Operational Management Model to Increase the Performance of an SME in the Coffee Shop Sector: Puku Puku Case

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Abstract

Innovation is a key factor for the competitiveness of SMEs, the service sector is characterized by recurring problems and fierce competition in a saturated market, causing these companies to reduce their profitability. This work presents an operational model to increase the performance of a coffee shop. For the design, a case study has been developed in "Puku Puku", a coffee shop based in Lima, Peru. Applying the Huff Model, the company's competition was defined based on different relevant variables and, using benchmarking, a pricing strategy was implemented. For this purpose, a value was given to the distance from the premises to the consumer, price, location, customer satisfaction, among others; and the probability that a consumer would go to the different cafeterias in the studied area was obtained. Based on the results of this model, a report was made that provides a potential increase of 30% over the estimated income in the scenarios analyzed. The value of this research lies in the economic advantages that could be obtained by applying this model in a coffee shop business, with the possibility of being replicated in other areas.

Keywords
Huff Model, SME's, pricing, benchmarking, management model.

1. Introduction
There are various models of strategic management through which large companies perform and operate in the best possible way, whether in the financial, economic, commercial, or production spheres, among others. However, it is not the same for small and medium-sized enterprises (SME's) due to a combination of lack of resources, personnel, time, and in some cases, a lack of knowledge. This implies a deficient control of cost management, pricing systems, and margin definition, guided by market research.

Firstly, the lack of innovation and technological performance is mentioned, which hinders the improvement of companies themselves and their ability to find enhancements. Secondly, there is a lack of knowledge about the tools that could be implemented, applicable theories for their business, and specialized management controls. Without

knowledge of the different available management models, analyzing suitable variables for each company becomes unfeasible.

On the other hand, as mentioned earlier, SMEs lack the resources and capacity to implement large management tools and systems. When referring to resources, this includes both technological and human resources, which is counterproductive when setting standards. "SMEs may have a great capacity for innovation, but they often lack the resources and knowledge to manage the entire innovation process themselves" (Marcelino-Sádaba et al. 2014). This lack of resources makes it impossible to adequately analyze cost optimization and evaluate the profitability of different products offered.

Similarly, Galindo Lucas (2004) mentions that small businesses tend to experience setbacks due to the lack of ability to gather capital or access new technologies. The innovation capacity of SMEs is crucial if they want to compete with large companies. Innovation is evident in new management models that could be implemented to increase the effectiveness of assets in generating profits by avoiding counterproductive resources and/or products.
The two main reasons why SMEs do not benefit much from trying to implement management controls are a lack of expert human capital and a lack of resources.

Cost-based decision-making is directly related to the unit margin of products, as it allows for informed decisions based on actual costs incurred. Understanding the contribution of each product unit to the profit margin and revenue is crucial (Cuevas and Villegas 2002). Likewise, knowing the unit margin allows for flexible pricing based on competition, demand, variable costs, the market, among others.

The coffee shop industry faces several recurring problems that can lead the business to bankruptcy in the worst cases. Firstly, the competition is fierce, especially in a metropolis like Lima. It is increasingly difficult to attract customers in such a saturated market, with up to 6 cafes operating on the same block. Furthermore, high rental costs and fluctuations in coffee prices (raw material) make this business model less and less profitable over time.

All the aforementioned factors lead to small businesses not developing the capacity to implement strategic management models. Therefore, they rely on intuition and their own knowledge for decision-making. The central inquiry of whether the profitability of a café can be augmented through the implementation of a new management model shifts the focus to examining how the coffee shop sector determines its prices, manages costs, decides on sales quantities, and formulates promotion strategies, predominantly relying on intuition. Management control, executed by the same administrative personnel, prompts consideration of the potential adoption of a new management approach to enhance the coffee shop's profitability.

2. Literature Review
Flores et al. (2017) conducted a study that empirically and theoretically examines 25 artisanal companies with the aim of establishing appropriate prices for them. The study determined that 60% of the companies in question lack a basic cost system, excluding its control and management, making price determination challenging. This is largely attributed to the lack of knowledge among administrative staff. The absence of a pricing system poses certain difficulties since it prevents working with actual price data, resulting in an experimental cost registration. Market prices are the other variable under investigation in the research plan, leading to comparisons of fluctuations in the predetermined prices within the organization. These predetermined prices were based on empirical costs calculated in the company. To define selling prices, an initial cost analysis was conducted, leading to certain alterations that, after evaluation, resulted in the unit cost of products and subsequently in price determination.

On the other hand, Mera (2013), following the empirical acquisition of essential data for the study, adopts a quantitative approach to analyze the costs and prices of a restaurant. The information was obtained from primary sources, utilizing surveys, interviews, and visualization of the company's raw data. Findings revolve around various variables, with the first being the lack of price control and management, leading to a lack of knowledge about expected utility and hindering proper price determination. Secondly, it was determined that the current pricing methodology of the company is entirely antiquated and inefficient, relying solely on competitor prices. 80% of the restaurants in the area lack a pricing system, with a surprising 43% of businesses acknowledging that this lack of knowledge and price control is the cause of misconceptions and a baseless decision-making process.

Ramón Varela et al. (2018) present research proposing to evaluate the perception of justice in price determination as a competitive barrier for implementing Revenue Management. Revenue Management is a pricing management process that combines different variables such as demand forecasting, product stock availability, and price determination to maximize profit, specifically in restaurants in the City of Puebla, Mexico. The study employed a non-experimental, quantitative, descriptive, and cross-sectional research design to draw general conclusions and predict future behaviors in the gastronomic industry of Puebla. The conclusion reached is that Mexico lacks theoretical contributions and empirical research on the topic. Additionally, Revenue Management strategies can be implemented as long as customers are informed about the benefits it brings, and employees are trained on the subject.

Another relevant research for the state of the art is that of Villegas (2002), where the three basic factors to consider when setting prices for products or services are analyzed. The research concludes that it is not possible to determine the margin on cost using formulas; therefore, developing an objective costing method cannot be considered a technique but an approach to setting costs.

3. Methods
3.1 Huff Model
To define the competition of the study object, the Huff model was employed. This is a mathematical model used in geography, urban planning, and marketing to estimate the probability that consumers choose certain commercial locations or stores based on their size and distance from their homes. It is commonly used to analyze the spatial distribution of demand. The model is based on the theory that customers prioritize larger and closer stores, assuming that the probability of a consumer choosing a store is directly proportional to the size or attractiveness of the store and inversely proportional to the distance between the consumer's location and the store. This is composed as follows:

$$P\_ij = (S\_ij / D\_ij^\alpha) / \Sigma (S\_kj / D\_kj^\alpha)$$

Where:
1. "P_ij" is the probability that consumer i chooses store j.
2. "S_ij" is the attractiveness of store j for consumer i.
3. "D_ij" is the distance between the location of consumer i and store j.
4. "α" is a parameter representing the sensitivity of consumers to distance.
5. "$\Sigma (S\_kj / D\_kj^\alpha)$" is the sum of all competing stores, where "k" represents each store in the set of stores.

To calculate the level of attractiveness, the following algorithm was developed based on Google Maps data:

$$S\_ij = M\_j + (N\_j*\beta) + \log(O\_j*\theta)\ ^2 - Q\_j$$

Where:
1. "M_j" is a rating between 1 and 10 for store j based on the looks of the establishment, every coffee shop in the study area was visited during field work to retrieve this data.
2. "N_j" represents the average rating for store j in Google Maps (1 to 5), this web service provides user-based data regarding their personal experience in each coffee shop in the studied area.
3. "β" and "θ", represent the importance assigned to the average rating and the quantity of reviews (0.6 and 0.4), respectively. This values where selected after several runs of the equation to give the best balance between those variables.
4. "O_j" represents the number of reviews that store j has in Google Maps.
5. "Q_j" is a rating between 1 and 10 for store j based on the prices of the establishment (lower values are preferred), every coffee shop in the studied area had its bill of fare reviewed during field work to retrieve this data.

To simulate the model, 44 coffee shops located within a 1.5-kilometer radius from Puku Puku were used as the study subject; and 10 strategic points of high commercial gravity were chosen, from which the arrival times to the 44 different venues would be measured.
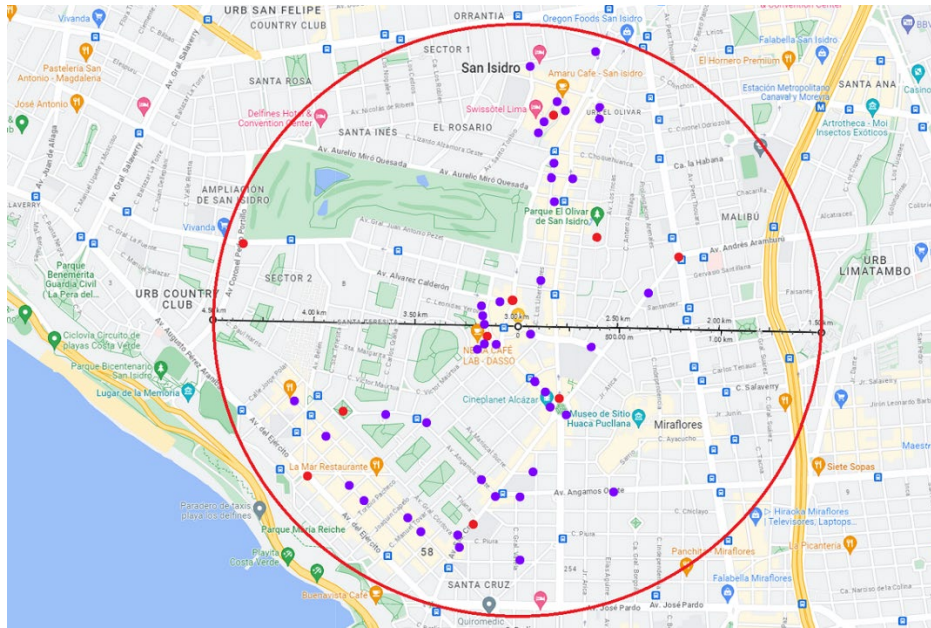
Figure 1. Study sample for Huff model – High commercial gravity points marked in red, coffee shops marked in purple

3.2 Pricing

For the pricing calculation, the technique of pricing based on expected product margins will be used. This technique is employed to assign a competitive value to a product or service, utilizing various perspectives that best fit the specific sector. It is commonly used in the café services sector because each product must have a minimum profit margin, complemented by the product cost margin defined as "food cost." By appropriately defining different margins for each product, a contribution margin to income can be determined, and even planning to sacrifice the margin of one product to increase sales in another.

$$Sale\ Price = Cost\ Price + Margin$$

The profit margin measures the profit obtained per monetary unit of sales. Various evaluation margins will be taken into account.

$$Profit\ Margin = (Sale\ Price – Cost) / Sale\ Price$$
$$Gross\ Margin = Gross\ Profit – (Cost / Total\ Sales)$$
$$Net\ Margin = Net\ Profit / Total\ Sales$$

3.3 Variables and Sample

The independent variable will consist of the price: It is the amount of money charged for a product or service or the sum of values that consumers give in exchange for the benefits of having or using the product or service.

The dimensions of the price include the cost price, or in other words, the cost of putting the product on the company's counter. The margin will be used to analyze the various possible prices of products in the area.

The dependent variable will consist of competitiveness: The relative position of the company compared to its competition and its ability to sustain it in a lasting way and improve it if possible. To measure the variation in competitiveness, the Return on Equity indicator will be used to determine if the company's resources are being used appropriately, and how the increase in income achieves greater solvency and execution capacity.

However, the price will be affected by the total costs of putting the product on the counter, including fixed costs (rent, electricity, water, salaries) and variable costs (transportation, production, sales, among others). Finally, it depends on

the elasticity of demand in the sector, determined by the percentage change in price and how it affects the percentage change in quantity demanded.

4. Results and Discussion

4.1 Findings from Huff Model

The results provided by the Huff model include the probabilities of choosing different cafés in the area, as well as the relative importance of each destination based on its attractiveness and the distance from the consumer. The result showed Puku Puku in fourth place with an 5.87% probability of being chosen by consumers in the study sample. In Figure 2 it is represented how the Huff Model determined the probability of a customer going to each coffee shop, it's important to highlight that there isn't a linear relationship between the attractiveness of a venue and the likelihood of a customer visiting. While the model takes this variable into account, the location of the establishment carries more weight in the final outcome. After obtaining the results, during days of high demand, cafes belonging to both the top and bottom 5 were visited to verify the accuracy of the model. Indeed, it was confirmed that the cafes with a higher probability of being visited according to the model were considerably more crowded than those that weren't.
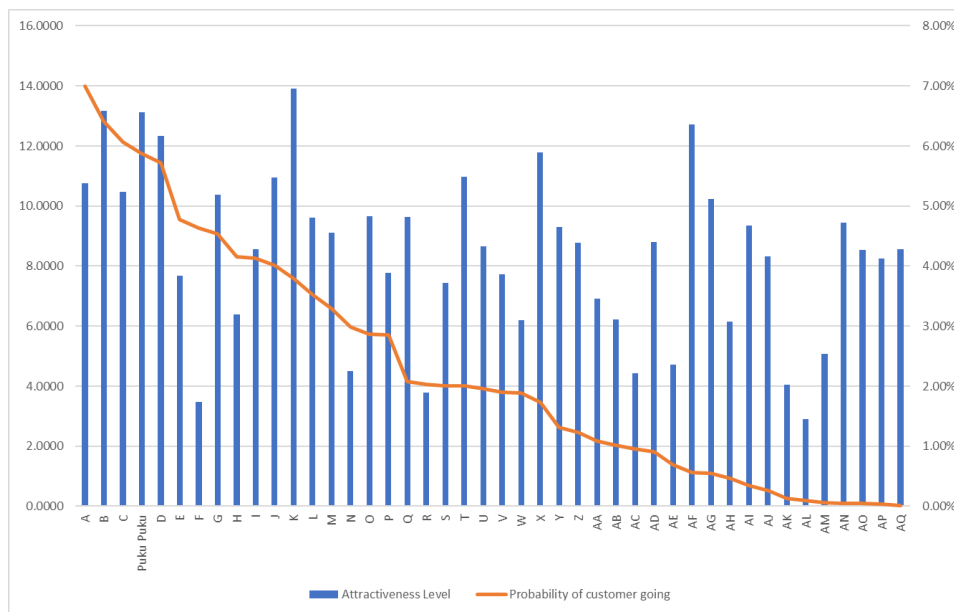

Figure 2. Huff Model Results – Attractiveness level vs. Probability of customer going

4.2 Reevaluation of Fixed Costs

The monthly fixed costs incurred by the Puku Puku café located on Pardo y Aliaga street were determined, resulting in S/. 138,254.00. Upon dividing the total fixed costs by the quantity of products sold in the month, a value of S/. 4.42656 was obtained. Then by applying the revenue formula to each individual product, the ones that were generating losses, requiring subsidies from higher-income products, where identified. This was a total of 24 products.

4.3 Target Prices

The analysis then proceeded to compare the prices offered by Puku Puku café with a sectorial benchmark of its 5 main competitors. The competitors were identified using the Huff methodology. The sampled products were categorized

(hot, cold, savory, sweet, natural, infusions, frappes and packaged) and the top three highest-income products within each category were selected for comparison.

With the obtained results, a percentage variation analysis of Puku Puku café prices was conducted in comparison to the prices of its major competitors. In this way, the percentage variation per product was calculated, which was then used to determine the average percentage variation for a category of products.

Table 1. Statistical Measures

Category	Satistical Measures		
	Average (S/.)	*Standard Deviation*	*Marginal Variation*
Hot	12.00	1.51	11%
Cold	12.27	1.81	-1%
Savory	18.60	3.25	5%
Sweet	13.77	3.22	11%
Natural	15.17	3.23	12%
Infusions	11.60	3.70	5%
Frappes	17.20	4.75	8%
Packaged	8.37	5.33	-12%

By excluding products that incur losses, adding their corresponding distributed fixed costs to their income, and applying a percentage correction to the price based on benchmarking from their main competitors, there was a 30.66% increase in operating profit.

Table 2. Original Uility vs Modified utility

Results (monthly)	*Amount (S/.)*
Original Utility	33,987.22
New Utility	44,407.19
Increase	10.419.97
Increase (in %)	30.66

4.4 Discussion

The present study focuses on optimizing a case study, specifically in the coffee shop sector, using Puku Puku café as the sample company located in the San Isidro district on Pardo y Aliaga Avenue. The primary objective of the research is to determine an operational management model that reduces operational costs and increases marginal profit. Velásquez Contreras (2003) discusses the constant change in the business world and highlights that most companies are not ready to respond to these new circumstances. Additionally, the operational management model for a small and innovative business differs from that of a larger company with more resources. Therefore, the proposed model must adapt to the specific needs of each company.

Upon analyzing the data obtained from the company, two main areas for improvement affecting the company's profitability were identified. Firstly, there were products being subsidized by the rest, as deducting the unit fixed cost and unit variable cost from the unit income resulted in a negative value. Secondly, the company's pricing strategy was solely based on a subjective analysis, leading to certain products having very low marginal profit and consequently high food costs for the sector.

As an initial engineering solution, the Huff model was implemented to determine the competition of the café based on data analysis. This considered variables such as the café's location, consumer satisfaction, ambiance attractiveness, and average price. The result provided the probability of a consumer visiting 44 cafés in the area (within a 1.5-kilometer radius from Puku Puku). This tool allowed us to identify that Puku Puku was among the 6 cafés with the

highest probability of attracting consumers, essentially identifying the top 5 competitors. As a second engineering solution, operational cost management was employed, resulting in increased productivity for the company.

This research is supported by three major pillars. Firstly, the Huff model allowed for the identification of competition in a manner not previously seen in scientific articles. Its versatility permitted the inclusion of easily accessible variables leading to the expected results, unlike other studies that feed the model with extensive databases or Big Data, such as the study by Liang et al. (2020), who used the location of mobile devices to calibrate their model. Furthermore, it demonstrated its ability to be replicated in different sectors of the Peruvian market, such as supermarkets, retail, or even education; it's simply a matter of adjusting the model variables according to the objective. An example of this versatility is the research by Li et al (2018), which uses the model to study childhood obesity based on the location of different fast-food restaurants. Finally, the model provided probabilities of a consumer approaching different establishments in the area, allowing for benchmarking with the top 5 competitors. Like the different cases studied, the price analysis based on competition provided a different perspective and an opportunity for improvement in pricing strategies. Having all the information about the company made a detailed cost study unnecessary; however, lacking information on competitors' costs made it impossible to identify a technical gap. Therefore, the focus of improvement was on prices.

4.5 Limitations & Future Research Suggestions

The main limitation that emerged was the lack of information regarding demand variability based on the selling price, which can pose a significant risk to profit generation. This is due to two scenarios that could arise when modifying selling prices as proposed in the research. The first scenario corresponds to inelastic demand. In case the company chooses to reduce selling prices for a category of products, it might face challenges in optimizing its cost structure and maximizing profitability. The company might lower prices, expecting higher demand, but if there is no increase in demand, unit costs increase due to lower production, leading to a decrease in profit margins. The second scenario corresponds to elastic demand. If the company chooses to increase selling prices for a category of products according to the benchmarking study, it could face a substantial decrease in demand, directly impacting the marginal profit per product and even the operating profit.

On the other hand, the research could also be affected by a lack of a macroeconomic study of the sector. If macroeconomic factors affecting the industry, such as growth trends, demand seasonality, competition, possible substitutes, government policies, and market conditions (trends, positioning, customer demographics, etc.), are not properly understood and analyzed, it's challenging to accurately assess the costs and prices of the company. This leads to misguided pricing, cost management, and resource allocation, causing a negative impact on the profitability and competitiveness of the company.

Also, due to the competitive nature of the research, where access was only available to the metrics of the company under study, the only way to feed the model with substantial data was through public and free databases, such as Google Maps. Additionally, although Puku Puku is an SME, its competitors are not necessarily so. Within the study, cafeterias belonging to giant corporations like Starbucks or McCafé were found. Therefore, if a more precise analysis is desired, aspects of the business such as large marketing campaigns or stratospheric discounts that these companies can afford, whereas an SME cannot, should be taken into account.

5. Conclusion

In summary, this study set out to address the fundamental question posed in the introduction: can the profitability of a café be increased through the implementation of a new management model? The Huff model emerged as a key tool in delineating competition based on the establishment's location, showcasing its adaptability for replication across diverse business models. While an ideal scenario would involve determining the price elasticity of the café's products, this was hindered by the lack of historical price changes.

Despite this limitation, our analysis, bolstered by various management indicators, underscores the transformative potential of the proposed changes in enhancing the company's financial standing. A more quantitative lens reveals noteworthy achievements. The adoption of an operational management model not only allowed for the identification of problematic areas but also translated into tangible benefits. For instance, the model facilitated a 30.66% increase in operating profit through strategic adjustments in product prices based on benchmarking against major competitors.

Moreover, our quantitative analysis demonstrated that the proposed changes enable small and medium-sized enterprises (SMEs) in the food industry to achieve significant cost reductions. By addressing issues such as storage costs, product obsolescence, and stockouts, the operational model optimized inventory levels, leading to increased sales opportunities. The impact of marginal adjustments in prices, as evidenced by the achieved percentage increase in operating profit, further solidifies the effectiveness of the proposed changes.

The strategic use of management indicators, especially in eliminating subsidized products, played a pivotal role in the observed cost reductions. This model not only promises improvements within the café chain but also holds potential for replication in analogous sectors. In conclusion, the quantitative achievements showcased here affirm the efficacy of implementing our proposed management model, offering a promising avenue for financial enhancement within the dynamic landscape of SMEs operating in the food industry.

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