A NEW FORM OF CONSUMPTION OF ORGANIC PRODUCTS: A CUSTOMER SATISFACTION ANALYSIS IN A COMMUNITY SUPPORTED AGRICULTURE

UNA NUOVA FORMA DI CONSUMO DEI PRODOTTI BIOLOGICI: UN’ANALISI DI CUSTOMER SATISFACTION IN UN SISTEMA DI COMMUNITY SUPPORTED AGRICULTURE

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Abstract

La notevole crescita del comparto biologico durante gli anni ’90 non è stata accompagnata da un rapido adeguamento delle strutture di mercato alla crescente domanda di questi prodotti. Questo ha comportato la nascita di nuove forme di commercializzazione che hanno cercato di dare una risposta alle carenze distributive. Una di queste è il box scheme. Esso è caratterizzato dalla vendita locale soprattutto di prodotti freschi, dalla consegna a cadenza prestabilita e a domicilio, e da prezzi prefissati con contratti di uno o più mesi che in taluni casi raggiungono anche l’anno. Tale metodo consente al produttore, inoltre, di internalizzare i benefici derivanti dalla fase di commercializzazione del prodotto instaurando un rapporto fiduciario con i consumatori. Partendo da un caso studio relativo ad un’azienda biologica campana, abbiamo condotto un’analisi di customer satisfaction. Per l’indagine delle preferenze del consumatore è stato utilizzato un modello econometrico a variabile dipendente discreta ordinata. I risultati dell’indagine consentono di esprimere un giudizio positivo sulle potenzialità del box scheme per alcune realtà del biologico.

Key words: organic agriculture, customer satisfaction, community supported agriculture, logit, box scheme.

Parole chiave: agricoltura biologica, soddisfazione del consumatore, community supported agriculture, logit, box scheme.

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1. Introduction

This study analyses a new form of commercialisation and consumption of organic produce, Community Supported Agriculture (CSA), commonly found in the USA, Japan and other countries of northern Europe, and taking its first steps in Italy. Under the system there is a medium-term (3 months) or long-term (1 year) contract between one or more farmers and a group of consumers, generally situated close to the farms: a package containing a set amount (fixed at the time of subscription) of fresh organic produce, at a price fixed on stipulation of the contract is delivered regularly to the consumer's home or is collected at the farm itself.

Here we analyse the potential of this new consumption mode using a customer satisfaction survey conducted on a sample of 100 consumers who use this alternative means of supplying themselves with fresh organic produce. The survey was conducted in Campania where CSA, in its box-scheme variant, was first adopted in Italy. The method of analysing customer satisfaction used in this study was proposed in a recent study by the same authors (Cembalo et al., 2002)

2. Community Supported Agriculture and the Box Scheme

Community Supported Agriculture (CSA) arose in Japan in the mid 1960s, later spreading to Europe (initially only Switzerland and Germany (Miele, 1998)) and arriving in the USA in the mid 1980s where it generated considerable enthusiasm, attracting in the space of a few years more than one thousand schemes.

Illustrating the mechanism of CSA operations (or CSAs) is far from simple as every CSA is different and the box scheme, which will be the focus of our paper, is a simplified variant of CSA. The main element that links these various experiences is their positioning half way between a new form of sale and consumption of low-impact farm produce – especially organic - and a new tool for sustainable rural development.

If we wish to identify a general scheme, a CSA may be said to be structured as follows: one or more farms contact a group of citizens from the same area. This contact is often promoted by a core group that may consist of volunteers, people who receive remuneration in the context of a CSA, or institutional operators such as agricultural extension officers. Once the contact has been created, the farmers (or farmer) submit forms to consumers, one detailing production costs (including remuneration of household labour), and the other specifying the expected quantity of
products associated to a “share” which is proposed for purchase. In other words, each farm subdivides its own production into shares, where the share is equivalent to the quantity of produce consumed by a family of four (at times even two or one); it subdivides production costs by the number of shares and obtains the purchase price proposed for each share. Importantly, the amounts proposed are “expected”, in the sense that they may change according to “environmental” variables which are considerable in the case of organic produce. Hence for each product the consumer who purchases the share may obtain larger or smaller amounts than those “expected”. Thus the consumer shares with the farmer the risks of production. Moreover, while stipulating contracts, citizens may also agree with the farmer(s) a change to the production plan to meet specific requirements.

Products are delivered with various mechanisms that may make the subscription price vary. The box may be collected directly from the farm, or at collection centres in town, or it may be delivered to the consumer’s home.

The success that this new approach is encountering is due to the many benefits that a CSA generates for producers and consumers, or rather, citizens. On the production side there is: 1) internalisation of the benefits of distribution; 2) sharing of part of the production risks with citizens; 3) greater work opportunities on the farm; 4) incentive for cooperation with other farms. Consumers, on the other hand, 1) obtain fresh produce at the optimal point of ripening; 2) know the origin of their produce and those who produce it; 3) help to protect the environment on a local scale by creating incentives for organic farming; 4) considerably reduce the consumption of non-renewable resources involved in the transport and packaging of agri-food products; 5) have access to activities organised by the farms of which they are “shareholders”; 6) may influence farm cropping systems.

Finally, it should be noted that there are many benefits in social terms as well: 1) there is an incentive for farming with low environmental impact; 2) there is a reduction in energy consumption and packaging materials associated with conventional distribution; 3) the development of rural areas is supported via the market (De Muth, 1993; Van En, 1995; Iowa University Extension, 1999; University of Massachusetts, 2003 ). Furthermore, the recent OECD report on multifunctionality in agriculture shows that CSAs may be one of the tools to internalise, via the market, the positive externalities produced by farming (OECD, 2001).

In Europe CSAs are distributed fairly thinly in their integral form. In Italy, besides a somewhat similar experience reported by Londei et al. (2001) in the land of Montefeltro, CSAs

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2 Of which, we stress once again, there are many variants.

4 Some experiences, known also under different names, are to be found in the UK, Germany and Swizerland.
have been recently proposed in their quasi-integral version under the term GODO (Organised Groups of Demand and Supply) by the Rete Lilliput jointly with AIAB (Italian Organic Farming Association) and Greenpeace5.

3. The customer satisfaction evaluation method

The method to evaluate customer satisfaction used in this paper was recently proposed in a study by the same authors (Cembalo et al., 2002), to be consulted if greater detail is required. Compared with other methods found in the literature, this new method has modified the questionnaire given to consumers, and has adopted a new statistico-econometric approach to elaborating responses. Drawing up the questionnaire is of particular importance in this method. Indeed, poor structuring will produce results of low reliability6.

In this specific case-study for calibrating and selecting questions to pose consumers we first organised a focus group with some ex box-consumers who were asked to express their opinion on this new form of selling. This enabled us to calibrate the questionnaire starting from those characteristics deemed “crucial” for them. The focus group process was followed by a pre-test of 20 consumers, some of whom subscribed to the service at the time of the interview, while others had let their subscription lapse. Only at the end of these preliminary phases was it possible to set up a definitive questionnaire, which consisted of three sections.

In the first (warm-up) the interviewee was asked some questions that allowed us to gather preliminary information on the consumer approach to the product/service in question; the second section, which is the core of the questionnaire, gathers data on consumer satisfaction with the product/service supplied; in the final section, the socio-economic characteristics of the interviewee and his/her family were recorded.

On the basis of reports in the specialised literature and with the aid of information obtained via the focus group and the pre-test, we thought it appropriate to divide global satisfaction with the product/service (the box) into six macrocategories: 1) composition of the box; 2) packaging; 3) characteristics of the products contained in the box; 4) price/quality ratio; 5) service quality; 6) information contained in the box. Each macrocategory was broken down into criteria that defined each aspect of the macrocategory in question (figure 1)7.

Having performed this breakdown of global satisfaction into macrocategories and their relative criteria, we asked the interviewee to initially assign a score for global satisfaction and

5 For greater detail consult the AIAB internet site: http://www.aiab.it.
6 However, it is possible to ascertain ex-post the validity of a questionnaire. As we will see below, this operation was the prerequisite for the authors to continue the survey.
then to each criterion (but not to the macrocategories). The score varied from 1 to 5, where 1 corresponded to “not at all satisfied” and 5 to “completely satisfied”. As explained in the previous section, one of the potential problems involved in this type of survey relates to the consistency of responses among the various parts of the questionnaire on which the interviewee is called upon to express an opinion.

In our questionnaire the consistency of the responses was statistically verified by asking the interviewee, at the end of the second section and after assigning scores to each criterion, to distribute 100 points among the six macrocategories, bearing in mind that a higher score meant greater importance and making sure that the total points assigned was equal to 100. As we will see below, the availability of such “weights” enabled us to assess response consistency using an econometric model.

The second phase of the method, concerning statistical analysis of the data, begins with the estimate of what we term the “consistency model”. It consists in defining a classical linear model in which the parameters are estimated with the ordinary least squares method. In this first model the dependent variable consists of scores attributed to global satisfaction of the box scheme, while explicative variables consist of the average of scores attributed to each macrocategory with due weighting assigned by the consumers. If the responses are consistent, the parameters of all macrocategories must be statistically significant. The limits that are described in

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7 This approach has several points in common with that recently used by Sandalidou et al. (2002).
the literature concerning the use of $R^2$ are also in this case demonstrated. Indeed, with only 5% of responses with little or no consistency, this index is considerably lowered. This is precisely why it is not deemed appropriate to use $R^2$ to verify the model’s goodness of fit, but rather other statistically more solid tests such as Ramsey’s *reset* test (Ramsey, 1969) and those based on recursive residuals (Brown *et al.*, 1975). Finally, we stress the importance of at least one statistical test for the variables omitted which allows any omission of major macrocategories to be ascertained.

Once the consistency of responses is verified, we identify the aspects that are important for consumers (critical aspects of the product/service) in giving a global assessment. We identified the critical aspects by using two successive latent variable models, in which the dependent variable is ordinal (Greene, 1997; Aitchison *et al.*, 1957). In the first of the two models the ordinal dependent variable (which remains the global assessment) was correlated with the average of the scores obtained by each macrocategory, this time non-weighted; in the second model the ordinal dependent variable was correlated with the scores obtained by the individual criteria.

5. The survey results

Empirical estimation of the “consistency of consumer responses” was effected with the aid of a multiple linear regression model, using the ordinary least squares method:

\[
SG = \beta_{cz}^p CZ^p + \beta_{pk}^p PK^p + \beta_{pd}^p PD^p + \beta_{pq}^p PQ^p + \beta_{sv}^p SV^p + \beta_{inf}^p INF
\]

where the dependent variable of the SG model indicates the value of global satisfaction; $\beta_{ij}^p$ indicates the coefficient to be estimated for each of the explicative variables examined. Recall that the six macrocategories (contained in $V$) on which the consumer was asked to express an opinion were: CZ, which is the group of variables relative to the composition of the box; PK, the group of variables relative to packaging; PD, the group of variables relative to product characteristics; PQ, which indicates the interviewees’ opinion on the price-quality ratio; SV, the group of variables relating to service; INF, the group of variables relative to information. Each of the vectors in $V$ contains the average assessment given by the $i$-th consumer to the $V$-th macrocategory. Moreover, the superscript $p$ indicates that the variables are weighted according to the percentage of the macrocategories expressed by the interviewees. The results of regression are reported in table 1.

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8 The best known and most common test is that set up by Davidson and MacKinnon (1993) based on a maximum likelihood function.
Table 1 - Model 1 results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t-Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>$CZ^p$= composition</td>
<td>1.18</td>
<td>4.05</td>
</tr>
<tr>
<td>$PK^p$=packaging</td>
<td>0.57</td>
<td>1.72</td>
</tr>
<tr>
<td>$PD^p$=product characteristics</td>
<td>1.11</td>
<td>10.0</td>
</tr>
<tr>
<td>$PQ^p$=price-quality ratio</td>
<td>0.84</td>
<td>4.44</td>
</tr>
<tr>
<td>$SV^p$=service</td>
<td>1.05</td>
<td>4.20</td>
</tr>
<tr>
<td>$INF^p$=information</td>
<td>0.80</td>
<td>3.66</td>
</tr>
</tbody>
</table>

The fact that all the variables inserted in the latter model are statistically significant implies that the interviewees responded, on average, consistently to the various questions, albeit posed at various points in the questionnaire. Moreover, a test was formulated to ascertain the possible omission of variables\(^9\). The test was non-significant, indicating in six macrocategories used those that are on average considered for formulating the global assessment on the box. In practical terms this result leads toward an important initial consideration: the aspects of the box which were considered are actually those that affect the degree of interviewee satisfaction. This is the first positive assessment on the work conducted with our survey. Moreover, given the way the model was constructed, the estimated coefficients are sorts of multipliers that indicate the variables that most affect the global assessment. In other words the coefficients estimated with greater value indicate variables that most affect the global assessment of the box. The composition, product and service characteristics are the three macrocategories with a significantly higher coefficient. This result enables us to further verify the hypothesis of a functional relation between the six macrocategories and the assessment of global consumer satisfaction with the box.

Empirical analysis thus proceeded by using a further estimate of an econometric model, on this occasion an ordinal dependent variable one (Aitchison et al., 1997). We made reference to the following theoretical model:

\[
SG_i^* = x_{i,v} \beta_v + \varepsilon \quad \text{with } i = 1,\ldots,71
\]

where, also in this case, SG stands for the value of global satisfaction and is the dependent variable of the model; $\beta_v$ is the coefficient to be estimated for each of the explicative variables

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\(^9\) The test we used is the Log likelihood ratio test (Davidson and MacKinnon, 1993).
(V) considered. Vector \( x_{iV} \) contains the average score given by the \( i \)-th consumer to the \( V \)-th macrocategory described above.

Of the six variables inserted in the theoretical model, those that were statistically significant\(^{10} \) are composition, product characteristics and service (table 2):

**Table 2 - Model 2 results**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t-Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>CZ = composition</td>
<td>0.72</td>
<td>2.50</td>
</tr>
<tr>
<td>PD = product char.</td>
<td>2.34</td>
<td>13.6</td>
</tr>
<tr>
<td>SV = service</td>
<td>0.44</td>
<td>3.72</td>
</tr>
<tr>
<td>( \gamma_1 )</td>
<td>1.17</td>
<td>14.13</td>
</tr>
<tr>
<td>( \gamma_2 )</td>
<td>1.39</td>
<td>13.65</td>
</tr>
<tr>
<td>( \gamma_3 )</td>
<td>1.56</td>
<td>13.85</td>
</tr>
</tbody>
</table>

Bearing in mind the results obtained, especially the signs of the estimated coefficients, the degree of satisfaction may be said to be: 1) directly proportional to the degree of satisfaction with the composition of the box; 2) directly proportional to product characteristics; 3) directly proportional to service (that what was delivered corresponded to what was required).

If we wish to outline a type profile of box consumer, it may be concluded that the degree of global satisfaction with the box increases when the consumer, being satisfied with the composition of the box, remains satisfied both with the quality of the products as well as their choice structure and delivery.

To attain a level of greater detail a further model was estimated. In the latter, the explicative variables are all the scores of the interviewees given to each criterion of the macrocategories which were statistically significant in the previous model. Of the variables inserted in the theoretical model, those that were statistically significant are reported in table 3:

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\(^{10}\) Statistical significance of the estimated coefficients is always guaranteed at least 5%.
Table 3 - Model 3 results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t-Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>$CZ_F$ = composition (flexibility)</td>
<td>0.35</td>
<td>3.17</td>
</tr>
<tr>
<td>$PD_A$ = prod. charact. (flavour)</td>
<td>0.83</td>
<td>4.00</td>
</tr>
<tr>
<td>$PD_B$ = prod. charact. (storability)</td>
<td>1.39</td>
<td>10.3</td>
</tr>
<tr>
<td>$SV_B$ = service (precision)</td>
<td>0.53</td>
<td>4.62</td>
</tr>
<tr>
<td>$\gamma_1$</td>
<td>8.55</td>
<td>28.68</td>
</tr>
<tr>
<td>$\gamma_2$</td>
<td>11.90</td>
<td>32.19</td>
</tr>
<tr>
<td>$\gamma_3$</td>
<td>14.62</td>
<td>29.46</td>
</tr>
</tbody>
</table>

where $CZ_F$ is the “flexibility” characteristic of the composition category; $PD_A$ is the “flavour” characteristic concerning product characteristics; $PD_B$ is the “storability” characteristic under product characteristics; and $SV_B$ is the “precision” characteristic in the service category.

Taking account of the results obtained, especially the signs of the estimated coefficients, the degree of satisfaction may be said to be: 1) directly proportional to the flexibility that the farm shows in terms of variety of products available at the time when the choice of box composition is made by the consumer; 2) directly proportional to the degree of satisfaction with product flavour and storability; 3) directly proportional to the degree of satisfaction with the service rendered by the farm.

6. Concluding remarks

Our survey suggests some interesting considerations on CSAs, especially on the box-scheme variant. It highlighted the fact that the box-scheme, at least in our case-study, enjoys considerable favour on the part of consumers interested in fresh organic produce. Indeed, 74% of 71 interviewees stated they were very or completely satisfied with the service/product purchased. Our survey also identified fairly clearly the key points of this new sales method to which the consumers are generally very attentive; their lack of satisfaction in these aspects compromises the degree of global satisfaction with the whole initiative. These points were product composition, product features and service. This implies that the consumer who subscribes to the initiative expects in the first place that the “experience” attributes are more than satisfactory, as it is the
latter that affect overall judgment on the (service/product) initiative to which they subscribe. Therefore, the farm that aims to achieve high customer satisfaction using a box scheme should offer: 1) considerable flexibility both in the gamut and choice of organic products available; 2) optimisation of product features, that is, flavour and storability; 3) lastly, perfect precision or correspondence between what is ordered and what is delivered.

References


