

Consumer behaviour in the Hungarian beer market

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Abstract

In the Hungarian food economy beer marketing remains something of an enigma. Based on a direct-question survey, focussing mainly on educated younger consumers, this article offers an overview of the most important characteristics of Hungarian beer consumption. It is important to stress that beer consumption is *situational*, meaning tied to specific consumption situations. Research results prove that logistic regression analysis is a suitable method for determining why consumers opt for specific beverages in specific consumption situations. To analyse targeted marketing, the application of heuristic methods, and decision trees provide a high degree of accuracy. This has proven true for consumers that drink non-alcoholic beers.

Keywords

direct-question survey, consumer study, logistic regression, decision tree approach

Introduction

Over the last few years there has been a boom in scientific publications that analyse wine consumer behaviour (e.g. Gaál & Párdányi, 2006, Lehota and Komáromi, 2004) but knowledge of the factors influencing beer consumption is much more limited. In Hungary, professional public opinion is much less preoccupied with the concept of beer marketing as compared to wine marketing. An excellent example of this is the much greater number of internet “hits” received for the Hungarian word “wine marketing” than for the term “beer marketing.” On google.com wine marketing received 29,000 hits while beer marketing received only 2 (Search Data: 07.01.2007). A cynic might say that while “small-scale” wine makers enjoy speaking and writing about wine marketing, “large-scale” brewers actually do it. However, marketing must be based on sound scientific research. Otherwise, one runs the risk of wasting money on it. In developed market economies one observes almost equal acceptance of beer and wine marketing. Let us take, for example, the scientific database scholar.google.com. Using the key words “wine” and “consumer behaviour,” 1,280 hits were received, and with “consumer behaviour” and “beer” 1,120 hits. On an international scale, it is hard to determine whether beer or wine marketing research is the most advanced.

In European culture, beer production has long held an important role, but beer has never enjoyed the respect that wine has. In the early years of the medieval period, viticulture and wine production were a central activity in some European royal courts (England, the Netherlands, Poland). But in the 15th and 16th centuries this was abandoned. Historically, beer production has been closely associated with urbanisation and industrialisation. Some sources state that in 17th century England per-capita beer consumption reached 100 litres (Unger, 2004).

In the 20th century beer production steadily rose and consumption was stable in traditional beer-drinking countries such as Australia, South-Africa, the US, and Germany

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(Leifman, 2001), and in traditional wine-drinking countries beer consumption shot up (Christianne et al., 1993). For example, between 1970 and 2005 French beer consumption increased by 20% (Hauteville, 2005)

The beer industry is fairly concentrated. Reller (2000) estimated that multinational firms dominate approximately 60% of the world beer market. At the beginning of the nineties Szabó (1991) observed a sharp drop in the number of small-scale beer producers. However, contrary to expectations, in the early 21st century there are still numerous independent, small and medium-scale breweries. These smaller breweries are especially numerous in European countries such as Germany, Switzerland, and Belgium. Between 2000 and 2005 the number of German breweries remained stable at 1,280. Of these 1,280, 670 were situated in Bavaria. (<http://www.brauer-bund.de/index1.html>).

According to Reller (2000), small and medium-scale beer breweries play an important role in regional development. A medium-scale German brewery with 100 employees creates 400 additional jobs in agriculture, logistics, trade and catering.

To increase their exports traditional beer-producing countries try to exploit European integration and globalisation. For example, between 1999 and 2005 German beer exports increased from 9.5 million hl to 14.5 million hl. It is an open-ended question whether European integration has brought about a single European beer market, or whether one should refer to a geographically varied market based on different member states. To answer this question, Nielsen et al. (2003) carried out a detailed econometric analysis, based on a time-series examination of beer retail prices in 15 different EU member states. The bivariate cointegration analysis tests demonstrated that the single price series were non-stationary and, with a few exceptions, it could be generally stated that the bivariate price pairs were also non-stationary. For the (few) situations where in fact the price pairs *did* cointegrate, the result appeared not to be viable to an increase in the information set and an inconsistent ordering would apply. Correlation analysis indicated relatively high partial correlations for real producer price comparisons. However, because the single price series were non-stationary the high correlation was likely to be inaccurate. From the empirical analysis we thus conclude that there was no evidence of market segments for groups of countries in the delineation of the relevant geographical market. Individual countries appeared to have domestic producer price trends that were not shared by other countries. Therefore, the relevant market for the individual countries was their own domestic market.

During recent years greater attention has been paid to the health-effects of beer consumption. A meta-analysis by Di Castelnuovo et al. (2002) showed a statistically significant inverse association between light/to moderate beer consumption and vascular risk, but this association was smaller than in case of red wine consumption.

In terms of practical and applied economic science, there are several reasons to analyse factors influencing beer consumption:

1. In their domestic market Hungarian beer producers are facing new challenges. In Hungary beer drinking lacks tradition and during the 1950s per capita consumption did not reach 5l/capita. From the sixties to the early nineties consumption has monotonically increased. In 1990 the per capita consumption reached a peak of 105.1 litres/capita. During the last sixteen decades consumption has decreased monotonically; in 2005 consumption was barely 71 litres/capita (HCSO: Statisti-

cal yearbooks, 1950-2005). This total equalled only two thirds of the totals kept over the last fifteen years. Hungarian beers are increasingly less competitive. From 1993-2003 imported beers had a market share of 1.5-2.8%, but the post-Eu accession average for 2004 and 2005 increased to 15.5%. In the seventies Hungarian hop production was nearly one thousand ha but in the mid nineties it ceased to exist (www.fao.org).

2. In-depth interviews with Hungarian food industry marketing specialists indicate that the major beer companies have conducted an intense marketing campaign. Of course the major beer companies have ample capital to conduct such campaigns (Table 1) and, off the record, some experts estimate that the average promotion cost is approximately 0.6-0.1 €/l beer. It is an open question whether these efforts have a tangible effect on consumers or not. There is a wide range of research literature studying the effect of prices or income on beer consumption. Mészáros (1984) analysed the Hungarian data which proved income elasticity regarding beer consumption. The value of income elasticity was 0.894 ($t = 20.3$), and price elasticity -0.619 ($t = 7.1$). Based on data for the last two decades, our preliminary econometric analysis of aggregate beer consumption did not yield reliable results. Though it theoretically exists, we were unable to detect price or income elasticity of consumption, and the cross-price elasticity between beer and its substituents was also undetected. This fact can be explained partly by a relatively high level of data aggregation but we contend that the most important factor is that the socially imbedded determinant for beer consumption is hard to grasp using econometrics. It is thus an open question how much the respondents' socio-economic backgrounds impact on the situational nature of beer and beverage consumption.

Table 1

Main beer producing companies in Hungary

Companies	Year of establishment	Owner	Revenue (Euro)	Beer Production
Bordsodi Sörgyár ZRt. (Borsodi Beer Brewery Closed Ltd.)	1973	Interbrew-group		2.2×10^6 hl
Brau Union Hungária NyRt. (Brau Union Hungary Open Ltd.)	Sopron (1895) Martfű (1985)	Heineken-group	147 million	1.5×10^6 hl (Sopron) 0.75×10^6 hl (Martfű)
Dréher Sörgyárak ZRt. (Dreher Beerbreweries, Closed Ltd.)	1854	SABMiller-group	162 million	2.8×10^6 hl
Pécsi Sörfözde ZRt. (Pécs Beer Brewery Closed Ltd.)	1848	Ottakringer-group		0.89×10^6 hl

Source: Association of Hungarian beer producers

3. We have analysed this problem by multinomial logistic analysis. This is a rather new method that lends itself to measuring stochastic relations between a set of independent variables, measured on a nominal or ordinal scale, and dependent variables, and measured categorical variables.
4. Predicting consumer behaviour is a question of considerable practical and theoretical importance. The development of machine learning algorithms offers new analytical solutions. Comparative analysis of different prediction methods provides

the opportunity to choose the optimal methodological background for marketing strategies.

Based on an analysis of the scientific literature and on focus group interviews, we formulated basic research aims:

1. Formulating a general picture of consumer behaviour in the Hungarian beer market;
2. Determining how various drinks appear in different drinking situations
3. Determining what influences the different socio-economic factors regarding beer consumer behaviour and product choice;
4. Comparing different methods of consumer-segmentation involving market targets;

Methodology

In the first phase of our research we conducted three focus group interviews with beer consumers. Two interviews took place in Budapest and one in a small Hungarian town. Broadly speaking the participants were middle-class. These interviews illustrated that the “beer consumer” hails from numerous social classes, ranging from a hard-working low-paid street sweeper guzzling cheap beer at the nearest tarven to a yuppy flaunting his/her wealth by drinking trendy beer. The majority of participants emphasized that there are two basic forms of beer drinking situations. First of all, beer for relaxation purposes, meaning in a family setting. Then there is beer for different social occasions. The majority of respondents were satisfied with the selection offered, but felt that the atmosphere surrounding *beer culture* was less than ideal (e.g. restaurant don’t put a lot of emphasis on beer) Well-traveled, better educated people were generally less satisfied with beer culture.

Characteristics of the sample

From the interviews it was evident that the most important consumer segments are the younger generation, which is why we placed special emphasis on researching this group. A *snowball technique* was partly used to gather the questionnaire results, and they were also partly collected through the Internet. Participants were encouraged to answer by a small gift offered by a brewing company. As a result, more than 2,000 questionnaires were completed. To our knowledge, this was the largest Hungarian beer consumption survey ever. From analysing the basic socio-demographical characteristics of the sample (Table 2) and comparing them with national trends, it was clear that in our sample younger people were over-represented.

Therefore, the sample can’t be considered as representative, but is viable as an analysis of younger consumers who are the most susceptible to beer industry innovations. In the sample younger and especially better educated respondents were over-represented, but in this way we were able to collect more reliable information on the attitudes and opinions of younger consumers. If we apply Lazarsfeld’s classic “two steps flow of communication” model (1948), the better educated respondents provide the opportunity to study the attitudes of potential opinion leaders.

Table 2

**Basic socio-economic indicators of respondents, compared
the national-wide demographic indicators**

Indicator	Nation-wide value		Sample	
Gender	Male	44%	Male	52%
	Female	6%	Female	48%
Age	18-25	23%	18-25	64%
	26-35	39%	26-35	17%
	36-65	19%	36-65	15%
	> 65	30%	> 65	4%
Place of living	Budapest	17%	Budapest	28%
	Centre of county	29%	Centre of county	17%
	Other town	16%	Other town	35%
	Village	38%	Village	18%
Highest level of qualification	Primary school or lower	21%	Primary school or lower	6%
	Accomplished high school	60%	Accomplished high school	71%
	College, university	19%	College, university	23%
Social status	Single	19%	Single	41%
	Couple without children	33%	Couple without children	30%
	Couple with children	27%	Couple with children	22%
	Single parent with child(ren)	21%	Single parent with child(ren)	7%

Source: Hungarian Central Statistical Office (2005a, b); own data collection

Mathematical models

In socio-economic analysis, the application of a binary logistic model is rather well known and widely applied (Fertő and Szabó, 2004). In using a binary logistic regression model, a set of regression coefficients is estimated that predict the probability of the outcome of interest. The logistic model can be written as

$$p_j = \frac{\exp(\beta_j x)}{\sum_{j=1}^n \exp(\beta_j x)}$$

β_{k+1} can be set to zero as a normalisation, and thus

$$p_{k+1} = \frac{1}{\sum_j \exp(\beta_j x)}$$

As a result, the j logit has the form

$$\log \frac{p_j}{p_{k+1}} = \beta_j x$$

for $j = 1, \dots, k$

The logit is the log of the odds that an event occurs. (The odds are a ratio between the probability that an event occurs, and the probability that an event won't occur). The coefficients in the logistic regression model tell us how much the logit varies based on predictor variables' value. If we have more than two events (more than two categories) we can extend the binary logistic regression model. If the measurement level for dependent variables is nominal, we have to use multinomial logistic regression analysis.

In target marketing it is essential to group consumers. In order to classify consumers a decision tree algorithm is applied. Building a decision tree model commences with a root node. The data is partitioned to the children nodes using a splitting rule (Srivastava et al., 1999). A splitting rule is composed of the following form: If $A > c$ then s belongs to L , otherwise to R . Here A is a selected variable, c is a constant, s is the data sample and L and R are the left and right branches of the node. In this example splitting is done by using one variable and a node has two branches and thus two children. A node can also have more branches and the splitting can be done based on several variables (Chae et al., 2001).

For each node the optimal splitting is sought based on "purity" function, calculated from the data. The data are considered pure when they contain the samples from only one class. The most frequently used purity functions are entropy or other formulae, expressing data dispersion (e.g. Gini-coefficient). The data for each children node are again partitioned to maximise the purity function. The tree-building is an iterative process: the tree is continually constructed until the data purity in each node reaches the predefined level, or until leaf nodes contain a predefined minimum number of data samples. Each leaf node is then labelled with a class. Usually the node class is determined through a majority rule: a node is labelled according to the class to which the majority of the training data belong.

The QUEST algorithm constitutes a part of SPSS 14.0 software and was designed to handle categorical variables. A QUEST tree is a decision tree that is constructed by splitting space subsets into two or more child (nodes) separately, beginning with the entire data set. To determine the best split at any node, any acceptable pair of predictor variable categories is merged until there is no statistically significant difference within the pair regarding the target variable. This QUEST method naturally deals with interactions between the independent variables directly available for examining the tree.

To predict non-alcoholic beer consumption four predictor variables were selected: gender, age, per capita monthly revenue and a respondent's place of residence.

Results

Some basic features of beer consumption

Sixty percent of beer consumers drank beer at least once a week. Only 16% of consumers declared that they drank beer only on special occasions. The age for becoming a regular beer drinker (consuming beer at least once in a month) was between 16-25 years. The most prestigious brands were those developed in Western European states: Amstel, Tuborg, Steffl... The wide choice of products and keen competition were reflected by the fact that during recent years the majority of regular consumers (57%) tried more than 5 brands with 26% trying more than ten different products, indicating that consumer brand loyalty was rather low (Table 3). These facts showed that beer consumption was an integral part of con-

sumers' everyday consumption, and that there is strong competition between different producers. This is due to multinational companies' trying to increase their market share through aggressive advertising campaigns. Another possible explanation for the relative low level of brand loyalty is because there are only minimal (if any) differences between the brands when it comes to sensory characteristics.

Table 3

Some indicators of brand-loyalty in case of Hungarian beer-consumers (%)

If in my shops I do not find my favourite beer	I would not do it, definitely	I would rather not do it	It depends, whether I would do it or not	Probably I would do it	I would not do it, definitely
... I would search in another shops	35.6	31.8	23.5	7.3	1.7
... I would buy another beer brand of the same producer	7.4	24.2	40.1	25.9	2.4
... I would tell it to the shop manager	52.0	21.7	10.7	11.4	4.1
... If the price of my favourite beer have been augmented by 30 %, I would buy the same	7.7	26.6	30.1	26.9	8.7

Source: own survey

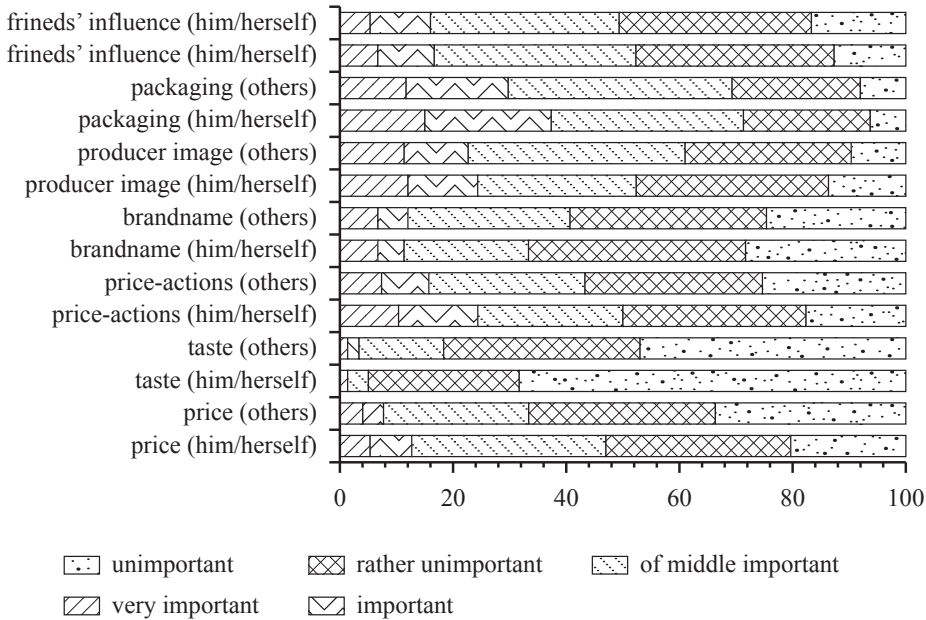
In the pertinent marketing literature it is suggested (e.g. Totth, 1996; Domán & Tamusné, 2006) that people's opinions are often skewed because respondents' assume a given role. This is why we utilised two questions to emphasise factors influencing a consumer's choice of beer. One of the questions dealt with the perceived effect of various factors regarding a given consumer, and another dealt with estimating various factors regarding respondents' opinions..

After analysing the responses (Figure 1) it became clear that there were only slight differences between the results obtained from the above two questions. The most important factors were taste of a given product, price, and brandname. It is noteworthy that although word-of-mouth impact had been considered as a significant factor, we assumed that its impact would be underestimated. However, it is clear from the results that the quality of a particular beer is an everyday topic of conversation. If one accepts that drinking beer is a "trendy" thing to do, then in the future beer will be an important alcoholic drink.

It was also surprising that the respondents clearly stated that packaging and the manufacturer's image were important to them when it comes to choosing a product. This runs contrary to the idea of product taste as a significant factor, and shows the importance of a beer company's *image*. Even though beer companies are working hard on their image, they continue to lack a definite image strategy.

Figure 1

Effect of different factors regarding a respondent's choice of beer and how respondent's opinion affects other consumers



The importance of price and discount sales are further evidence proving consumers are hardly demanding when it comes to the taste of beer. At retail outlets beer is often placed close to cash register and this underlines the extent of impulse buying in beer consumption.

Analysing the results definitely shows that the theoretical model for positioning the different types of drinks are widely supported by primer results. In this high tech era of computerized jobs alcoholic drinks are no longer used to quench one's thirst. Beer is used for after work relaxation and for various informal (casual) social or family occasions. Beer advertising tends to emphasise family occasions rather than simple social occasions.

Choosing what and when to drink

One's choice of drinks greatly depends on the situation. Figure 2 indicates that in everyday consumption the most popular drinks are mineral water and soft drinks, and only occasionally beer. Wine is increasingly limited to celebrations and other specific occasions. Using the survey results, a conceptual model for different drinks has been set up (Figure 3).

Multinomial logistic regression were used to analyse choice of drinks in relation to the drinker's socio-economic status.

In various cases some drinks accounted for a relatively low share and for this reason there were too many empty cells in the questionnaire to obtain a reliable result. In order to avoid this computational problem drinks with less than a ten percent share were deleted. After deletion there remained only two or three drink types, from which we determined the influence of socio-economic factors in relation to the respondents.

Figure 2

How often different drinks are consumed during various social occasions.

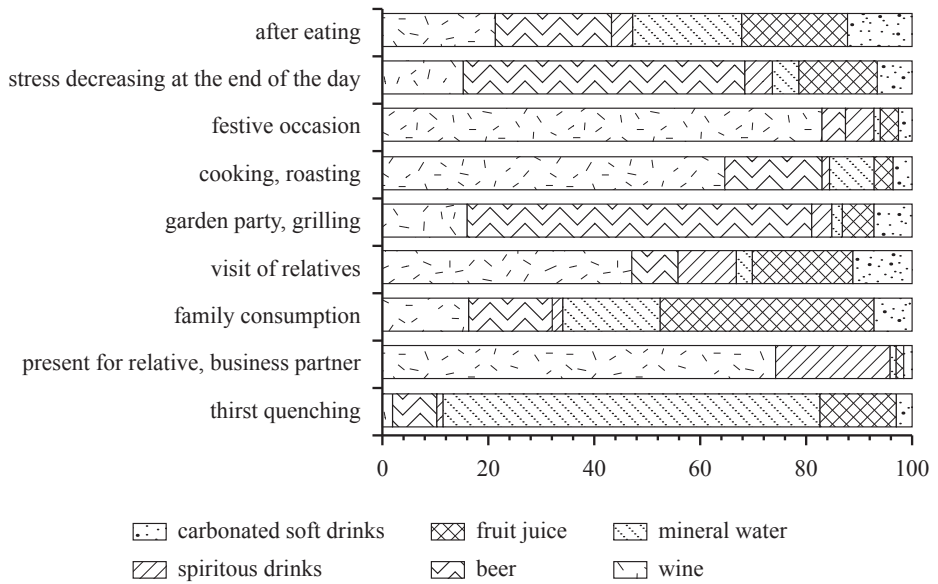
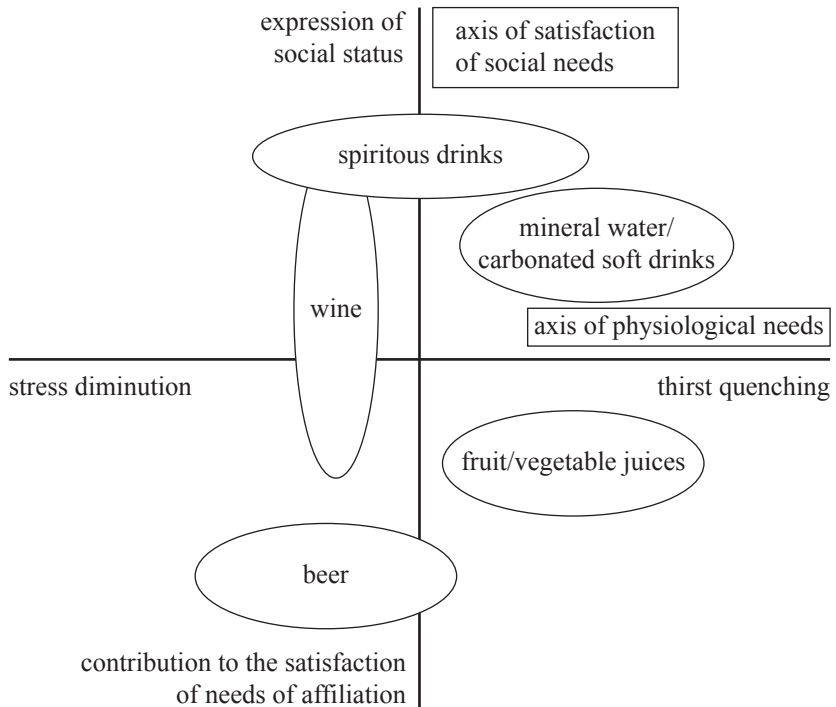


Figure 3

Conceptual framework for satisfaction toward different social needs in relations to different beverage types



In Table 4 some of the results are summarized.

Table 4

Results of loglinear analysis on how socio-economic factors influence the selection of different drinks in different occasions

Preferred beverage after free-time main eating

Reference category: Beer	Wine	Mineral water	Fruit juice	Carbonated soft drink
Gender: men (reference category: women)		0.458	0.347	0.444
Place of living: Budapest (reference category: other town or village)	0.324		1.578	0.548
Income level: (reference category: low)				
Middle	0.754		0.421	
High	0.873			
Highest qualification level (reference category: at the most high school diploma)				
Unaccomplished college, university	0.423	1.570		
BSc or higher	0.758	2.010	1.345	
Nagelkelke's R square	0.345	0.288	0.357	0.377

Preferred beverage for family consumption

Reference category: Beer	Wine	Mineral water	Fruit juice	Carbonated soft drink
Gender: men (reference category: women)	1.345	0.458	0.477	0.254
Place of living: Budapest (reference category: other town or village)	0.557		1.322	0.987
Income level: (reference category: low)				
Middle		1,544.000	1.484	1.541
High		1.387	2.004	
Presence of young people or children (below 18 years) in family (reference category: absence of minors)		3.458		
Highest qualification level (reference category: at the most high school diploma)				
Unaccomplished college, university	1.252	1.570		
BSc or higher	1.255	2.010		
Nagelkelke's R square	0.325	0.245	0.411	0.274

Preferred beverage for garden(grill) party

Reference category: Beer	Wine	Mineral water	Fruit juice	Carbonated soft drink
Gender: men (reference category: women)		0.658	0.254	0.241
Place of living: Budapest (reference category: other town or village)	0.388		0.654	
Income level: (reference category: low)				
Middle	1.478		1.254	1.541
High	2.365	1.114	2.045	
Presence of young people or children (below 18 years) in family (reference category: absence of minors)		2.324	3.458	2.487
Highest qualification level (reference category: at the most high school diploma)				
Unaccomplished college, university	1.669			1.441
BSc or higher	2.245	1.981	1.421	
Nagelkerke's R square	0.147	0.250	0.423	0.142

The results indicate that mainly poor elderly rural drinkers look on beer as a thirst quenching beverage. This can be explained by the greater role technology has in upper class society. Families with small children prefer mineral water or fruit juices even for garden barbecues.

As a rule beer is preferred as an end-of-the-day beverage mainly by wealthier young consumers. Without doubt beer is foremost a drink for social occasions and parties.

Our research supports Kidorf et al's. (1990) results contending that alcohol increases social assertiveness.

Niche marketing opportunities in the beer sector

During recent years greater product development has been devoted to promoting non-alcoholic beer, and there is a good explanation for this. Not only is non-alcoholic beer competitively priced compared to other beers, but producers are not required to pay a post-production tax, thus making it a lucrative product.

For this reason producers need to determine exactly who drinks non-alcoholic beer. Analysis has confirmed that about a quarter of consumers can be considered regular non-alcoholic beer drinkers, but it is necessary to precisely identify who these consumers are. The traditional predictive method for group membership with categorical predictor variables is binary logistic regression analysis.

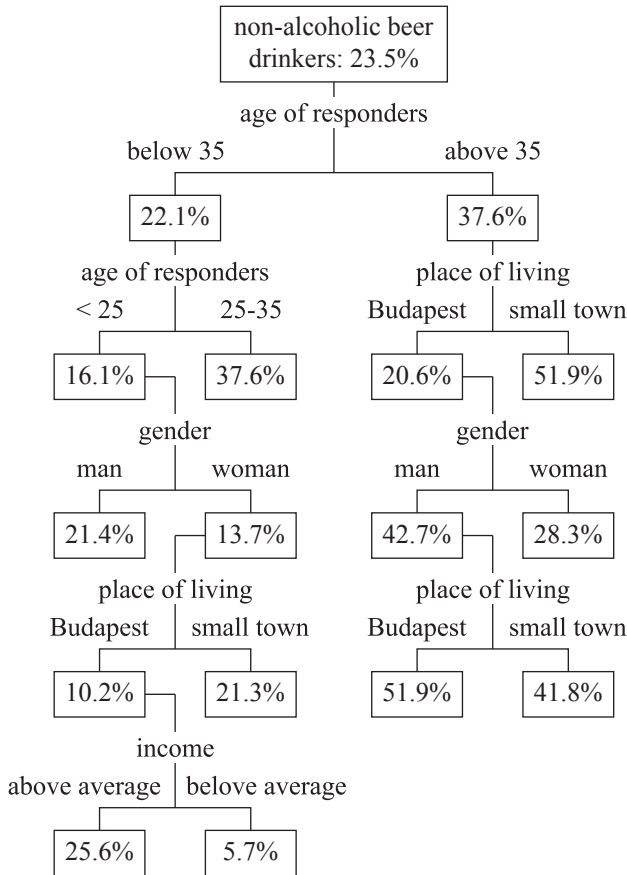
We applied this method to predict the consumption of non-alcoholic beers, and utilized the same predictors as for determining the impact socio-economic factors' have on a consumer's situational beverage choice. However, after applying this method we were forced to conclude that the binary logistic regression's performance was poor. After trying to determine the regression equation using the Conditional Forward algorithm we also concluded that the method was unsatisfactory. The Cox and Snell R square value was 0.066, the Nagelkerke's R square 0.098.

The alternative method used was the Quest Tree algorithm of SPSS for Windows 14.0. Validation for the model was based on cross-validation technique. In building the decision tree this method uses all the data. The risk estimate is computed by partitioning the data into k separate subsets. After k decision trees are constructed using the same growing criteria as the tree under evaluation. The first tree uses all folds except for the first one, and the second tree again uses all the folds except the second one and so on. This continues until each fold has been excluded once. For each of these trees, a risk estimate is computed, and the cross-validated risk estimate is the average of these k risk estimates for the k trees, weighted by the number of cases in each fold. In our case the k number was equal to 10.

After analysing the tree structure (Figure 4) there is no doubt that the most important segments are consumers, who live in small towns. Among younger people a typical non-alcoholic beer consumer is a man between 26 and 35 who lives in Budapest or in a larger town.

Figure 4

Determination of non-alcoholic beer consumer groups using the data mining technique



Some practical implications for beer producers

Our research results confirmed our expectations, meaning better educated people consume new kinds of beverages more often than less educated people who tend toward traditional beverages.

Beer marketing mainly targets younger people. However, in certain circumstances the beer companies don't transgress by targeting those under drinking age. An example of this is the Dreher beer factory museum where minors are not allowed to visit. In our view this is absurd as younger generations need to socially adapt to the reality of alcohol.

The beer industry is highly competitive. For this reason *authentic* product innovation, especially concerning new types of beer, greatly matters. When it comes to innovation, we stress the word *authentic* because in some cases the same beers are marketed under different names.

The results of our research support the marketing strategy of beer producers, which market beer as the drink for social occasions, e.g. parties. Our results support Holroyd's (1978). At an experimental „party” participants who were timid and prone to rejection drank less beer and had lower blood alcohol concentrations than outgoing participants who were socially accepted.

Targeted marketing would benefit from a wide-ranging application of the most recent data mining methods. The industry would also benefit by emphasizing the positive health effects of beer drinking.

In Hungary small-scale producers do not adequately market their products. This should be rectified.

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