

## Correspondence Analysis to Observe Potential Group of Beekeepers as Direction of Interest and Demographic

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**Abstract.** Correspondence analysis is appropriate because the variables are qualitative (nominal). The purpose of such analysis is to provide a tool for analyzing the dependencies of a contingency table. This analysis delimits four quadrants where there are various cities and demographic characteristics of beekeepers from North West Region of Romania. An increasing interest is given to product flavor. This characteristic is found at the groups of beekeepers from 3 cities from North West Region of Romania (Oradea city, Baia Mare city and Bistrița city).

**Keywords:** qualitative research, beekeeping, semi-structured interview, groups of beekeepers, correspondence analysis

### INTRODUCTION

The purpose of the current paper is to establish the main groups of beekeepers or how they could be built. Identification of beekeepers groups according to their interests, their needs or their behavior would not be possible with conventional methods of segmentation due the low number of questionnaires (quantified variables). Therefore, the analysis that is less sensitive to statistical assumptions and provides some ideas regarding the main groups of beekeepers or how they could be built can be used. As there are more qualitative variables (nominal), an appropriate analysis is the analysis of correspondences. The main purpose of such an analysis, in general, is to provide a tool for analyzing the dependencies of a contingency table. For the present study, six factors derived by principal component analysis in correlation with demographic variables (gender, age, city, school) were used (Marc *et al.*, 2012).

Beekeeping is defined as a science that deals with the growth and reasonable care of bees in order to use their products (Marghitas, 2008).

Beekeeping is the oldest form of food production. Beekeepers are divided into the following categories: hobbyists-they have a different job, but practice beekeeping as a hobby; sideliners –that have other income, but practice beekeeping as an additional job for extra money and commercial beekeepers in which case beekeeping is their only source of income (Pocol, 2006).

Honey is a unique natural product obtained by processing flowers' nectar or plants' manna, being used as sweetener or in food industry due to its nutritive, therapeutic and dietetic quality (Vica *et al.*, 2009)

Interviews comprise a broad continuum of focused inquiry. At one end, interviews may be informal, unstructured, nondirective, and conversational. On the other end, they may be formal, highly structured, entirely directive, and administered identically across all informants. Interviews may be conducted with individuals or with groups (Iacobucci, 2001).

## MATERIALS AND METHODS

Qualitative research methods are employed to uncover other ways of gaining access to such types of data; they seek to answer the 'why' and 'how' questions, rather than the 'what happened' or 'how many' types of enquiry (Baker, 2003). The three main techniques of qualitative research are: group discussions, individual depth interviews and projective techniques. Smith (1998) includes the following categories of depth interviews: mini-depth interview; semi-structured interview; paired interview and triangular interview (Baker, 2003). This method of performing research is less structured than most quantitative approaches. The researcher must extract meaning from unstructured responses, such as an interview (Zikmund, 2007). One of the main objectives of qualitative research is to gain preliminary insights into decision problems and opportunities (Hair Jr., 2003). The objective of most marketing research projects is to obtain information about the characteristics or parameters of a population. A population is the aggregate of all the elements that share some common set of characteristics and that comprise the universe for the purpose of the marketing research problem (Malhotra, 2007).

The researcher can pick specific individuals with specific characteristics to be included in the sample. In this case, the interviewer is free to include in their quota sample individuals who met this specification. If data collectors are given too much freedom to choose their sample, it can be best described as a convenience sample (Palmer, 2000).

A simple definition of the semi-structured interview is pre-set questions, which the interviewer cannot change, but the respondents may reply using their own words. The advantages to this approach include the fact that it addresses more specific issues, responses are usually easier to interpret than other qualitative approaches and cost advantages are over focus groups (Zikmund, 2007)

Principal components analysis (PCA) known also as Hotelling transform or Karhunen-Loeve transform, is a factor analysis technique, in which, the goal is the reducing of variables number initially used, taking into consideration a reduced number of representative variables. PCA is the simplest of the true eigenvector based multivariate analyses. Because in data of high dimensions, the patterns are hard to find, the PCA method is very useful because by reducing the number of dimensions, the patterns can be found without an important information loss. Principal components analysis has found application in fields such as face recognition and image compression (Carbureanu, 2010).

Correspondence analysis aims to provide a dependency analysis tool of a contingency table when observations refer at two qualitative variables (2 categorial/nominal variables) so hardly to apply other suitable analyses scalar variable. But, the power lies in extending the analysis to "multiple correspondence analysis" by applying a number of different variables (nominal, ordinal scale). Moreover, there are tests for nominal variables (or right if necessary) but correspondence analysis provides a graphical view of the existing associations between variables. The present study uses the six factors derived by principal component analysis in correlation with demographic variables (gender, age, city, education).

## RESULTS AND DISCUSSIONS

The variation from one category of beekeepers to another was identified using variables with standard deviation high enough above average. SPSS provides its own graphic or simply coordinates all categories introduced in analysis for OX and OY axis of a classic bidimensional graph. These coordinates were used and it was generated a graph in Excel that was reshaped so as to include its own interpretation. The figure below shows the result of

correspondence analysis with its interpretation. Thus the 6 components help us to define the axes (Fig. 1).

OX axis in the positive direction (right) reflects interest in image quality and in the negative direction (left) gives interest in exploiting the flavor quality product.

The OY axis in the positive direction (up) reflects interest in maintaining and preserving quality by specifying the packaging and storage conditions of validity and in the negative direction (down) reflects interest to identify the basic elements of product and origin.

In the middle of the axis is found the region in which the first element comfort or simply and efficiently makes its presence felt.

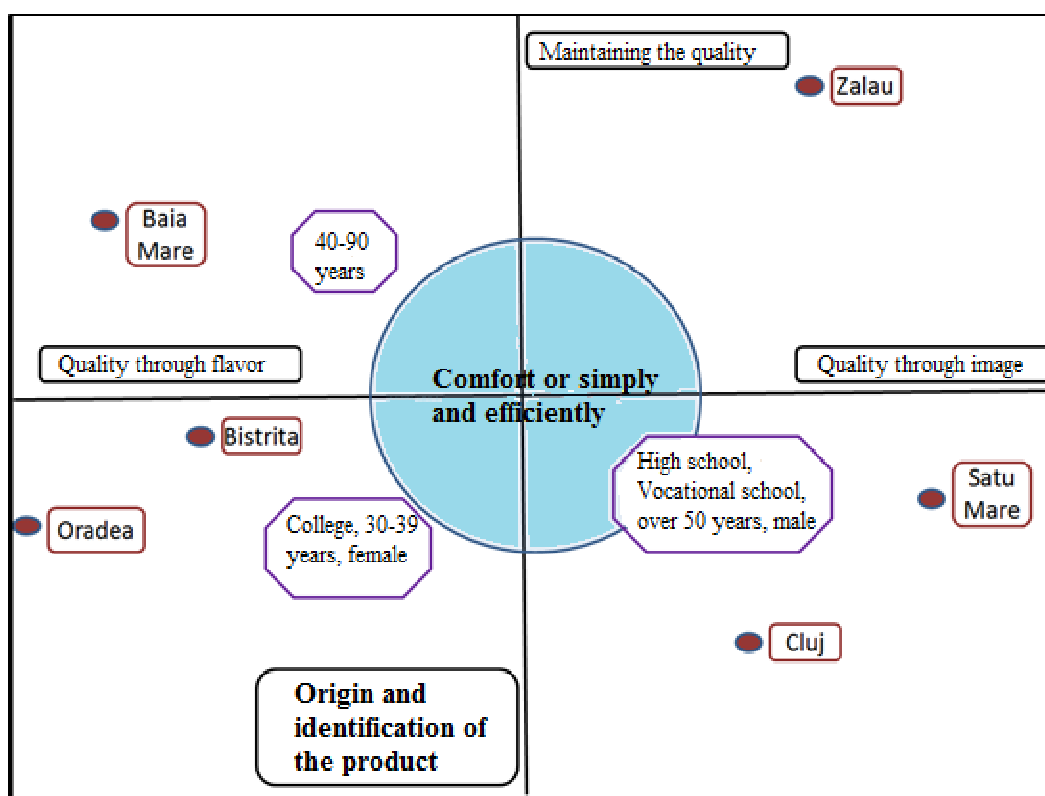


Fig. 1. Main groups of beekeepers Source: Own calculation in SPSS and Excel

The two axes define four quadrants in which various cities and demographic groups are found. Starting from the top right corner:

- ✓ Zalău city -is identified by an increasing interest in maintaining the quality of the product and if they have to choose between images and savor these beekeepers would choose flavor. In this quadrant a specific age group is not defined.
- ✓ Satu Mare city -is characterized by the importance of the image of the product. Beekeepers from this city are not very close to any of OY axis extremes so they are interested in the idea of comfort and simplicity of the product.
- ✓ Cluj-Napoca city -is somewhere between simple products and those who reflect their origin. Beekeepers from Cluj area and Satu Mare area tend to have this characteristic: men, over 50 years old with a vocational school or high school.

- ✓ The group of beekeepers from Oradea, Baia Mare and Bistrița gives an increased interest to product flavor. The difference between them is that those from Bistrița and Oradea are young college women and those from Baia Mare are people of 40-49 years old. Beekeepers from Oradea give interest in provenance of the items, while beekeepers from Bistrița care more about comfort and practical benefits.

## CONCLUSION

The present research reveals the fact that there are some differences between beekeepers according to area, following a first qualitative analysis through the interview.

This analysis shows that there are some differences between beekeepers in the trading behavior of honey and demographic characteristics. Area differentiation is the most significant because these cities have emerged as areas of extreme points of the graph.

This distinction deserves to be studied by further quantitative analysis through a questionnaire applied to a more complex and larger statistical population.

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