Applicability of analysis techniques to determine consumer behaviour

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Abstract

To explain consumers' actual buying behaviour, a choice experiment and a standardised interview shall be combined in a twofold methodological approach. While the choice experiment provides information about consumers' buying behaviour, the interview shall examine backgrounds and reasons for the choice decision by investigating the internal factors consisting of consumer attitudes, motivations and emotions, as well as the external factors, which are socio-demographic characteristics. The data provided by this twofold methodological approach need to be linked in the analysis procedure. Thus, the aim of this paper is to discuss the applicability of single multivariate analysis techniques and their ability to explain consumer behaviour. To identify causalities between the observed behaviour and factors influencing the buying behaviour, two successive techniques are favoured. To reduce the large set of variables collected in the interview, a factor analysis is suggested. To link the variables of experiment and interview, both multiple regression analysis and ANOVA are applicable to explain causalities. Multiple regression analysis is suggested as it is more flexible towards the measurement level of the independent variable if only a small number of non-metric variables have to be transformed into dummy variables.

Introduction

One important task of the organic farming sector is to improve quality, ensure safety and reduce production costs. Thus, an objective of the EU-funded project "Improving quality and safety and reduction of costs in the European organic and 'low input' food supply chains (QLIF)" is to improve the congruence between producers' interests and consumers' expectations towards quality and safety of organic and other "low input" food. It is foreseen that consumer research includes a multi-methodological approach. One subproject investigates the following key questions: Which product stimuli are preferred or rather declined? How are socio-demographic criteria of the test persons, their attitudes, motivations and emotions related to their buying decision? Thus, the consumers' actual buying behaviour towards quality and safety of organic and 'low input' food will be observed by a choice experiment. This will be combined with a standardised interview. The interview is aimed at giving insights into backgrounds and reasons for the choice decision observed in the experiment. The data provided by this twofold methodological approach needs to be linked in the analysis procedure. The aim of this paper is to discuss the applicability of various multivariate analysis techniques and their ability to complement each other so that synergy effects can be used to understand consumer behaviour.

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Methodological approach

Neobehavioristic theory explains consumer behaviour by Stimulus-Organism-Response (S-O-R)-models, Kroeber-Riel and Weinberg 2003. According to S-O-R-models, observable stimuli (S) and processes within the organism (O), consisting of cognitive and activating components are causing reaction (R), as for example a buying decision. Hereby, the cognitive component includes stimuli perception, evaluation and learning processes. It is influenced by attitudes, while the activating component is influenced by emotions and motivations. Besides these internal factors, external factors such as socio-demographic characteristics (SC) influence the organism (Figure 1).

Figure 1: The S-O-R-model
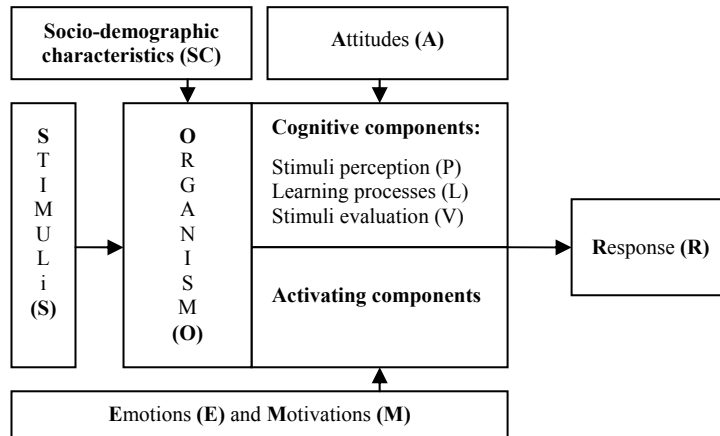
Source: Own illustration

Obviously, a single-sided investigation of consumer behaviour without analysing factors influencing cognitive and activating components in the organism falls short. Same applies to the investigation of O without stating the consequent behaviour. How can a research design lead to a more comprehensive understanding of the complexity of consumer behaviour? We suggest interviewing and carrying out an experiment in a complementary twofold methodological approach, whereby R is examined by a choice experiment. This frequently used method is chosen because it closely mirrors actual consumer buying behaviour and especially if nonhypothetical payment is applied (Lust and Schroeder, 2004). Besides, it is a very flexible method with possible integration of several attributes. The experiment will be conducted in a test studio in a close to realistic buying situation and not in a store test, due to three reasons: Not all product stimuli are available on the market. Thus, products have to be manipulated. Furthermore, the lineage of experiment and interview underlies a single source approach. Thus, same consumers have to do both interview and choice test. This would be not practicable using a store test. Furthermore, a store test would be too expensive.

Before the choice test, the test persons get standardised information about the products offered. After the choice experiments, factors influencing O are investigated

in a personal standardised interview following the choice experiments. Hereby, the focus lies on consumers' attitudes, emotions and motivations towards food quality, production and processing methods and lifestyle as well as on socio-demographic characteristics. The study will take place in Germany, France and Switzerland in October 2007 with a sample of approx. 50-100 test persons per country. The recruitment will follow typical consumer household profiles. During the choice experiment, test persons may choose one or no product out of a series of product stimuli (S) using a reduced design. The stimuli vary in the production system; products of two production levels "conventional" and "organic" will be offered. Furthermore, the stimuli are offered at different price levels.

Applicability of analysis techniques to explain consumer behaviour

Data collected in the interview shall explain consumer behaviour which was observed in the choice experiment. Thus, variables from both methods have to be linked in the analysis procedure. To identify causalities between the observed behaviour "product choice" and attitudes, motivations, emotions as well as socio-demographic characteristics, dependence analyses provide a higher applicability than interdependence analyses. Nevertheless, to reduce the large set of 20 to 30 variables necessary to describe consumer attitudes, motivations and emotions, a factor analysis is suggested: By grouping metric independent variables with high correlation or covariance between metric variables in order to reduce information, factor analysis delivers latent variables (factors), whereby each latent variable represents a corresponding group of attitudes (Jacq 2006). Therefore, factor analysis is a useful preparation for a succeeding dependence analysis if only a small number of non-metric variables have to be transformed into dummy variables.

Causalities between attitudes, motivations and emotions (reduced and provided as factors) as well as socio-demographic characteristics and the dependent variable "stimuli choice" shall be investigated in a second step applying dependence techniques. To choose the most appropriate technique from a wide range of techniques available, the following exclusion steps are undertaken: Generally, such techniques considering more than one dependent variable are not applicable regarding the survey design. Techniques restricted on the investigation of only two variables are excluded as well, as several independent variables are considered to be relevant. Furthermore, causal analyses, considering dependent non-metric variables (e.g. discriminant analysis) are also excluded, because the dependent variable is measured at ratio level. After these exclusion steps, remaining techniques are the multiple regression analysis (MRA) and the analysis of variances (ANOVA). Both techniques are based on linear models and investigate the causalities between several independent and a dependent variable.

MRA is a technique often applied to investigate the relation of several independent variables and one dependent variable with the aim to build a regression model or a prediction equation (Aaker et al. 2004). It is used to describe the variable of interest (Hair et al. 2006). If the independent variables are non-metric, they have to be transformed into dummy variables. MRA models have to be linear and need to include the relevant causal variables (Hair et al. 2006). Regarding the sample size, the number of cases has to be at least twice as much as the parameters included in the model. In the study, the foreseen sample size fulfils this precondition. To conclude, MRA can be applied to investigate which independent variables cause a high intention to choose the organic or non organic product stimulus.

The alternative technique ANOVA investigates how the variability of dependent variables could be explained by several independent variables. By application of an ANOVA, interactions between independent variables may be considered. Thus, an ANOVA is especially useful if interactions between the independent variables are expected. In this study, interactions for example between consumers' perception of a product stimulus and their evaluation of the stimulus or between educational level and income are expected. A prerequisite for a successful ANOVA application is again the sample size allowing conclusion from the investigated sample to the whole population. Another important consideration is the measurement level. If in an ANOVA design at least one independent variable is measured at interval level, this is called "covariate" and the applied technique is the ANCOVA (Tacq 1997). To build up a model including covariates, a complex number of covariate theorems is set up with corresponding F-tests (Tacq 1997), while MRA, in contrast, provides a less cumbersome way of including both metric and non-metric variables by transforming the non-metric variables into dummy variables.

Conclusions

To identify causalities between observed buying behaviour (R) and factors influencing the organism (O) in a buying situation, a choice experiment is linked with a standardised questionnaire, collecting information about consumers' motivation attitudes and emotions towards food, and socio-demographic characteristics. To link the data in the analysis procedure, two techniques are suggested. In order to reduce the large set of variables related to attitudes, emotions and motivations, a factor analysis will be undertaken. To link the variables of experiment and interview, both multiple regression analysis and ANOVA both are applicable when considering the amount and level of measurement of the provided variables as well as the utility of technique to explain causalities. However, as multiple regression analysis is more flexible regarding the measurement level of the independent variable, this technique is more applicable. The results of the study will be available in the mid of 2008.

Acknowledgments

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