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Short Communication

Use of multi-market preference mapping to design efficient product portfolio

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ABSTRACT

Preference mapping is widely used in food industry for purposes as diverse as mapping product offers, understanding consumer segmentations, identifying liking drivers or determining ideal product profiles. Such an approach is generally considered for a given target population in a single market. It is proposed here to move from traditional portfolios with one consensual product per market (leading to global product portfolios with as many products as markets) to portfolios with only two or three differentiating products for a group of markets. The proposed approach embraces all purposes detailed above in a sequence in order to design efficient product portfolios. As an example, it was possible to design a product portfolio for ten markets with only three products instead of ten, moving from less than 50% to more than 80% of consumers who get access to their most liked product. This was done using a multi-market preference mapping with 405 consumers (135 in each of the three leading markets representative of an Asian region of ten markets) who assessed a set of eight coffee mixes for overall liking and for likes and dislikes (open comments). The slightly increased complexity at market level (i.e. each market launching up to two of the three products of the portfolio) is largely compensated by the simplification at a global level and the insurance to please many more consumers with products that are liked for their differentiating sensory properties.

1. Introduction

Efficient product portfolio management is a complex and highly multifactorial challenge (Cooper, Edgett, & Kleinschmidt, 1999), especially in fast evolving contexts such as beverage consumption habits in Asia. Over the last decade, coffee mixes (i.e. individual sachets of typically 15 g of powder featuring soluble coffee, creamer and sugar that are reconstituted in typically 200 ml of hot water) became very popular in many Asian regions. And although it is known that the pleasure of drinking such products depends on situational conditions (Kim, Lee, & Kim, 2016), subjective dimensions (Masson, Delarue, Bouillot, Sieffermann, & Blumenthal, 2016) or motivation (Labbe, Ferrage, Rytz, Pace, & Martin, 2015), a prerequisite for successful product portfolios certainly remains taste superiority over competition. Traditionally, each market launched one consensual product that, on average, achieved taste superiority over its direct local competitor. Using multi-market preference mapping suggested that moving from this traditional market-by-market strategy to a multi-market product portfolio was a much more efficient strategy. A multi-market study on tomato was investigated by Causse et al. (2010), but the approach using external preference mapping consisted in separate analyses per market followed by a global interpretation of the results. We propose here to use a consumer centric approach (internal preference mapping) and to consider all markets in the same analysis to build global conclusions rather than local/market conclusions. This multi-market preference mapping sequentially answered four questions: 1) How do current commercial products perform and what products do consumers like? 2) Do all consumers like the same products? 3) Why do consumers like the products they like? 4) What is the best product portfolio strategy?

Using preference mapping to answer such questions is certainly not a new idea. Over the last 30 years, more than 270 papers were published featuring “preference mapping” either in the title, the abstract or the keywords. Among these papers, 223 feature some practical cases: fruits are studied most often (73 cases with 19 studies on fruit juice, 10 apple, 8 wine and 7 olive oil), followed by a cluster grouping dairy, meat and fish (58 studies including 15 cheese, 10 yogurt, 5 ham and 5 fish), before industrially processed foods (54 studies including 18 beverage, 13 culinary, 10 confectionery, 7 snacks and 5 ice-cream) and 38 non-food consumer goods (e.g. tobacco, cosmetics, cars, telephones or printers).

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All these cases focussed on one or other of our four questions: 64 studies focus on the first question (what products do consumers like?) by describing the variety of available products, which is very relevant for raw materials such as apples (Bonany et al., 2014); 25 studies focus on the second question (do all consumers like the same products?) by describing the effects of extrinsic factors (Lawrence, Lopetcharat, & Drake, 2016) such as culture, demographics, usage & attitudes, product knowledge or communication on product acceptance; 69 studies focus on the third question (why do consumers like what they like?) by relating consumer preference with product characteristics, mainly sensory attributes when dealing with soluble coffee (Geel, Kinnear, & de Kock, 2005). Finally, 42 studies address a simplified version of the fourth question (what is the best product?) by developing products that ideally match consumer preference, with 20 cases including nutritional constraints such as reduced sugar and fat in ice-cream (Cadena, Cruz, Faria, & Bolini, 2012) or reduced sodium in sausages (Dos Santos et al., 2015). The aim of this paper is to extend this fourth question from designing optimal products to designing optimal multi-market product portfolios. To our knowledge, few studies tackled the multi-market complexity and none of them proposed a truly global approach, i.e. accounting for a multi-market strategy across markets.

2. Material and method

2.1. Samples

The study included eight soluble coffee mix samples, namely the commercial products of three key markets (respectively coded A, B and C), their direct competitors (respectively coded Ax, Bx and Cx), and two prototypes (P1 and P2).

This sample selection allows evaluating the performance of commercial products vs. their direct competitors in each market, the potential of commercial products in other markets and the potential of prototypes in these markets.

2.2. Consumers

The study involved a total of 405 consumers with 135 in each of the three leading markets representative of an Asian region of ten markets (coded respectively aaa, bbb and ccc). All consumers were aged from 18 to 35 years (with half 18–25 y and half 26–35 y), half male and half female, half consumers drinking at least five coffee mixes per week and half drinking between one and four. Finally, consumers were recruited to match the quotas of Brand Used Most Often (BUMO). For the test, consumers were asked to reconstitute samples according to their usual preparation (i.e. amount of used water was recorded).

This study followed the basic principles of sampling accurately a well-defined target population in terms of demographics, socio-economics, Usage & Attitude (U & A) and Method Of Preparation (MOP).

2.3. Sample evaluation

Consumers evaluated the eight samples in sequential monadic in a central location, using Williams Latin Squares (Williams, 1949) to balance position and first-order carryover effects. They evaluated the eight samples in two sessions (four products per session) on two consecutive mornings. They rated overall liking on a 7-point hedonic scale and elicited spontaneous open comments about likes and dislikes (Varela, Beltrán, & Fiszman, 2014). No other question was asked in this study, in order to keep the consumers as unbiased as possible.

2.4. Other sample characterisations

12 well-trained panellists profiled the same eight samples on ten sensory attributes covering aroma, flavour, taste, texture and aftertaste using a non-structured scale (a posteriori coded 0–10) using a fixed method of preparation (one sachet for 200 ml hot water).

In addition, recipes were available for the five in-house samples and basic compositional data were available for all samples.

2.5. Data analysis

The data analysis naturally followed the four questions, starting with consumer liking, and therefore basing on an internal preference mapping logic (MacFie & Piggott, 2011).

2.5.1. How do current commercial products perform and what products do consumers like?

In order to answer this question on an average level, overall liking scores were analysed using a mixed model with product as a fixed factor and consumers as a random factor, and adding subsequent multiple comparisons using Fisher's Least Significance Difference (LSD) with $\alpha = 5\%$ (Yackinous, Wee, & Guinard, 1999).

This analysis is visualized using a sorted bar chart (from most to least liked sample) with bars colored in red for samples with highest or not significantly lower mean liking scores, then blue for samples with lowest or not significantly higher mean liking scores, and grey if significantly different from both highest and lowest. This coloring allows focusing on the products with highest potential, while eventually comparing their scores to external benchmarks. Such external comparison is possible since the same scale (7-point hedonic) is used for all our studies. This analysis is done across all three markets and results are also displayed separately for each market, but keeping the overall order to highlight market specificities.

2.5.2. Do all consumers like the same products?

It is common to observe small differences among mean overall liking scores. This can have two causes: either all individuals like all products the same, or individuals make large but contradictory differences leading to small mean differences. A histogram representing the distribution of individual ranges of liking scores generally allows concluding that the second cause applies (i.e. average individual range $\gg$ range of mean liking scores). Knowing that individual consumers have clear but contradictory preferences, it would be easier for business purposes to have contradictory likings being associated with specific consumer traits such as demographics, socio-economics, U & A or MOP. As a consequence, the analyses described above were also performed on a priori consumer clusters (i.e. market, age, gender, consumption frequency, BUMO and MOP).

Unfortunately, liking is generally not directly related to such traits and two techniques (k-means clustering and internal preference mapping) were used in conjunction in order to identify and visualize consumer clusters based on their liking patterns only (Wajrock, Antille, Rytz, Pineau, & Hager, 2008). The identified clusters of consumers were then analysed for prevalence to a priori traits. These clusters were visualized on the internal preference map. For both k-means and the internal preference map obtained through Principal Component Analysis (PCA), overall liking data were normalized (i.e. mean = 0 and variance = 1 for all consumers, except for those who gave the same score to all products, for which mean = 0 and variance = 0). The analysis described above is also performed for the whole population (all three markets), and the percentage of consumers per cluster are displayed globally as well as per market.

2.5.3. Why do consumers like the products they like?

In order to understand why consumers like the products they like, supplementary information was required. Since the questionnaire invited consumers to elicit open comments, there was unique causal and unbiased information made available to identify drivers of liking (Ares, Giménez, Barreiro, & Gámbaro, 2010). The questionnaire invited explicitly to comment both about likes and dislikes (i.e. "What do you particularly like/dislike in these products?") since it is known (ten