Positioning a Beverage in Iran Airline Industry by Sensory Analysis

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Abstract
Positioning is a quick method to adapt a product to a new market. The position of the product reflects the type of consumer attitude towards the overall interest as well as important features of the product. One of the convenient ways of positioning is mapping the target market assumed from sensorial information. Thus, the purpose of this study is to position the beverages around the preferences of airline customers' viewpoint to indicate a suitable one. The statistical population of the study includes the travelers aged 10 years or older experienced at least one long-haul air travel, whose opinions gathered through the central product test scheme. Accordingly, eight beverages proposed by domestic suppliers selected as test options. In this study, data analysis performed by XLSTAT software based on sensory analysis and extracted two branch results containing as internal and external preferences maps. The maps indicate the preferences of the products according to their competitive advantages and their overall interest in the customers' minds. Ultimately, the results lead to segmentation and market overview, and suggestions for target product properties and production for the major segment of the market and suppliers' marketing strategy.

Keywords: Positioning, Sensory Analysis, Preference Mapping, Beverage, Airline Industry.

1. Introduction

In general, design and development activities in consumer goods sector can be in a range from repositioning and adaptation of existing products to the development of a completely new product. Positioning is an opportunity to give a product or service a much-needed update. It can be helpful to the present market due to changes over time or to an entirely new market (Shekar, 2006). The success of the product provided in a target market is possible according to the principle of knowing the market and knowing who our customers are and what they want and being able to get a good position among them (Kotler & Keller, 2009). On the other hand, the consumer's perception of the products has direct effect on their decision of buying or using them. Therefore, product positioning is necessary and inevitable. The concept of positioning is to design the product in a way that they get a prominent and exponential competitive position in the minds of the target customers (Kotler, Armstrong & Opresnik, 2018). This strategy also has expressive influence on branding and positioning without confusion and doubtfulness and creates stable trust in a brand (hajibabaei& Esmailpur, 2018). Product positioning expands in two areas. Firstly, determining the position that a product or a brand has in the minds of the customers according to their needs and to competitors' products or brands, and secondly, how the firm managers decide to achieve the target position. Therefore, the idea of positioning includes competitive considerations and paying attention to customer needs (Aker & Joachimsthaler, 2000). The decision to determine the position of a product is a strategic decision and has some implications that the company relies on them to know how to design its goods or services and can determine other elements of marketing strategy accordingly. Positioning methods divided into two main groups, including statistical methods such as multidimensional scale, factor analysis, cluster analysis, differences analysis, similarities analysis; and graphical methods such as perceptual, preferences and

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common point maps. In much research, both methods, as a complement, are usually adopted and executed. In the meantime, by examining and comparing the perceptual and preferential judgments, it is determined that when the consumer needs are due to preferential rules, it has a higher predictive validity for purchasing from the consumer needs due to perceptual judgments. Before making a preferential judgment, the consumers imagine the benefits offered by the products. This information is vital for developing a new product or modifying an existing one (Van Kleef, Van Trijp & Luning, 2005). Therefore, the preferences map is a very practical tool. Preference mapping is a set of multivariate statistical methods used to make connections between consumer acceptance and product features and to develop a deeper perception of the market (Meilgaard, Civille & Carr, 2007). The outcome of this method is generally graphic, which is used to study the product space and preference patterns visually (Lawless & Heymann, 2010). The characteristics of a product are usually measured by using instrumental analysis or descriptive-sensory analysis to gain perception of the key features that affect the overall interest. Meanwhile, Internal maps measure overall interest directly but external maps measure the popularity of the product through its liked features. The gained information can be used to guide product development because it helps to reveal where a new product is on the market or how to improve existing products to increase demand (Van Kleef, Van Trijp & Luning, 2006). Preference mapping techniques are key tools in portfolio management that use consumer and sensory information to identify motive characteristics of interest (MacFie, 2008). After years of experience in airline industry, the managers and operators have realized that the role of customers is a key element in the profitability of this industry. Meanwhile, customers' satisfaction in serving food and beverages, especially in long-haul flights in this business, is very significant due to the brand loyalty caused and its associated advantages such as consolidation and survival of the market share, guaranteeing long-term profit, and lowering advertising costs on the part of companies (Khansabbakh et al., 2018). This issue is very important for travelers, so that they pay several times more for in-flight meal items than when they purchase the same product from a restaurant, fast food, or bar store. However, there is still a demand for these services (O'Shea, 2018).

On the other hand, in Iranian airlines, due to legal and even religious restrictions, it is not possible to serve some food items and beverages as alcoholic drinks. Therefore, the need for alternative products gives these airlines the requirement to provide and introduce creative and customer-friendly products, especially to foreign customers and tourists to move in the direction of creating a competitive advantage and compensating for the decline in the customer satisfaction as well as increasing the income and create wealth. In the meantime, the problem is the beverage and the features suitable for the customers on flights. In this way, the preferences map owing to the prominences among other sensory analysis techniques will be more helpful.

Literature Review and Theoretical Framework

Through preferences map, positioning has completed many researches, due to its efficiency in the food and beverage industry. It includes a wide range of products from natural ingredients as Oduro et al. (2021) and Mahato et al. (2022) about milk, Sirimuangmoon (2022) about the disquisition on pineapples to the processed foods as Dooleny et al. (2010) on the investigation connected with vanilla ice cream and Mongi and Gomezulu (2022) about the exploration of beef sausages and industrial as Adjei et al. (2020) related to wines and to the experimental ones as Paulsen et al. (2012) apropos of salmon–sauce and Maleki et al., (2020)) on the examination of cooked rice.

In this kind of study, an experimenter can have considerable control over the products under investigation. While in many cases, he chooses the products inscribed in the sensory space and then the overall interest is measured. Many researches have focused on specific features of the products manipulated. For example, in a study on pudding, the experimenters adjusted samples by changing materials in three different dimensions: thickness, fat, and softness, while trying to keep other characteristics, such as colour, constant. Such manipulations of the samples can systematically followed by a pre-selected experimental design, as in the study by Yackinous et al. (1999) in which the experimenters followed a three-by-three factorial design systematically manipulated the salad sauce into three levels of fat and three levels of garlic, and finally, nine different samples were tested. Concerning variables, the flavour is, in almost all of the studies, considered. However, the appearance (Geel et al., 2005, disquisition), the aroma (Martinez et al., 2002, research), the combination technique of the ingredients (Meullenet et al., 2007study), and the mouth-feel (Richardson-Harman et al., 2000, research) have been well considered in many reports. Numerous studies have also related to the overall interest in instrumental variables such as the studies of Alves et al. (2008), Ares et al. (2006), Berna et al. (2005), Harker et al. (2008), and Pham et al. (2018). Furthermore, positioning relates to an interest in a particular characteristic such as component construction in Ares et al., 2006) study. Thybo et al. (2003) examined children's preferences for apples. They modeled not only sensory, chemical, and instrumental criteria, but also demographic information including age; gender, etc., behavioral data such as apple consumption amount, and flavour and appearance preferences. Via presenting a map for food appearance preferences along with behavioral data related to the appearance and objective criteria, interdisciplinary relationship can be identified and used to provide the perceptions explaining different priorities among the children.

Often, overall interest relates to descriptive sensory information. For a clearer view of these conditions, we can see the research of Meullenet et al. (2001) and Yang et al. (2015). It is also possible to link the interest to the timeline

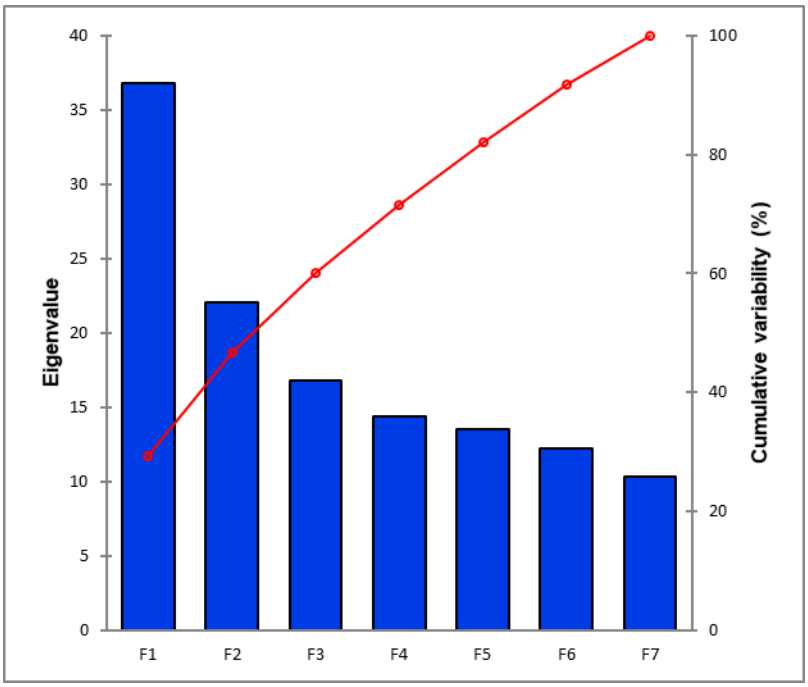

Figure 1: Pebble diagram for extracting the main components in the internal preferences map

of a feature. When surveying strawberry jam, Alves et al. (2008) had judges, evaluate the taste of strawberries, pickles, and sweets under volume time. Maximum volume, time to maximum volume, total time, and the surface under the curve showed significant differences between the jam and these criteria where it relates to the consumers' interest and satisfaction. In this case, the mean values for all criteria were associated with the most popular samples.

Accepting the products depends on more than their flavour. Packaging a product is important for selling and related to desiring too. In a study on cheddar cheese, descriptive panelists trained in addition to sensory criteria of appearance, flavour, aroma, and texture to evaluate the characteristics of twenty packages, including shape and function. Consumers were asked to rate their interest in packaging and taste. The result reveals the preferential models of sensory features and packaging specifications that were most attractive to consumers. Although, instrumental criteria used for positioning alone, but such methods are risky for missing values and measurable sensory features. For instance, both instrumental and sensory criteria need to predict consumers' interest in the texture of Dulce de Leche products. In this study, consumers evaluated overall interest in the texture. The trained sensory panel examined texture features and made instrumental measurements. Although, specific instrumental criteria were associated with overall interest, but they did not tell the whole story. For example, instrumental criteria and sensory rankings for solidity were highly correlated, and some instrumental criteria for solidity used to predict desire as well as sensory solidity scores. Viscosity, on the other hand, not related to any of the instrumental criteria. However, it is important to remember that even when consumers asked to focus on a particular set of features, other irrelevant features can be effective in their evaluation. For example, Bagchi and Nair (2017) asked consumers to rate their interest in the creamy texture of pudding samples with very different fat thickness and subtility. Descriptive analysis of appearance, texture, mouth-feel, and flavour also performed on these samples. Even if, the consumers directly guided to ranking their interest in texture, the results show that smell and flavour characteristics affect the preferences.

2. Material and methods

The present study is, in purpose, applied and it is to segment the market and achieve better product features. In addition, its method is an analytical one. Statistical population of the study is air travel customers 10 years old or higher experienced long-haul flight once at least. According to the table proposed by Hough et al. (2006) in the sensory analysis of product acceptance, which recommended the minimum number of testers and with observance to the margin of confidence of the missing data, a sample of 130 respondents selected, randomly. Product test criteria for beverages were extracted by Zimet qualitative method and mapping the customer's mental value. These characteristics include flavour, aroma, appearance, and mouth-feel (Fayazi et al., 2021). The sample group of customers surveyed by using a 9-point Likert scale questionnaire about the dimensions of these four characteristics and the overall interest in the product from very unpleasant to very pleasant. In this regard, the judges, after testing each sample of the products, reported the overall interest of that product and the degree of the pleasantness of each product feature. The calculated Cronbach's alpha coefficient is 0.86, ensuring the reliability of the research tool. In addition, the supervisors and consultants approved content validity of the questionnaire. The number of the products tested according to MacFie's viewpoint (2007) concerning the minimum analyzable samples was acceptable. Therefore, 8 prototypes of proposed beverages by domestic suppliers,

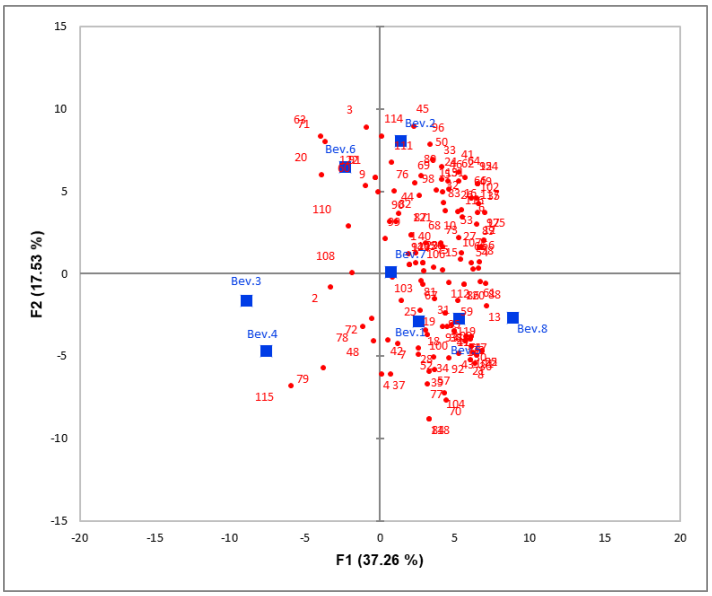

Figure 2: The internal map of the respondents' preferences around the tested beverages

were selected. In addition, each judge should test at least 75% of the products, in this study, equivalent to 6 basic products, to be able to use the questionnaire. Thus, 126 questionnaires could be used, cause of their completely fulfilled information. Therefore, the answer rate to the questions is equal to 97%. Mathematical analysis and structuring is through XLSTAT software version 2018, and a multi-step method based on the steps of internal and external preference mapping is used.

In this test, each option was nameless and coded with a random number, due to neutralizing the halo effect of the product name and brand. In this section, each respondent completed a screening questionnaire after drinking product samples according to his/her opinion. The scheme used in this test is the central location test (CLT), accordingly, the scope is Emam Khomeini airport of Tehran and just landed passengers. The research conducted in the spring season and the room temperature was 19° C. In this test, instructions such as water consumption between the two products and usage of same glass cup size and the same sample volume (10 ml for each sample), and the same temperatures of 4 ° C for all beverages were observed. In addition, until the end of the test, the name and the brand of the product remained unsaid to the respondents.

3. Results

Before starting the main steps, according to the existing basis of analysis, it is necessary to measure the adequacy of the sample size. In this direction, calculated values of K-M-O and Bartlett's test of sphericity were 0.54 and 0.003, respectively, indicating that the sample size is acceptable for the analysis. In principal component analysis with a reduction in the dimensions, rather than the modeling, normality is not an obligatory assumption (Jolliffe, 2002).

3-1. Internal preferences map

Firstly, principal component analysis of the respondents' overall interest was done trough the tested options. In this way, the diagram of changes in specific values, pebbles, drawn to determine the number of principal components. Figure 1 shows these changes.

Considering that the curve in the F2 component has a slight angle change and components F1 and F2 together cover more than half of the changes. These components can be utilized, and the others discarded with caution. Therefore, internal preferences map can be drawn in two dimensions with good approximation. Based on this, internal map of the respondents' preferences around the beverages tested is drawn. The map is shown in Figure 2.

As considered in the figure, such maps evaluated through the criteria of density and position proximity of the variables to each other. The beverage 5 is among the highest density of the respondents' overall interest. The beverage 1 and 7 and the others are in the next ranks, respectively. Therefore, the beverage 5 selected as the platform for the target product.

3-2. External preferences map

At first, the principal components of features analyzed and thus four main components extracted. Then the correlation degree of each variable with these factors was calculated. Results have been revealed in Table 1. As can be seen, about the primary significant factors, variables that have highest correlation with F1 are the flavour and the mouth-feel, and F2 has the highest correlation with the appearance and the aroma of the beverage.

The bioplat diagram was then drawn based on the two top components. As shown in figure 3, the direction of the flavour and the mouth-feel vectors are towards the beverage 5, meaning the greatest influence on the respondents' interest in this product made by these two variables. Other products and the effective variables identified from the plot.In next step, by the framework of hierarchical analysis, the customers classified based on the similarity of liking, variance, and distances between respondents.

Table 1: The correlation degree of each variable with actors

	F1	F2	F3	F4
Flavour	0.881	0.184	0.175	0.398
Aroma	-0.333	0.790	0.508	-0.080
Mouth-feel	0.881	-0.172	0.196	-0.394
Appearance	0.317	0.801	-0.499	-0.097

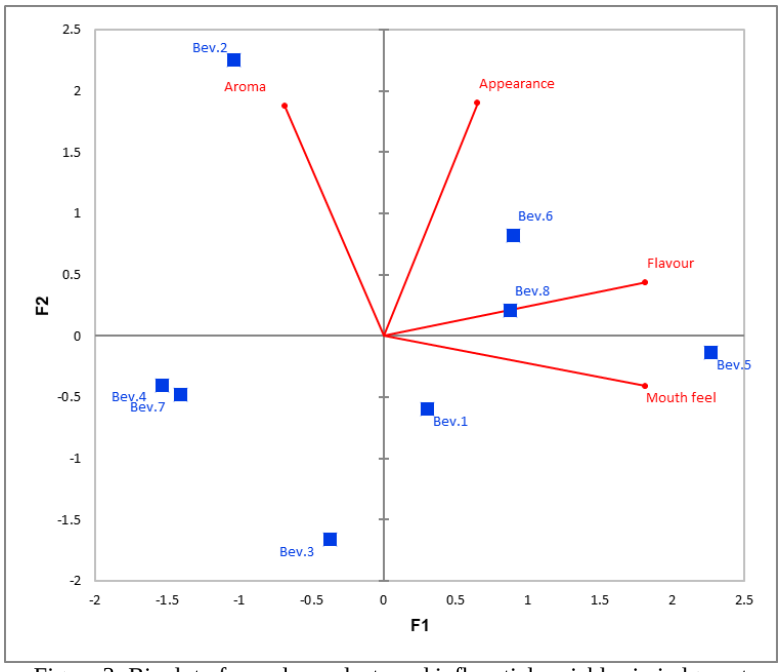

Figure 3: Bioplot of sample products and influential variables in judgment

Figure 4 shows this clustering in the form of a customer segmentation tree. We also used the heterogeneity of clusters criteria and R2 principles in determining appropriate quantity of clusters. Thus, the customers are divided into three general clusters.

The variance analysis (ANOVA) test was performed on the three clusters to ensure the significance of the three clusters. According to table 2, the variance homogeneity of all three clusters is significant, and their existences proven.

The external map of preferences can be drawn by using the results of the principal component analysis as well as clustering obtained from the hierarchical method. This map is shown in Figure 5. This figure illustrates the tendency of each cluster to each tested product.

According to the map, the beverage 5 is almost welcomed by all three clusters of customers. The beverage 8 is more popular among clusters 1 and 3. The beverage 4 is popular among cluster 1 and the taste of cluster 2 is somewhat close to beverage 2. Similarly, the situations of the other tested products can be seen in the preferences map. Also, matching the external preferences map with the customer contour is shown in Figure 6. The customers' desire is shown in the colour scheme.
This colour scheme shows a much greater desire of customers for the beverages 5, 8, and 4, located in the red range. The beverage 2 is located on the border between the two areas, put it in a lower rank than the previous three products. The rest of the products are located in areas of low interest.

4. Discussions and Conclusion

This study generally aims to draw market space of the consumption of the drinks in the situation of air travel and position the beverages by customer sensory preferences to provide products, favored by the majority in the target market of Iran airline industry. Based on this, a set of options presented to the respondents' sample from the target community, and based on the extracted features as well as the overall interest; the products evaluated and statistical analysis of preferences mapping done. Overall, the results showed that the beverage 5 has a good level of liking and preferences among the respondents and so, many customers tend to it. More interestingly, by clustering the customer community based on the heterogeneity criteria and classifying into three separate clusters, this product is favored by all three clusters of customers and they have shown interest in consuming it, which indicates that it is a suitable choice for the entire target market. Although, in prioritization, the intensity of interest in cluster 3 is the highest, followed by cluster 1 and then cluster 2. Of course, it should be considered that the comparative estimation of market segment volume in each cluster is comparable based on the vector size of that

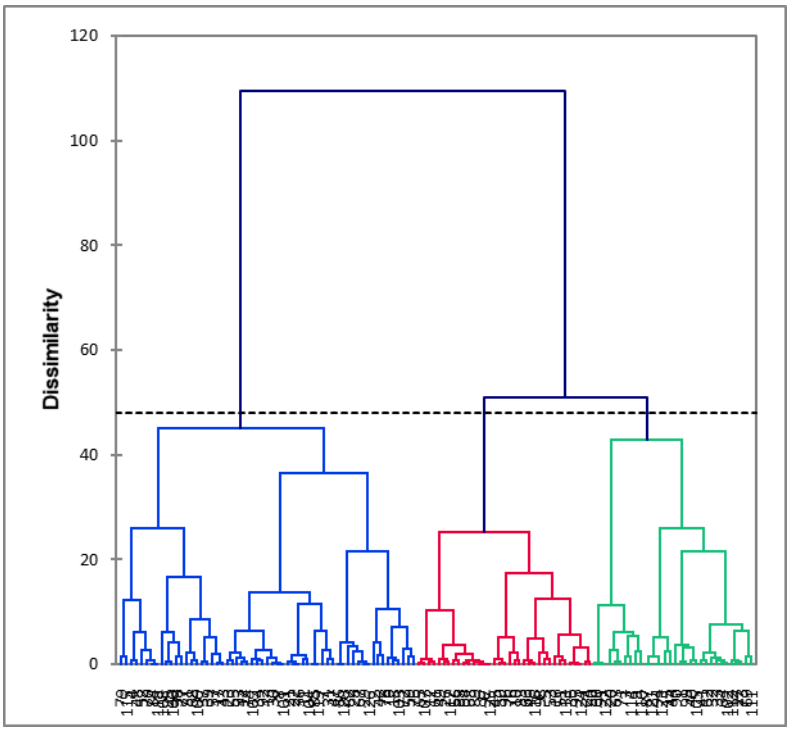

Figure 4: Cluster tree diagram

Table2: ANOVA test on three clusters of respondents

Y	DF	Sum of squares	Mean squares	R^2	F	Pr (> F)	p > 0.05
cluster.1	5	6.853	1.371	0.021	0.054	0.948	Yes
cluster.2	5	4.797	0.959	0.315	0.148	0.389	Yes
cluster.3	5	6.074	1.215	0.132	0.381	0.701	Yes

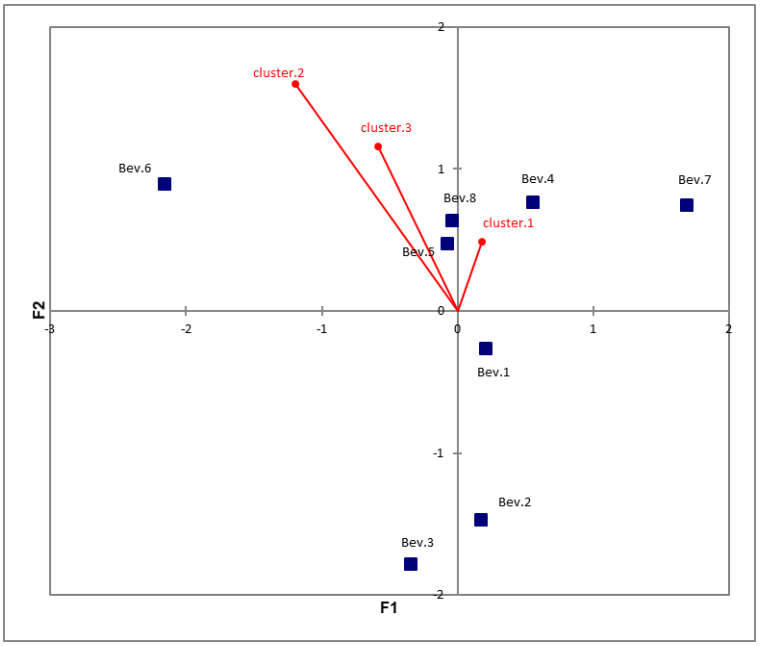

Figure 5: External preferences map of tested products and clusters of respondents

cluster. Based on the shown external preferences map, it is clear that cluster 2 is larger than clusters 3 and 1, and also the market in cluster 3 is larger than cluster 1. Other remarkable points are that although the totality of the product preferred and liked by customers, the main advantages that make this product stand out for customers are the flavour and the mouth-feel features after the product is tested. However, emprises are to optimize and improve product 5 to be strengthened in two other characteristics. Therefore, this product recommended for serving the market in general with revisions to improve the appearance and aroma.

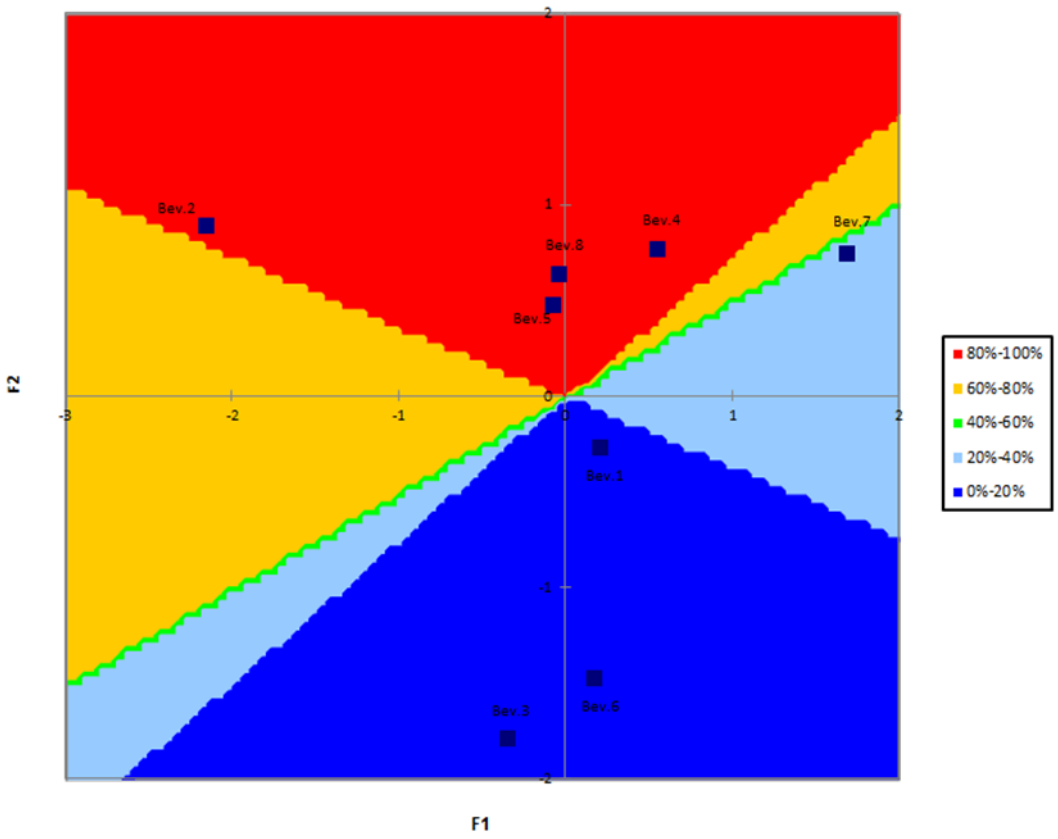

Figure 6: Combined map of customer contour and external preferences of tested products

Furthermore, other applications can be offered for the airlines from the research, in addition to the beverage introduced with the desired modifications. 1. Since the foreign travelers are a significant segment of the target market, for more customizing the product around them, the tools such as penalty analysis and check-all-that-apply (CATA) in the optimization step, can be used to just foreigner samples as a way to more accurately reveal the weak or acceptable points in the compounds of product 5 and the extent of manipulating of these compounds to customizing the features. 2. Airlines can combine the demographic information of their customers in terms of age, gender, education, with the basic sensory information resulting from the research to obtain more segregated analysis in the sections of target customers and will be able to get a drink serving pattern based on their fleet route schedule on their destinations. 3. Airlines can use statistically significant tests on these sections in the consumption of the target beverage and complete the beverages serving pattern. In this regard, the methods of comparing the mean between groups, including the least significant difference test, Duncan test, Tukey test, Dante test, and Newman Coles test, will be helpful for aviation industry consultants. 4. Iranian airlines, by taking the origin and destination of the made trips and based on different airline business models, including charter, low-cost-carrier, commuter, and network, can adjust the service volume of the target drink. This provides an important advantage for Iranian airlines since some foreign airlines have eliminated serving drinks in order to reduce their costs in some of these models. 5. Flavoring with extracts, adding ingredients or offering a mixed cocktail of drinks is a common way to achieve customer satisfaction by focusing on satisfying their secondary level preferences such as curiosity, the sense of different experience, the sense of a native culture acceptance, and so on. In airlines, according to this approach, based on the offered drink, derived products with the aim of satisfying such needs and a diversification of services provided according to the suitability of the target customers.

Finally, suggesting the following topics for future research can help expand and deepen the results and concepts of this research:

In the present study, we tried to ignore the halo effect of the brand and product name on the customer's mind. To make an accurate judgment about the focused features of the product, it is suggested similar research with the same conditions but by informing customers about the product name and brand of the manufacturer, and thus the effect of the brand halo on customer preferences and the amount of power and direction to under investigation.

In this research, simple statistical scales were used in product testing and data collection. It suggested to use the fuzzy method of collecting preferences in order to increase the accuracy of similar research. This research was

conducted in the spring and temperate seasons of the year to exclude the factor of environmental temperature in the research. To investigate this effect, it is suggested that a study with the same framework as the present study be conducted in the very cold or hot months of the year or in hot and cold regions.

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