An application of the
Consumer Disposition toward Satisfaction (CDS) scale
for a-priori segmentation

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Abstract: *An a priori latent segmentation procedure is proposed, which is based on an adaptation of the Consumer Disposition toward Satisfaction (CDS) scale. The disposition level is then used to define clusters of the respondents to the Customer Satisfaction annual survey of an Italian banking organization. In order to verify the evidence of a proper classification two different multivariate tests are suggested.*

Keywords: Latent segmentation, SEM, PLS

1. The concept of market segmentation

Market segmentation is a key element in marketing analysis and planning, which enables one to recognize the unobserved heterogeneity of customers, see Johnson *et al.* (2000), pp. 36-37. The recent research provides Marketing people with new techniques for segmentation, mainly related to the availability of the so-called segmentation basis, i.e. a set of variables or characteristics (directly observable or latent) used to assign potential customers to homogeneous groups.

Moreover, in the last decades, great attention has been devoted to the measurement and analysis of Customer Satisfaction (CS) and Loyalty (LOY), operated by means of the structural equation models (SEM) approach. Later on, we shall make reference to this context.

Following Wedel and Kamakura (1998), we may classify the segmentation methods in accordance with the categories reported in Table 1.

A priori, based on
      - Demographic variables
      - Psychographics, Life style, Perceptions

Post Hoc
      - Finite mixture models
      - Latent class models
      - Clustering methods

Table 1: Segmentation methods

The *post-hoc* methods are also called response-based procedures. Examples are represented by the following procedures based on the Partial Least Squares (PLS) algorithm: Finite Mixture Partial Least Squares (FIMIX-PLS), Partial Least Squares Typological Path Modeling (PLS-TPM) and REsponse Based Units Segmetation (REBUS-PLS), described in Vinzi *et al*. (2007), where their performances are also compared by means of a simulation study.

All these procedures take into consideration the manifest variables, as well as the latent ones, whose scores are previously generated adapting a common SEM model to the whole sample of data. Moreover, in particular, FIMIX-PLS assumes that observations come from a finite mixture of normal populations (see, also, Hahn *et al*., 2002), while the other procedures adopt proper measures of distance from units to the local models.

A latent segmentation procedure is also presented in Boari, Cantaluppi (2007), which employs the estimated scores of the latent variables in order to perform a hierarchical cluster analysis of the respondent units. An aspect common to the four previously mentioned procedures is that they all start from the estimation of a global path model; then, afterwards, they tackle the problem of detecting the unobserved heterogeneity and defining the cluster of data. We want to outline that heterogeneity is ascribable essentially to different covariance structures existing among the groups (and therefore different inner relationships in the local models) and/or to different mean levels of the latent variables.

2. *A priori* segmentation approach

Typically, heterogeneity should be addressed by assuming that subjects can be assigned to segments *a priori*, on the basis of proper variables (directly observable or latent), like for example, demographical and psychographic ones, or much better, variables pertaining Personality, Perceptions or Intentions, characterizing the respondents. So *a priori* means that segmentation is performed prior to the definition of models and variables of direct interest.

With reference to the application of SEM in the measurement of Customer Satisfaction, it was recently reported in Grace (2005) that CS is highly related to the so-called notion of Consumer Disposition toward Satisfaction (CDS). The author derived the following five-item scale, properly purified and validated, to measure the construct:

1) Usually I am pleased with what I buy,
2) More often than not, I am a satisfied consumer,
3) I generally find the goods and services I buy don't live up my expectations (*),
4) Quite often I am dissatisfied with my purchases of good and services (*),
5) Overall, I am usually satisfied with the purchases I make,

where (*) indicates reverse scoring. Assuming that CDS well defines the existing differences among customers, we propose to adopt its scores in order to perform an *a priori* segmentation of units.

3. Adaptation of CDS to the Italian reality and CATI data collection procedure

Preliminary to the annual Customer Satisfaction survey of a bank organization, a pilot Computer-Assisted Telephone Interview (CATI) was performed, in order to verify the adequateness of the previous scale to the Italian reality. During the scale refinement and purification activities it was observed that the data collection procedure gave rise to some problems concerning the correct interpretation of the reverse scoring items, probably due to the telephone interview modality. So the following Italian adaptation of the CDS scale has been proposed:

a) *Normalmente sono contento di ciò che acquisto*,
b) *Sono un consumatore più spesso soddisfatto che insoddisfatto*,
c) *Generalmente trovo che i prodotti/servizi che acquisto sono all'altezza delle mie aspettative*,

where a), b) are the translations of the original items 1), 2) proposed by Grace, while c) corresponds to the reverse of item 3). The items are gathered on a ten points Likert scale of measurement, according to the general structure of the Customer Satisfaction questionnaire.

Then, the estimated scores of the latent variable (factor) CDS, linked to the three previous items, may be used to define the grouping of the respondents.

With reference to the pilot survey, a sample of 66 randomly chosen customers were contacted.

For the sake of simplicity we considered the average values of the items defining the CDS scale. They are represented in the following histogram, which gives evidence of the presence of two distinct groups: customers disposed toward satisfaction (the majority) and those who are not particularly disposed (left tail of the graph).
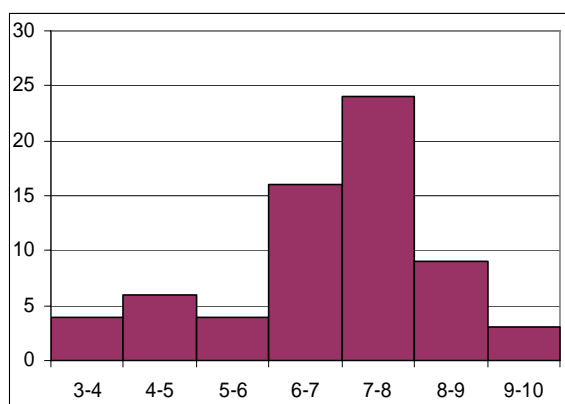

Figure 1: Average values of the items defining the CDS scale

Then, in order to optimally define the two groups, the deviance within groups, D_W, has been calculated as the sum of the deviances of the two groups defined by separating at subsequent ordered estimated averages. We could define the point 5.67, attaining the minimum D_W, as the ideal *cut-off* value (it obviously corresponds to the maximum of the between deviance).

The following sample distribution of the responses was then obtained. Observe that people not particularly disposed toward satisfaction do not represent a negligible minority.

CDS average values	
Low	**High**
14 (21.2%)	52 (78.8%)

Table 2: Sample distribution of the responses

We remark that the aim of the annual mentioned CS survey is to describe the relationships among Customer Satisfaction (CS), Loyalty (LOY), their antecedents and all the corresponding observable proxy variables (inner and outer models).

With reference to the clusters defined by the CDS scores, path models of the identical structure may be locally adapted. Usually, their structure is previously identified by making recourse to all the available data.

A further evaluation of the correct identification of the latent groups may then be performed by testing the following hypotheses:

i) homogeneity, between clusters, of the covariance matrices of the manifest variables defining the measurement model,

ii) equality of the mean levels of the latent variables concerning CS and LOY.

To test the first hypothesis the so-called Box's M test may be performed, while the latter hypothesis requires the execution of a MANOVA test.

Observe that the former hypothesis concerns the model heterogeneity due to different linear effects among the latent variables defining the inner model, while the latter one takes into account mainly the differences of the average levels of the latent scores characterizing the groups.

A specific application to a real case has been planned for the 2008 forthcoming CS survey: the questionnaire has been defined by taking into consideration also the preceding three items; the complete data set will be available for the analysis by the end of June.

Bibliography

Boari G., Cantaluppi G. (2007), A proposal for the latent segmentation analysis, in: Atti della Riunione Scientifica "Valutazione e Customer Satisfaction per la Qualità dei Servizi", Roma - Tor Vergata, 12-13 aprile 2007: 45-46.

Grace D. (2005), Consumer Disposition toward Satisfaction (CDS): scale development and validation, Journal of Marketing, Theory and Practice, 20 (spring): 20-31.

Hahn C., Johnson M.D., Herrmann A., Huber F. (2002), Capturing Customer Heterogeneity using a Finite Mixture PLS Approach, Schmalenbach Business Review, 54: 243-269.

Johnson M.D., Gustafsson A. (2000), Improving Customer Satisfaction, Loyalty, and Profit: An Integrated Measurement and Management System, Jossey Bass, San Francisco.

Vinzi V.E., Ringle C.M., Squillacciotti S., Trinchera L. (2007), Capturing and Treating Unobserved Heterogeneity by Response Based Segmentation in PLS Path Modeling. A Comparison of Alternative Methods by Computational Experiments, Working Paper n. DR 07019, Essec, Centre de Recherche.

Wedel M., Kamakura W.A. (1998), Market segmentation: conceptual and methodological foundations, Kluwer Academic Pub., Boston.