decision Problem (ADP): What decisions must be made to successfully introduce Café Nativo's cold brew to the market?

Marketing Research Problem (MRP): Analysis of consumer acceptance of Café Nativo's cold brew, visual perception of its packaging design, and purchase intention, to estimate its potential demand and support its commercial feasibility in Tegucigalpa.

Additionally, a competitive analysis (benchmarking) was conducted in strategic supermarkets, which included direct observation and data collection from the shelves of La Colonia, Mas x Menos, YIP, and Diproba. Information was documented on prices, available brands, packaging formats, shelf positioning, active promotions, and differentiating product characteristics.

B. Application of Structured Surveys for Consumer Analysis

This phase employed a quantitative research approach with a simple cross-sectional design, using a structured survey developed through Google Forms. The instrument was designed based on the information needs identified in the problem audit and organized into thematic sections addressing consumer behavior and preferences. It assessed coffee consumption habits, familiarity with cold brew beverages, brand awareness, perceptions of price, flavor, packaging design, and willingness to purchase Café Nativo's cold brew at a predetermined price. Additional variables, including expected consumption frequency, estimated quantity per occasion, and sociodemographic data (age, gender, occupation, and income), were incorporated to enable segmentation and profile comparison.

The questionnaire incorporated nominal, ordinal, Likert, and ratio measurement scales, allowing the application of diverse statistical analyses. A pilot test with 30 participants validated the instrument and informed adjustments prior to its final implementation. Data collection was conducted in person at three strategically selected points of sale (Café Nativo, La Colonia #1, and Pronto La Esperanza) to ensure diversity within the target consumer profile in Tegucigalpa.

The sample size was calculated using the statistical formula:

$$n = \frac{Z^2 . p . q}{e^2} \qquad (1)$$

Where Z represents the Z-score at a 95% confidence level, p the expected proportion of product acceptance (0.80), q=1− p= (0.20), and e the allowable margin of error (0.05). Following this model, a total of 246 surveys were conducted using non-probabilistic convenience sampling, aligned with exploratory survey methodologies proposed by Hernández Sampieri [8].

C. Annual Demand Estimation

To estimate annual demand, only responses from participants with firm purchase intention were used. An individual annual demand variable was constructed from declared purchase frequency and quantity, processed in Excel, and analyzed descriptively in JASP. Due to high variability, a natural logarithmic transformation was applied to stabilize the distribution, following recommendations by Bellégo et al. [9] and Kim et al. [10]:

$$y = In\,(X + 1) \qquad (2)$$

Where X represents individual demand and +1 avoids undefined results for zero values. Total demand was extrapolated to Tegucigalpa's target population using socioeconomic and age filters, survey acceptance rates, and an adjustment factor (75%) to correct overestimation, based on Risen and Risen [11]. An additional adoption scenario of 16% was incorporated for innovators and early adopters, per Rogers' diffusion of innovations model [12].

D. Exploratory Neuromarketing Survey Using Eye-Tracking

The exploratory neuromarketing study was conducted using iMotions software paired with a research-grade eye-tracker. Digitized images of Café Nativo's cold brew packaging, label, and ingredient bar were presented under controlled conditions. Areas of Interest (AOIs) were defined to capture key visual attention metrics, such as total fixation duration, fixation count, time to first fixation, and first fixation duration, metrics widely validated in visual marketing research [13], [14]. Heatmaps were generated to identify high-attention zones like the logo, flavor label, and nutritional information.

Emotional responses were recorded simultaneously through facial micro-expression analysis (anger, joy, surprise, disgust, among others) using iMotions' affective module, integrating visual and emotional data in real time. A non-probabilistic judgment sampling method was applied with 97 participants recruited at La Colonia supermarket. The sample size was determined using a standard formula for exploratory studies [15], adopting a higher margin of error (8%) due to the high reliability of the neuromarketing equipment, which ensures precise and consistent data collection. Statistical analysis was performed in JASP (v.0.18.1) using descriptive measures and independent samples t-tests to compare emotional responses by gender. This approach is consistent with findings from Mehta et al. [16], demonstrating that integrating eye-tracking with facial analysis offers valuable insights into consumer interaction with packaging designs.

III. Results and Discussion

A. Consumer Preferences and Benchmarking

Interviews with Café Nativo's owners confirmed that the acceptance of cold beverages has increased among the 18- to 35-year-old segment, which prioritizes smoother flavor profiles, lower acidity, and greater portability. These findings align with research from the National Coffee Association identifying a generational shift toward cold coffee consumption, even in regions traditionally dominated by hot coffee [17].

Retail sector representatives in Tegucigalpa, including supermarkets such as Mas x Menos, Diproba, La Colonia, and YIP, highlighted key criteria for the acceptance of new ready-to-drink (RTD) cold brew beverages. Among the most relevant factors identified were expected product turnover, brand reputation, logistical ease, and differentiation in flavor and presentation. Overall, expected turnover, strong brand backing, attractive packaging design, supplier follow-up, and the use of tastings as a promotional tool were recurrently valued in the incorporation of products on shelves. Despite the growing acceptance of cold coffee, the market still demands a clear and coherent value proposition to overcome barriers such as low brand familiarity or lack of promotional activations.

The benchmarking conducted in supermarkets in Tegucigalpa revealed a segmentation of the RTD cold brew beverage market into three price levels: premium, mid-range, and affordable. Although the products are similar in volume (280–405 mL) and traditional flavors such as mocha, vanilla, or caramel, significant differences were observed in packaging design, shelf visibility, and promotional strategies. Brands like Starbucks stand out for their modern presentation design, high brand recognition, and frequent promotions, whereas national brands, although more price-competitive, display more traditional packaging with lower visibility, occasionally compensated by discounts or active product rotations [18].

B. Application of Structured Surveys for Consumer Analysis

As shown in Figure 1, 63% of respondents consume coffee daily, reflecting a deeply ingrained habit within their lifestyle. An additional 13% reported drinking coffee three to four times per week, while smaller percentages indicated weekly (14%) or two to three times per month (11%) consumption. This high frequency of daily consumption suggests that the market may be receptive to innovative offerings that preserve the traditional coffee profile.

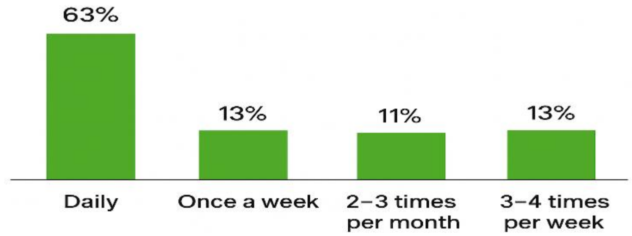

Fig. 1 Frequency of coffee Consumption in Honduras (Survey Results)

Seventy-five percent of respondents reported having previously consumed cold brew beverages, indicating high familiarity with this category in the market. This suggests that the product would not be introduced into an entirely new environment but rather one where prior experience and openness already exist, potentially facilitating adoption if accompanied by a differentiated value proposition. In contrast, the remaining 25% represents a strategic opportunity for activation and educational efforts about the product, particularly within less explored segments or those with lower exposure to such beverages [19].

As shown in Fig. 2, coffee shops constitute the most frequent purchase channel for cold brew beverages, with 37% of responses. These finding highlights consumer familiarity with these venues as access points to the product, likely linked to both the consumption experience and the availability of specialized beverages. Supermarkets ranked second at 33%, evidencing their potential as a strategic channel for incorporating cold brew into regular shopping routines. Transit-oriented sales points, such as convenience stores in gas stations, accounted for 28%, confirming the relevance of consumption associated with convenience, mobility, or impulse purchases. Finally, the "Other" category represented 2% of responses, including mentions of malls or overseas purchases, reflecting more sporadic or travel-related consumption patterns.

These findings support the need for a multichannel distribution strategy that combines presence in coffee shops and supermarkets with options in convenience outlets, thereby maximizing access opportunities according to consumer purchasing contexts.

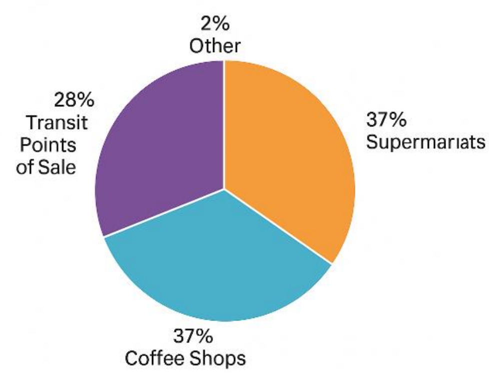

Fig. 2 Purchase Channels for Cold Brew Coffee (Survey Results)

Analysis of Fig. 3 shows that flavor is the most influential factor in the purchase decision for cold brew beverages, with 60% of consumers rating it as "totally decisive." Packaging design follows with 42%, underscoring the role of visual appeal in product perception. These findings highlight a preference for sensory and aesthetic attributes, consistent with modern consumption trends, especially among younger audiences.

In comparison, price was less decisive but still relevant: 27% rated it at the highest score and 34% at level 4, indicating moderate influence. This suggests that, for the target market in Tegucigalpa, launch strategies should emphasize sensory experience and design over price competition. According to Matt Alves-Hill, cold brew's popularity among younger consumers is driven by convenience and customizable design, where packaging conveys quality and sustainability [20].

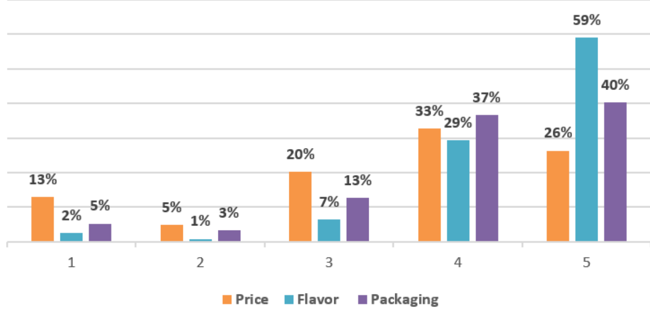

Fig. 3. Purchase Decision Factors for Cold Brew Coffee (Survey Results)

As shown in Fig. 4, the main reason for consuming cold brew was "enjoying a pleasant flavor without heat" (28.9%), highlighting its sensory appeal, particularly in warm climates or when a refreshing beverage is preferred. Other key motivations included "accompanying a light breakfast or snack" (24.8%) and "staying awake or focused" (18.3%). Additional reasons were "preferring cold over hot coffee" (15.0%) and "replacing an energy drink or soda" (13.0%). These findings demonstrate that cold brew consumption combines hedonic and functional dimensions, broadening its market positioning opportunities in Honduras.

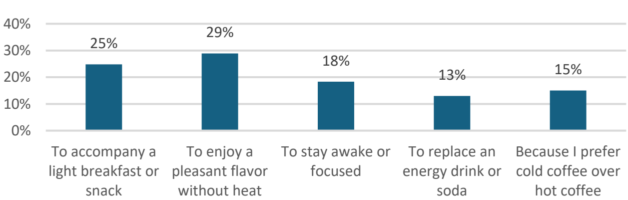

Fig. 4. Main Reasons for Cold Brew Consumption (Survey Results)

C. *Annual Demand Estimation*

Table 1 presents descriptive statistics of the log-transformed individual annual demand variable. The transformation significantly reduced data dispersion, yielding a coefficient of variation of 16%, which is acceptable for market research on emerging products and helps minimize the effect of extreme values, producing a more homogeneous distribution [21]. Additionally, ten responses with inconsistent or exaggerated annual consumption values were removed, likely due to data recording misinterpretations. Consequently, although 137 participants initially indicated definite purchase intention, the valid sample for final analysis was reduced to 127 individuals. This data cleaning step was essential to ensure statistical robustness and avoid overestimations in the demand model.

TABLE 1
DESCRIPTIVE STATISTICS OF LOGARITHMIC DEMAND

Descriptive Statistics	log
Valid	127
Missing	0
Mean	5.484
Std. Deviation	0.902
Coefficient of variation	0.164
Minimum	3.485
Maximum	7.031

Table 2 shows that after applying key filters socioeconomic level, age, declared acceptance, and the Nielsen correction the target population for cold brew in Tegucigalpa was reduced to 127,961 individuals, representing 12% of the total population. Initially, 137 respondents (56%) indicated they would "definitely purchase" the product; however, 10 records were removed due to atypical patterns in reported purchase frequency and quantity, leaving 127 valid responses for final calculations. This adjustment enhances the reliability of the estimate by ensuring data reflect consistent consumption patterns. Finally, a 75% correction factor, as recommended by Nielsen to account for the gap between stated purchase intention and actual behavior [22], [23], was applied. This progressive reduction provides a more accurate view of the realistically attainable market, mitigating the optimistic bias common in new product projections.

TABLE II
ANNUAL DEMAND PROJECTION SCENARIOS

Parámetro	Valor	%
Average annual demand per person	123	-
Total population of Tegucigalpa	1,109,732	-
Non-poor population	508,956	46%
Population aged 18 to 55	247,861	49%
Acceptance percentage according to survey	127	52%
Estimated acceptance level for new products (Nielsen, 2005)	-	75%
Target population	127,960.99	12%

Table 3 outlines three progressive demand projection scenarios for Café Nativo's cold brew, based on an estimated target population of 127,961 individuals. The first scenario estimates an annual demand of approximately 15.68 million units, assuming an average individual consumption of 123 units per year. This figure was then adjusted using a 75% acceptance factor recommended by Nielsen for new products [24], reducing the projection to 11.76 million units annually and providing a more realistic market volume by correcting potential overestimations from purchase-intention data.
A third scenario incorporates an initial adoption rate of 16%, corresponding to innovators (2.5%) and early adopters (13.5%) as described in Rogers' diffusion of innovations model [25], yielding a projected initial demand of about 1.88 million units for the first market cycle. This conservative estimate is intended as a strategic reference, recommending subsequent validation through controlled market testing in representative areas. Such testing would refine projections and support a phased scaling strategy aligned with the product's natural adoption cycle.

TABLE III
DEMAND PROJECTION SCENARIOS

Projection Scenario	Demand	Estimated Acceptance % (Nielsen)	Initial Adoption
Target Population	127,960.99	95,970.74	15,355.32
Total Annual Demand	15,681,085	11,760,813.86	1,881,730.22

A. *Neuromarketing*

The integrated heatmap analysis reveals three key visual attention patterns across Café Nativo's cold brew packaging. First, the general presentation shows concentrated fixations in the central area of the bottle, primarily around the "Caramel" flavor label and brand logo, indicating these high-contrast elements successfully capture initial consumer attention [26]. A vertical band of moderate fixations along the bottle's contour suggests secondary scanning of peripheral design features.
Second, fixation patterns highlight strong attention on the product's descriptive text and "Cold Brew" denomination, underscoring consumers' priority to identify product category and attributes. Brand logo attention appears moderate, yet sufficient for recall, while traceability data received minimal focus, suggesting it is not decisive for immediate purchase decisions.

Finally, in the nutritional table, the highest fixations concentrated on carbohydrates, sugars, and proteins, reflecting consumer interest in caloric and macronutrient content for quick product evaluation. Micronutrients and vitamins drew minimal attention, consistent with findings by Graham and Jeffery [27], who report that consumers prioritize energy- and sugar-related information when making rapid purchase decisions for ready-to-drink beverages.

These patterns confirm that visual attention converges on elements central to flavor, brand identity, and key nutritional cues, providing actionable insights to optimize packaging

design for consumer engagement and informed decision-making at the point of sale.

Fig. 5 Integrated Heatmap of Visual Attention on Flavor, Brand, and Nutritional Elements of Cold Brew Packaging

Table 4 shows that the product description and brand logo received the highest visual attention, exceeding 95% among participants and displaying both rapid and prolonged fixation times, reinforcing their central role in product recognition and recall. In contrast, the flavor image and URL drew lower attention and required longer times to be perceived, confirming that consumers prioritize essential information name, description, and brand when making quick purchase decisions. This attention pattern aligns with Clement's findings [28], which highlight that brand and essential information are the first elements visually processed in ready-to-drink beverage categories

TABLE IV
VISUAL ATTENTION METRICS FOR PACKAGING ELEMENTS

Metrics	Product Description	Brand Logo	Flavor Image	Brand URL
Respondent ratio (%)	95.1	96	50.5	27.7
Revisit count	1.7	1.3	0.4	0.1
TTFF AOI (ms)	1053.9	1228.3	2971.4	4034.6
Dwell time (%)	25.5	20	9.7	9.7
First fixation duration (ms)	254.7	327.5	313.2	329.6

The flat-label analysis (Table 5) shows that the product description and name drew the highest visual attention (97% and 91.1%), while the logo, URL, and flavor image received considerably less. This confirms that consumers focus on central, text-based elements, consistent with research highlighting the role of text hierarchy and central placement in driving attention [29].

TABLE V
VISUAL ATTENTION TO CENTRAL AND PERIPHERAL ELEMENTS ON FLAT LABEL DESIGN

Metrics	Product Description	Brand	Product Name	Brand URL
Respondent ratio (%)	97	76.2	91.1	30.7
Revisit count	2	0.7	1.8	0.2
TTFF AOI (ms)	1480.9	3075.4	1370	5820.7
Dwell time (ms)	4538.7	909.6	1898.1	490.3
Dwell time (%)	37.8	7.6	15.8	4.1
First fixation duration (ms)	208.2	312.5	197.3	202.4

Table VI indicates that participants focused primarily on nutrients and energy sections of the nutrition label, with respondent ratios of 95.1% and 83.2% and prolonged fixation times. Sugars received moderate attention (64.4%), while the general message was viewed less (58.4%) with fewer revisits. This pattern supports findings that consumers prioritize key nutrient information when making rapid purchase decisions for ready-to-drink beverages [30].

TABLE VI
VISUAL ATTENTION METRICS FOR NUTRITION LABEL ELEMENTS

Métricas	Sugar	Nutrients	Energy
Respondent ratio (%)	64.4	95.1	83.2
Revisit count	0.8	1.6	0.8
TTFF AOI (ms)	4859.8	2168	2638.1
Dwell time (ms)	995.3	2750.8	952.6
Dwell time (%)	8.3	22.9	7.9
First fixation duration (ms)	310.6	264.3	300.9

Also, Facial coding showed female participants exhibited higher joy and positive valence, while male participants expressed more confusion and mild anger when viewing the same packaging. A t-Student test confirmed these differences as statistically significant ($p < 0.05$), visualized in Table 7.

TABLE VII
T-TEST AND MEAN DIFFERENCES BETWEEN EMOTIONS

Emotion	t	df	p	Mean Difference	SE Difference
Anger	-33.392	88162	< .001	-0.875	0.026
Contempt	16.683	88162	< .001	0.711	0.043
Disgust	2.986	88162	0.003	0.008	0.003
Fear	0.275	88162	0.783	0.008	0.028
Joy	57.912	88162	< .001	8.667	0.150
Sadness	-3.077	88162	0.002	-0.094	0.030
Surprise	3.961	88162	< .001	0.133	0.034
Engagement	31.928	88162	< .001	6.568	0.206
Valence	69.663	88162	< .001	11.964	0.172
Confusion	-9.782	88162	< .001	-0.296	0.030

Overall, the results indicate a positive perception of Café Nativo's cold brew across multiple evaluated dimensions. Most consumers reported favorable purchase intention, particularly among women, who exhibited more intense and positive emotions toward the product's presentation. Demand projections, adjusted for purchase intention and early adoption, reveal a realistic introduction scenario, with production capacity covering approximately 72% of the estimated initial demand. This alignment between emotional perception, stated acceptance, and operational feasibility provides a solid foundation for advancing to a commercial testing phase in specific market segments.

III. CONCLUSIONS

The RTD beverage market in Tegucigalpa is highly competitive yet receptive to innovative proposals with local identity, strong branding, and distinctive shelf presence. The target segment young adults with medium incomes and stable occupations (employees, independent entrepreneurs, and students) presents a clear opportunity to position cold brew as a frequent choice in work and academic routines, offering functional energy benefits and sensory appeal compared to traditional coffee.

Projected annual demand exceeds current production capacity; however, feasibility can be ensured through a phased market introduction supported by progressive validation via pilot tests. Packaging design effectively captures visual attention, though emotional responses differed by gender, with female participants showing the most positive reactions. These insights suggest targeted adjustments to maximize impact across all consumer profiles.

IV. RECOMMENDATIONS

Implement intensive activation strategies in high-turnover supermarkets, including planned tastings, prominent shelf displays, and retail partnerships for joint promotions to reduce familiarity barriers, encourage product trial, and accelerate adoption.

Validate demand projections through controlled market tests at analyzed points of sale, scaling production gradually based on actual consumer response to mitigate overestimation risks and align resources with proven high-acceptance segments [31].

Plan product launch and production schedules around summer months or year-end periods, capitalizing on seasonal consumption peaks identified in historical sales data to optimize inventory and maximize impact during initial market entry.

Develop future low-sugar or naturally sweetened variants supported by additional sensory studies to attract health-conscious consumers, broadening the target market and aligning with global wellness trends.

Optimize packaging design by reinforcing the visual hierarchy of key elements (name, description, brand) and incorporating quality seals or certifications to enhance trust, authenticity, and differentiation in competitive retail environments.

Conduct pilot studies in other urban areas with similar socioeconomic and consumption profiles to evaluate national expansion potential.

Expand sample sizes in future research to obtain more robust, regionally comparable insights into purchase intentions and consumer behavior, enabling precise adjustments to commercial and logistical strategies before scaling distribution.

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