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# Ecological characteristics and new competitiveness strategies in fresh vegetables market

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## Summary

The intense process of internationalisation of the food market is giving rise to new competitive scenarios. The growth of market shares by new export countries, along with other consumer and retailer's issues impose different marketing policies for agri-food products. In particular, a wider awareness of consumers for environmental and health issues is modifying the structure of demand for fresh products. In the past, the country of origin and a convenient quality/price ratio were the main strategic strengths for gaining and maintaining international market shares. Nowadays market shares are gained by moving towards new product attributes, namely environment friendliness and food safety. This paper aims to suggesting new and more successful marketing strategies. The case study is the German market of cherry tomatoes. An analysis of German consumer preference was performed on stated choice data. Results provide interesting insights. Product attributes related to the environment are found to be relevant. As these are defined as "faith" attributes, we speculate that German consumers refer to product origin country as a proxy of its environmental aspects. Two separate competitive segments emerge, one with a higher level of environmental quality (Germany and Italy), and Turkey, Spain, France and Holland. Finally, results point out how policies need to be redesigned and focused on new and more complex issues expressed by consumers in modern and developed markets marketing.

**KEYWORDS:** competitiveness strategies, cherry tomato German market, environmental friendly, fresh vegetables, Mixed Nested Logit

## 1. Introduction

The process of intense internationalisation of the food market is giving rise to new competitive scenarios, mainly concerning quality products. A growing concern of consumers for environmental friendliness and health issues is slowly changing the structure of demand for several goods, including that for fresh products. Up to a few years ago, country of origin and a convenient quality/price ratio were the main strategic strengths for gaining and maintaining quotas in international markets. Nowadays, the important role played by new retailers is orienting the market towards new product attributes. This, as a consequence, affects market shares distributions across the largest conventional export countries.

In the present study these issues are tackled with the aim of suggesting new and more successful marketing initiatives for producers facing these changed market needs.

The case study concerns the German market of cherry tomatoes. Germany is a large importer of fruit and vegetables and its market shows the features described above. In the paper we present results derived from a two-step analysis conducted in Germany and

focused on survey data. The first step of the analysis is centred on focus groups run in representative cities. This phase shed some light on German consumers' preferences and opinions on fruit and vegetables. It also provided useful suggestions for the development of the questionnaire and choice set design which were integral parts of the multi-attribute choice survey which made-up the second step of the study. This was administered to a representative sample of German consumers. A consumer preference analysis was then performed by estimating random utility models on the choice data collected in this survey. Product attributes surveyed were: country of origin (Italy, Germany, Holland, Turkey, France and Spain), protected geographic indication, organic production, biodegradable packaging.

Results provide some indications on the development of potentially successful marketing strategy and highlight as a fundamental motivation underlying quality perception the environment friendliness of the product.

As cues related to this product dimension are defined as credence attributes, German consumers refer to product country of origin as a proxy for its "environmental value content". As a consequence, they seemed to perceive two different competitive segments: the first, with a higher level of "environmental" quality, including tomatoes from Germany and Italy and, the second, including tomatoes from Turkey, Spain, France and Holland.

Finally, results point out how policies need to be redesigned and focused on new and more complex marketing issues relevant to modern consumers in developed markets.

## **2. The Focus groups**

A research was conducted in Germany on cherry tomato market characteristics. Consumer's preferences were analysed through focus groups and quantitative models in order to outline choice behaviour and opinion towards products and their countries of origin.

In 2005 4 focus groups were held, two in Berlin and two in Frankfurt. All 39 selected participants were in charge of food shopping in their respective households and half of them had purchased Italian products in the last 6 months or sooner. Participants were equally distributed between sex groups and were distributed in two age groups (between 25 and 44 and between 45 and 60 years old) in each city.

The information that emerged during the discussions outlined the purchasing habits of German consumers' and their preference for Italian products, agro-food in particular. As in most developed economies, household grocery shopping was described as organized on a weekly basis, with the weekly shopping at the big distribution stores taking place during weekends and the daily shopping at supermarket as well as at *delicatessen* shops and street markets.

German consumers' pay particular attention to the environmental aspects of products and this is confirmed by the high importance participants gave to organic products and environment friendly processes. Strictly related to these aspects is considered the country of origin non as a product attribute *per se* but as a guaranty of attention towards environmental issues on the basis of the past reputation enjoyed by the products from each exporter country. From the focus group emerged that some countries are, in fact, generally regarded as reliable in consistently delivering good quality, others have the reputation of producing with high environmental impact via means of intensive processes and deliver mass-produced low quality products. In particular, local products are considered highly reliable because of the efficient national control systems, as well as fresher and less manipulated and more environmentally friendly because of the shorter transport distances (low food miles).

As a country of origin Italy emerged as being generally well regarded amongst focus group participants. Italian products inspire confidence and better quality production, particularly

for the favourable climate condition that makes possible to produce with low-input techniques.

The German market has long been accustomed to Italian products. Indeed, consumers showed a clear opinion about them and their origin: during the focus-group discussions, in fact, no confusion about real and fake Italian brands was recorded amongst participants.

Participants that expressed interest in product characteristics and country of origin emphasized the need for a clearer and more easily recognizable labelling policy, such as the use of a visible trademark assuring the exact origin of the produce. They acknowledge Italian products quality characteristics and appreciate them; however, specifically for fruit and vegetables, local products can benefit from a wider and better distribution and shorter distance to the shelf.

In conclusion, a relative not widespread distribution of Italian fruit and vegetables in conjunction with difficulties in an immediate and clear identification of origin emerge as the actual issues to tackle for Italian producers. A *Real Italian* trademark is suggested as a means to induce more consumers to choose original Italian products.

Nonetheless, only the group of *regular users*, that is individuals using regularly Italian products, declared a higher willingness to pay for such a form of labelling ensuring a genuine guaranty.

### 3. The survey

For the quantitative analysis, a representative sample of 360 individuals was selected and interviewed. The sample was randomly selected in five German cities: Berlin, Stuttgart, Munich, Cologne and Hamburg (72 each city – Fig. 1).

Figure 1. - Map of Germany with sample location



Face-to-face interviews were conducted in-hall, in public venues in the city centres. Individuals were selected among those who declared to be in charge of grocery shopping and to be consumers of cherry tomatoes. The main sample characteristics are reported in table 1.

**Table 1. - Sample descriptive statistics (n: 300)**

	Percentage
<b><i>Gender</i></b>	
Male	29.10
Female	70.90
<i>Tot</i>	<i>100.00</i>
<b><i>Class of age</i></b>	
18 - 29	23.30
30 - 39	33.00
40 - 49	20.70
50 - 59	13.70
> 60	9.30
<i>Tot</i>	<i>100.00</i>

The interview was based on a questionnaire structured in three sections. The first section was focused on purchasing and consuming models for consumers of cherry tomatoes. The importance of some real and immaterial product attributes was investigated in a seven-item Likert scale, going from 1 for “Not important at all” to 7, “Very important”. The attributes considered were organic certification, geographic indication, packaging, if ready to use, taste, transport from farm to shelf, price and growth level.

According to consumer’s answers the identification of the country of origin of cherry tomatoes is not perceived to be a problem. The 78% of them do their grocery shopping in supermarkets and discount stores (Tab. 2).

In fact, more than half of the sample stated that they buy this product at least once a week. Taste, appearance and degree of maturity are the highest ranked attributes. However, none of the attributes listed performed with a rank significantly below 4 (the lowest was packaging with 3.9 - Figure 2).

Italy holds the second best reputation for producing high quality cherry tomatoes: in fact, it is ranked second following Germany (Tab. 4).

**Table 2. Percentage of buying location**

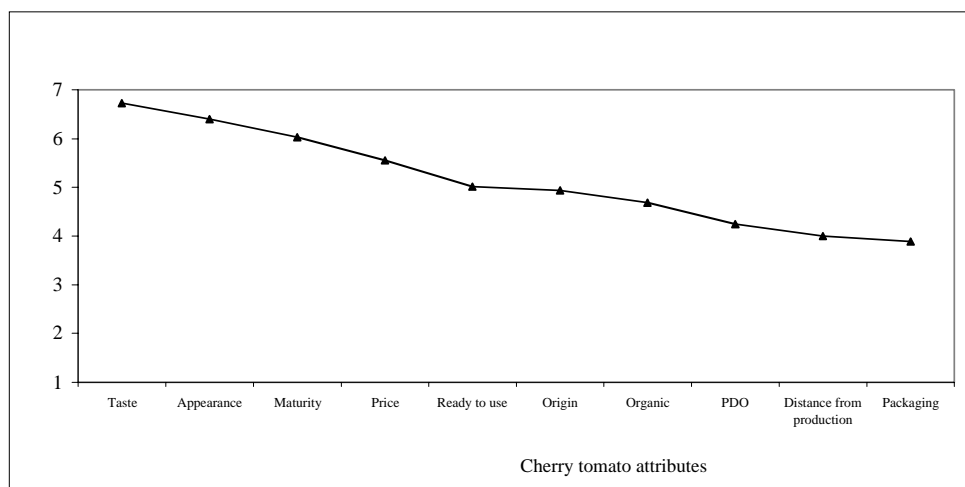
Alternatives	Percentage
Supermarkets	65.00
City market	19.33
Discount	13.00
Other	2.67
<i>Tot</i>	<i>100.00</i>

Consumers can be generally defined as frequent consumer of cherry tomatoes (Tab. 3).

**Table 3 - Distribution of how often interviewers declared to buy fresh tomato**

Alternatives	Percentage
3-4 times per week	14.33
1-2 times per week	53.67
1-3 times per month	28.67
less than once per month	3.33
<i>Tot</i>	<i>100.00</i>

**Figure 2. – Sample average Likert score of cherry tomato attributes**



**Table 4. - Best origin country of cherry tomato**

Alternatives	Percentage
Germany	32.00
Italy	23.00
Spain	21.00
Turkey	9.00
France	8.00
Holland	7.00
<i>Tot</i>	<i>100.00</i>

On the other hand, the majority of the sample ranks Holland as the worst producer for this product. Italy is considered the worst producer of cherry tomatoes only by a very small share of the sample (5%) and the best by a high percentage (23%) (Tab. 5).

The second section of the questionnaire consisted in a choice experiment. Important insights emerged from focus groups led in designing the experiment. Five attributes of cherry tomatoes were considered: country of origin (France, Spain, Italy, Turkey, Holland, Germany), packaging (biodegradable and non biodegradable), European certification of

geographic indication (PDO/PGI), organic certification and the price in Euro/kg (1, 1.5, 2, 2.5, 3). An orthogonal design on these attributes and levels produced 45 profiles, which were then shifted six times according to recent prescriptions in experimental design (Ferrini and Scarpa, 2007). Every consumer was interviewed on three sets, with 6 profiles each. The hypothetical scenario for choice experiment was presented as follows: “*Imagine you are in the shop where you normally buy fruit and vegetables: the following 500 grams packages of cherry tomatoes are available. Would you buy any of them? Which one in particular?*”

**Table 5. - Worst origin country of cherry tomato**

Alternatives	Percentage
Holland	46.00
Turkey	20.00
France	13.00
Germany	10.00
Spain	6.00
Italy	5.00
<i>Tot</i>	<i>100.00</i>

This approach has the advantage of being cognitively undemanding on the side of the respondent (DeShazo and Fermo 2002). Data from consumers’ response were analyzed accounting for substitutability across different export countries by means of a mixed logit with an error structure design to capture correlation in a similar way to a nested logit, as reported in the next section. Finally, the last section of the questionnaire investigated the socio-economic characteristics of the respondent.

#### **4. Random Utility Model with additional error component**

Consumer’s preferences estimation is achieved by means of a random utility model specified on qualitative attributes as described in packaging labels. The RUM model can be implemented to account for varied correlation across utilities of the similar type, but more flexibly than the traditional nested logit (for a general exposition see Train 2003, for details on substitution patterns see HERRIGES and PHANEUF 2002 for performance under misspecification see SCARPA et al 2005). In order to do this mixed logit models are specified with random utility specified as including error components in addition to the conventional Gumbel error. The assumption remains that the chosen cherry tomato is the one maximizing utility in the choice set, hence the probability of selection is linked to the probability of this tomato to provide highest utility across those available.

While conditional on the Gumbel error the selection probability of a type of cherry tomato is logit, the marginal probability requires integration over all the possible values of the additional zero-mean normal errors denoted by  $\varepsilon_n \sim N(0, \sigma^2)$ :

$$\Pr(U_j > U_{\neq j}) = \int_{\varepsilon_n \in \Omega} \frac{e^{\beta \mathbf{x}_j + \varepsilon_n}}{\sum_{j=1}^J e^{\beta \mathbf{x}_j + \varepsilon_n}} f(\varepsilon_n | \Omega) d\varepsilon_n,$$

where  $f(\cdot)$  defines the assumed distribution for the additional errors and  $\Omega$  is a set of parameters determining the behaviour of this distribution. Such probability does not have a close form and hence simulation methods need to be employed for its computation during



the estimation of the parameters from the observed choices. Techniques to achieve this are well illustrated by Train (2003) and need not be repeated here.

As reported in section 3, five characteristics of cherry tomato were used to estimate the choice probability for a German consumer:

1. Country of origin (Germany, Italy, French, Spain, Turkey, Holland), dummy coded using Germany as baseline;
2. biodegradable packaging (YES=1,NO=0);
3. PDO/PGI (YES=1,NO=0);
4. Organic (YES=1,NO=0);
5. Price (in Euros).

Table 6 reports results from the mixed logit error-component model.

According to what expected the coefficient for PRICE has negative sign and is statistically significant: *ceteris paribus*, price increase reduces the choice probability.

German consumers, as highlighted by other authors (Giraud *et al.*, 2007) and discussed in the previous part of this paper, are particularly attentive to ecological characteristics of products purchased: ORGANIC attribute has positive sign, thereby increasing the probability of choosing specific tomatoes. This attribute guarantees, on average, a premium price of 0.72 Euro per 500 grams of product.

**Table 6. - Results of the Random Utility Model with additional error component**

Variable	Coefficient	b/st.dev	p_value
France	-0.281	-2.83	0.0017
Turkey	-0.101	-1.075	0.2825
Holland	-0.227	-2.32	0.0201
Organic	0.249	3.814	0.0001
Price	-0.343	-7.471	0.0000
<i>additional error component</i>			
IT_D_Org $\beta$		fixed	
IT_D_Org $\sigma$	0.191	1.319	0.1872
<i>random parameter (normal distribution)</i>			
Spain $\beta$	-0.107	-0.927	0.3540
Spain $\sigma$	0.428	1.719	0.0856

N.Valid Obs = 359

Log\_L = 1840

However, particularly interesting is the role played in consumer's choice by COUNTRY OF ORIGIN. Results of the econometric model, in fact, suggest that the country of origin has a statistically significant influence on the choice but different depending on the country: Italian and German origins have a positive effect on consumer's choice, whereas origin from France, Spain, Turkey and Holland have a negative influence using as reference the domestic production. Nonetheless, Spain is the only country related to which German consumers showed some degree of taste heterogeneity. In fact, the null that this attribute is randomly distributed could not be rejected. The estimates of mean and standard deviation for the distribution of this attribute imply that about 40% of consumers show a positive attitude to Spanish tomato.

Preference towards Italian and German product is confirmed in the econometric model with error components by the presence of a correlated preference structure (common error term in the utilities) that places Italy and Germany together separately from all the other countries: the common error component for German or Italian origin shows a significant estimates for the standard deviation. The reasons underlying this preference are explained by the presence of the common error component in the utility structure of the model which displays a significant standard deviation: the variable *IT\_D\_ORG*. This represents the spread of the additional error component associated with Italian and German origin, and the event that the chosen tomatoes, came from an organic production technique.

This error component is additional to the Gumbel error and provides the model with a correlation structure similar to a nested model (Herriges and Phaneuf, 2002).

This result suggests that for cherry tomatoes it is Germany and not the other Mediterranean countries that should be considered direct competitors to Italian export, as instead is commonly perceived by Italian trading organizations. That the utility structure is consistent with the interpretation that consumers have an opinion about tomatoes with Italian and German origins which is different from the rest of the origins. Not only do they perceive them as high quality and environmentally friendly products, but they also set them into a different category from those of all the other investigated countries.

In conclusion, the interpretation of the nest is consistent with our understanding of motivations underlying German consumers' preference towards local and Italian cherry tomato, that are the perception of "ecological and territorial" aspects and a greater attention to the environment they associate to productions and producers of these countries.

## **5. Final remarks**

Competitive markets are contexts where valorization and promotion strategies are best implemented. The agro-food sector shows a diversified and continuously evolving framework. For some typologies of products, such as the Italian fruit and vegetables, product differentiation on worldwide markets has been entrusted by means of generic and immaterial attributes often grouped under the "Made in Italy" label.

New competitors, the evolution of consumption and demand models, the increasing relevance of big chain organization have raised the need for generating new strategies of market penetration. A decreasing market share in country such as Germany, which represents one of the wider foreign markets for many Italian fresh products, can be considered as an indicator of how important analyzing Italian strengths and weaknesses has become nowadays.

Such scenario represented the main motivation of this research study. It involved one market (Germany) and one product, cherry tomatoes, which is well known and deemed by European consumers as typically Italian.

The first result obtained concerns a new and unexpected definition of competitive groups which characterize the segment of cherry tomatoes in the German market. That is, it was possible to define, through a RUM model with flexible substitution patterns, the existence of two well defined groups of countries: Germany and Italy on one side, and Turkey, Holland, France, and Spain, on the other side. Consumers deem the two groups as producing two different quality levels of cherry tomatoes. More specifically, a higher quality standard is associated to the first group of countries.

A second relevant result is the characterization of an attribute involved in forming the quality concept in consumer's perception: ecological attributes such as organic.

This attribute, in fact, contributes to give the product in analysis a higher ecological and territorial character when related to country of origin.

Last, but not the least, result is the significant role played by price in German consumers' choice, as cherry tomatoes are a fresh product consumed quite often if not daily.

The described scenario is one in which new promotion and penetration strategies have to be put in place. The results suggest that for Italian export products the direct competitors may not be other export countries, such as Turkey, Holland or France are for cherry tomatoes, but domestic production itself. Modern German consumers look for something more tangible than the “Made in Italy” label because it is considered nonspecific and often self-referential. It seems necessary to attribute to this label a more specific content.

One of the possible strategies might be to satisfy the emerging needs of post-modern society (Fabris, 2005) that are related to a higher need of food safety, and with a low environmental impact of both production and distribution.

A significant effort of policy makers and entrepreneurs must be done in this direction if the lost competitiveness has to be recovered. Such objective, however, must be pursued together with renewed economic and organizational system efficiency. Price plays, as expected, an important role for consumers. So, a higher price would mean losing consumers that might decide to substitute Italian products with the ones coming from the second group of countries that seem are working to get the best quality/price ratio rather than the best possible quality product.

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