Anticipation of Market Opportunities

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Abstract
The effective use of market information is recognized as an important factor in determining success or failure of new products and as problematic area for firms (Ottum and Moore, 1997). It presents a crucial problem in countries in transition where market information on perceived quality of products did not play a pivotal role in decision-making in the past because demand exceeded supply. Two approaches which can promote the effective use of market information are described in the paper. The first one is based on objective data about the products applied in the Shocker-Srinivasan model. The second one is based on subjective data applied to predict the future behaviour of consumers. Both approaches are presented on the case of revealing the important attributes influencing the future purchasing behaviour of Slovenian consumers.
Keywords: Perceived quality, Shocker-Srinivasan model, Conjoint analysis, Externalist anticipation, Market oportunities

1 Introduction

Quality is rapidly becoming a major factor in a customer's choice of products and services. From this perspective, product quality is determined by what consumers want and are willing to pay for. The customer has a good feeling about the quality of a product when it surpasses their expectations. Let us take a set of similar competing products on a target market and denote it by S. Then for the jth product belonging to this set, the feeling about the quality is defined by the ratio:

$$\frac{Q_{pj}}{Q_{eS}} \tag{1}$$

where means:
Q_{pj} - the quality of the jth product perceived by customer;
Q_{eS} - the customer's expectations about a quality of products from the set S.

The company's aim is to design and manufacture products with the value of ratio defined by (1) greater than one. The quality perceived by the customer depends on their needs, requirements, and motives. Therefore, by purchasing a product the customer buys a set of attributes which directly or indirectly fulfil their needs and requirements. Considering all that, the customer's perceived quality of the jth product is defined by:

$$Q_{pj} = \sum_{p=1}^{m} w_p V_{pj} \qquad j \in S \tag{2}$$

where means:

Q_{pj} - the quality of the jth product perceived by customer;
w_p - the importance the customer assigns to the pth attribute;
V_{pj} - the value of the pth attribute possessed by the jth product.

The customer's expectations about the quality of products from the set S are defined by:

$$Q_{eS} = \sum_{p=1}^{m} w_p V_{ep} \tag{3}$$

where means:

Q_{eS} - the customer's expectations about a quality of products from the set S;
w_p - the importance the customer assigns to the pth attribute;
V_{ep} - the customer's expectations about the value of the pth attribute.

The main problem associated with the perceived quality defined by eq. 2 is to find the values of w_p for existing as well as for the new attributes. They can be obtained by asking potential customers about their attitudes or indirectly by analyzing the past customers' purchasing decisions. Conjoint analysis can be used for assessing a customer's attitudes particularly for new attributes, or improved values of existing attributes. The analysis of past purchasing decisions enables the decision-maker to consider the objective data in revealing the opportunities for improving a quality of the existing products or for designing new ones. This analysis can be done by the Shocker-Srinivasan model or by regression analysis.

2 Analysis of Purchasing Decisions of Slovenian Consumers

In order to find the most important factors determining the purchasing decisions on the Slovenian market, 43 different cookers manufactured in Slovenia, Italy and Germany were included in this empirical study. Technological progress built into cookers has enhanced the number of attributes as well as the number of intervals or levels within each attribute. Because the data for market shares were available for cookers, built-in oven and built-in hob, we decided to split the cookers competing on the Slovenian market into three groups:

- cooker;
- built-in oven;
- built-in hob.

The crucial task in creating the model is the selection of attributes to be considered in the model. In our case, both extrinsic and intrinsic attributes which directly meet the consumers' needs and expectations were included in the model. It was assumed that the consumers' knowledge about a quality of the cookers influence their expectations, too.

The importance of the following attributes associated with the quality of an oven was investigated:
- 11 different functional attributes;
- the number of colours the oven is available in;
- the aesthetic appearance;
- price;
- the image of producer.

The attributes associated with the quality of hob taken into account in the model are as follows:
- 13 different functional attributes;
- the number of colours the hob is available in;
- the aesthetic appearance of the hob;
- price;
- the image of producer;

The values of chosen attributes were determined by using information on technical and other characteristics of cookers available in brochures and catalogs. For the cooker with the highest market share in the first group, the values of chosen attributes are presented in Table 1.

Table 1: the values of attributes for the first ranked cooker

Attribute	Value
Electric oven	Yes
Conventional heating in oven	Yes
Conventional door on oven	Yes
Average accessories	3 pieces
Consumption of energy	1.05 kWh
Available in two colours	Yes
Average aesth. appearance	Yes
Normal hotplates	2 pieces
2 gas burners	Yes
Enamel on hob	Yes
Price in 1,000 SIT	49.84
Producer 1	Yes
Market share	17.159

The value of the cooker's aesthetic appearance is based on subjective estimates while the values of other attributes are objective data. The cooker's functional attributes, such as the energy source for its operating, the material the cooker is made from (it

determines the possibility for recycling) and the energy consumption influence a quality of the environment. The importance of the environmental attributes in perceiving quality shows how the consumers protect the environment while consuming products.

It was assumed that the importance of the pth attribute is not the same for the different values this attribute can take. For this reason, the Shocker-Srinivasan model was applied to define the importance of the attributes and their values.

3 Shocker-Srinivasan Model

The Shocker-Srinivasan model is based on a principle similar to hedonic pricing. It assumes that two identical products have the same market share. If one product differs from the other only in the value of one attribute, say p, then the difference in their market shares is the consequence of different values of the pth attribute. This difference is taken as the contribution of a better value of the pth attribute to the market share. The other assumptions applied in creating this model are: the consumer did buy the product with the highest value of the ratio defined by eq. 1 and the supply of this product is large enough to meet demand. The results of the study made by Griffin and Page (1996) also support our decision to take the product's market share as a measure of its market success or failure achieved by the quality perceived on a target market. Taking into account all that, eq. 2 can be reformulated, as follows:

$$\sum_{p=1}^{m} w_{pi}V_{pj} = U_j \qquad for\ V_{pj} \in \left[v_{pi}, v_{p,i+1}\right), \quad j = 1,...,n \tag{4}$$

where means:
w_{pi} - variable expressing the importance consumers assign to the pth attribute's values belonging to the ith interval;
V_{pj} - the value of the pth attribute possessing by the jth product;
U_j - the market share of the jth product predicted by the model;
v_{pi} - the lower limit of the ith interval for the pth attribute;
$v_{p,i+1}$ - the upper limit of the ith interval for the pth attribute;
m - number of attributes;
n - number of products.

The products included in the study are ranked in accordance with their market shares achieved on the Slovenian market. The product with the highest market share has the rank one and the product with the smallest one has rank n. Our task is to find the values of variables w_{pi}, so that the difference between the actual market share of the jth product denoted by M_j, and the predicted one by the model, denoted by U_j, will be minimal for $j=1,...,n$. The Shocker-Srinivasan model was chosen as the most appropriate one because it enables us to assign different weights to different values the pth attribute can take (1979). The Shocker-Srinivasan model is a linear model of the following form:

$$Minimize \; \sum_{j=1}^{n-1}\left(Z_j^+ + Z_j^-\right) \qquad (5)$$

subject to

$$U_j - U_{j+1} + Z_j^+ - Z_j^- = M_j - M_{j+1} \qquad j = 1,...,n\text{-}1 \qquad (6)$$

$$w_{p,i+1} - w_{pi} \geq 0 \qquad i = 1,...,I_{p\text{-}1} \qquad (7)$$

$$w_{p,i+1} - w_{pi} \leq 0 \qquad i = 1,...,I_{p\text{-}1} \qquad (8)$$

$$\sum_{j=1}^{n}\sum_{p=1}^{m} w_{pi}V_{pj} = 1 \qquad (9)$$

Variables U_j are defined by eq. 4. Variable Z_j^+ is positive if $M_j\text{-}M_{j+1}>U_j\text{-}U_{j+1}$, and zero otherwise, while variable Z_j^- has a positive value if $M_j\text{-}M_{j+1}<U_j\text{-}U_{j+1}$, and zero otherwise. The weights w_{pi} are assumed to be step functions of the values the pth attribute can take. The range of all values the pth attribute can take is split into I_p non-overlapping and exhaustive small intervals. Non-decreasing step function is defined by eq. 7 and applied for those attributes for which it is known that the importance assigned to their values does not decrease by increasing their values. Non-increasing step function is defined by eq. 8. Eq. 9 assures that logically consistent weights are obtained.

In the optimal solution of the model (5)-(9) for the data for the first group of cookers, the variables Z_j^+ and Z_j^- did not have small values, which meant that large differences between the predicted market shares and the actual ones did exist. The analysis of these differences helped us in the decision to split the first group into three segments. The cookers with low prices and a small level of technical progress built in their functional characteristics were assigned to the first segment (8 products), 7 products were assigned to the second segment and 5 products with a higher level of technical progress and, therefore, with higher prices were assigned to the third segment of this group (Bastic, 1995).

34 variables w_{pi} were allocated to the values of chosen attributes. As regards the attribute price, for example, the range of values which this attribute can take in the first group is split into five intervals. Considering that index 5 is allocated to attribute price, then variable w_{5i} is assigned to the ith interval, $i=01,...,05$. The intervals and the optimal values of these variables are presented in Table 2. The variable w_{501}, for example, expresses the importance of prices from the interval $[SIT\; 45{,}000 - 50{,}000)$ on perceived quality and consequently on achieving the market share of cookers assigned to the first segment on the Slovenian market.

Considering eq. 4, the contribution of the value V_{pj} to the market share of the jth cooker is equal to:

$$u_{pj} = w_{pi}^* V_{pj} \qquad for \; V_{pj} \in \left[v_{pi}, v_{p,i+1}\right) \qquad (10)$$

where w^*_{pi} denotes the optimal value of variable w_{pi}.

Table 2: the importance of the attribute price

Price in SIT 1,000	Variable	Optimal value
45 – 50	w_{501}	0.241335
50 – 55	w_{502}	0.108019
55 – 60	w_{503}	0.008855
60 – 70	w_{504}	0.008855
70 – 80	w_{505}	0.001561

For the first ranked cooker, the contributions of attributes to its market share defined by eq. 10, are presented in Table 3. They show that price has a major impact on the market share of cookers assigned to the first segment.

For all three segments of the first group, the values of contributions expressed in per cents for aggregated attributes are presented in Table 4. The functional characteristics of hob include the following attributes: the number of normal and fast hotplates, the number of gas burners, material the hob is made from and electric ignition of gas. The functional characteristics of the oven consist of the attributes: electric or gas oven, the type of oven heating, signal clock and accessories.

Table 3: contributions to the market share of the first ranked cooker

Attribute	Value	Importance	Contribution to market share
Electric oven	1	0.0919	0.0919
Conventional heating in oven	1	0.0919	0.0919
Conventional door on oven	1	0.0919	0.0919
Average accessories	3	0.6436	1.9308
Consumption of energy	1.05	1.3113	1.3769
Available in two colours	1	0.2866	0.2866
Average aesth. appearance	1	0.0973	0.0973
Normal hotplates	2	0.1326	0.2652
2 gas burners	1	0.1695	0.1695
Enamel on hob	1	0.1561	0.1561
Price	49.84	0.241335	12.0281
Producer 1	1	0.5720	0.5720
Market share			17.158

Table 4: the impact of aggregated attributes on purchasing decisions

Attributes of cooker	S1	S2	S3
Price	66.4	13.6	2.0
Functional character. of hob	5.5	3.1	16.5
Functional character. of oven	2.6	47.9	11.5
Consumption of energy	5.4	12.3	0.6
Image of producers	10.4	7.9	30.8

The results show that two extrinsic attributes had a strong impact on the purchasing behaviour, i.e. price and image of producer. Considering information that the highest total market share belonged to the types of cookers assigned to the segment S1, we can conclude that the large part of buyers in Slovenia decided to purchase a not too expensive cooker. The research showed that SIT 50,000 was the maximum price that this large group of buyers were willing to pay. Surprisingly, the number of accessories had an important impact on the purchasing behaviour. The low energy consumption had also an important impact on market share. We believe that this is more a consequence of the fact that low energy consumption was associated with types of cookers with low price rather than a conscious evaluation of this attribute by Slovenian buyers.

Considering the preferences of Slovenian consumers, the further researches of perceived quality can be focused on two groups of cookers. The major characteristics of cookers assigned to the first group are low price, high degree of standardization and small differences in aesthetic appearance. Higher level of technological progress and higher prices are the main characteristics of cookers assigned to the second group. Among attributes, the price, the producer image and the combination of gas burners and electric plates had the most important impact on Slovenian consumers during purchasing decision-making.

Taking into account the results obtained by the Shocker-Srinivasan model, our further research objectives were:

- to check some results obtained by this model,
- to test the consumers' response on environmentally responsible attributes,
- to test the consumers' response on new attributes.

The information on contributions of attributes' values obtained by the Shocker-Srinivasan model helped us to reduce both the number of attributes and their levels included in conjoint analysis (Lilien and Rangaswamy, 1998, Green and Srinivasan, 1978, Johnson, 1974). According to the preferences of Slovenian consumers, the attributes can be split into two groups. In the group *A* there were the attributes preferred by consumers who put high priority on low price. More sophisticated attributes were assigned to the group *B*. The levels for each of chosen attributes in the group *A* and *B* are presented in Tables 5 and 6.

Table 5: attributes and their levels in group *A*

Attribute	Level
Accessories	1. Two baking trays 2. Two baking trays and a cake tin
Hob	1. Hotplates only 2. Hotplates and gas burners
Image of producer	1. Producer 1 2. Producer 3 3. Producer 4

Table 6: attributes and their levels in group *B*

Attribute	Level
Hob	1. Hotplates and gas burners 2. Glassceramic hob
Oven	1. Multifunctional oven 2. Multifunctional oven with steam; it enables healthy preparing of food
Ecoenamel	1. No 2. Yes; it enables the reduction of the energy consumption and easier way of cleaning and recycling.
Image of producer	1. Producer 1 2. Producer 2

Our decision to analyse the attributes of the group *A* with conjoint analysis was based on our wish to check some unexpected results obtained by the Shocker-Srinivasan model. Taking into account the results obtained for Slovenian consumers who give priority to low price, it can be hypothesized that:

H1: Additional accessory is perceived as higher quality in spite of consequently higher price.

H2: Slovenian consumers prefer combination of hotplates and gas burners to hotplates only.

H3: The quality of cookers manufactured by the producer 1 is perceived as higher than the quality of other producers.

It was expected that the attributes of group *B* will be chosen by the consumers – innovators, who give the priority to sophisticated attributes over a low price. Their opinion and reaction on new product could have an important impact on the product's market success. The total number of stimuli (cookers) resulting from all possible combinations of the attributes' levels of the group *A* was 12 ($2^2 * 3$). They are presented in Table 7.

Table 7: cookers designed with attributes of the group *A*

Accessories	Hob	Image of producer	Price in SIT
2 baking trays	Hotplates only	1	41,997
2 baking trays	Hotplates only	3	41,997
2 baking trays	Hotplates only	4	41,997
2 baking trays and tin	Hotplates only	1	42,497
2 baking trays and tin	Hotplates only	3	42,497
2 baking trays and tin	Hotplates only	4	42,497
2 baking trays	Hotplates and gas burners	1	47,997
2 baking trays	Hotplates and gas burners	3	47,997
2 baking trays	Hotplates and gas burners	4	47,997
2 baking trays and tin	Hotplates and gas burners	1	48,497
2 baking trays and tin	Hotplates and gas burners	3	48,497
2 baking trays and tin	Hotplates and gas burners	4	48,497

The price of each coocker was equal to the minimum price at which a producer was able to manufacture it with a target profit. It was included in stimuli in order to give consumers all relevant information needed in estimating their quality. 16 stimuli were designed with attributes and their levels assigned to the group *B*. The multifunctional oven with steam is a new attribute, ecoenamel can be defined as an environmentally responsible attribute. It was expected that the consumers who preferred the sophisticated attributes over price, would perceive new attribute and ecoenamel as the factors of better quality. It can be, therefore, hypothesized that:

H4: The multifunctional oven with steam is perceived as the factor of better quality.

H5: The consumers who prefer the sophisticated attributes perceive the environmentally responsible attributes as the important ones.

Conjoint analysis was applied to test hypotheses 1 to 5. The procedure applied in this study was:

Data collection method:	Full profile
Stimulus set construction:	Full factorial design
Stimulus presentation:	Verbal description of all attributes' levels and presentation of products in the table
Measurement scale:	Rank order
Estimation method:	TRANSREG included in the SAS/STAT software package

The students collected data. The respondents were their parents and the part-time students. 135 questionnaires were given to the students out of which 99 were returned (return-rate of 73 %). Each respondent obtained the stimuli created with the attributes of the group *A* and the stimuli with the attributes of the group *B*. Each set of stimuli was followed by a description of the attributes and their levels. The new attribute and the environmentally responsible attribute were described in detail.

The first respondent's task was to decide which group of cookers (*A* or *B*) fits better their preferences. To illustrate, the respondent's decision to choose cookers with the attributes of the group *A* shows that the low price is their most important attribute in perceiving quality of cookers in making purchasing decisions.

50 respondents chose the cookers with the attributes of the group *A* and the other group of cookers was chosen by 47 respondents. Only 2 respondents could not decide between attributes of the group *A* and *B*. As a result, they assessed the quality of cookers in the group *A* and *B*.

Table 8: the attributes of group *A* – their relative importance and the utilities of their levels

Attribute	Importance	Level	Average Utility	Significance
Accessories	20.7	2 baking trays	-0.673	Significantly different
		2 baking trays and cake tin	0.673	
Hob	54.7	Hotplates only	-2.590	Significantly different
		Hotplates and gas burners	2.590	
Image of producer	24.6	Producer 1	1.087	Significantly different
		Producer 3	0.038	
		Producer 4	-1.125	

The results obtained by conjoint analysis for cookers with attributes of the group *A* are presented in Table 8. The highest relative importance belongs to hob. The average utilities of the individual attributes' levels were used to test hypotheses 1 to 3. The positive utility belonging to the attribute level '2 baking trays and a cake tin' supports H1. It means that small costs are needed to improve the perceived quality of cookers assigned to the group *A*. Unfortunatelly, it is not difficult for competitors to imitate such a quality by adding this attribute's level to their products. Hypotheses 2 and 3 are well supported by the positive value of utilities belonging to the attribute level 'hotplates and gas burners' and 'image of producer 1'.

Table 9: the attributes of group *B* – their relative importance and the utilities of their levels

Attribute	Importance	Level	Average Utility	Significance
Oven	24.7	Multifunctional oven	-1.068	Significantly different
		Multifunctional oven with steam	1.068	
Hob	44.0	Hotplates and gas burners	-0.515	Not significantly different
		Glass ceramic hob	0.515	
Ecoenamel	20.6	YES	1.177	Significantly different
		NO	-1.177	
Image of producer	10.8	Producer 1	0.486	Not significantly different
		Producer 2	-0.486	

In Table 9, the relative importance and the average utilities of the levels for the attributes of the group B are presented. The hob is also the most important attribute for the group of respondents who preferred the attributes of the group B. Average utilities for 'multifunctional oven with steam' and 'ecoenamel' were applied to test Hypotheses 4 and 5, respectively. Both utilities are positive and significantly different from another level these attributes can take. Hence, H4 and H5 are also supported. This information and experience of some companies should encourage more companies to design and manufacture environmentally responsible products and contribute to the protection of the environment during the consumption of products.

Considering that any human action at each current time takes into account the past events, the current situation in the environment, and the future anticipated events (Dubois, 1998), the respondents were additionally asked to choose the appropriate group of attributes and make decision on rank order of cookers according to their preferences in the case of a 10 % increase of their income in the near future. This analysis based on the externalist anticipation enables us to predict a future consumers' behaviour by taking into account our finding that the price of the product and consequently the consumers' incomes have and will have an important impact on their purchasing behaviour. 53.8 % of respondents who chose the attributes of the group A would prefer the attributes of the group B in the case of the 10 % increase of their income. This information shows that family income plays an important role in consumers' preferences and it is probably one of the factors determining the importance of price in perceiving the quality of cookers. Because there is a great chance of increasing the family incomes in Slovenia the sale of cookers with the attributes of group B will probably increase.

In Table 10, the relative importance and the average utilities of the levels for the attributes of the group B under assumption of the 10 % increase of the respondents' incomes are presented. The results show changes in values of the attributes' importances, but they do not change the rank order of the attributes' importances.

Table 10: the attributes of group B – their relative importance and the utilities of their levels at the 10 % increase of incomes

Attribute	Impor-tance	Level	Average Utility	Significance
Oven	23.2	Multifunctional oven	-1.140	Significantly
		Multifunctional oven with steam	1.140	different
Hob	46.2	Hotplates and gas burners	-0.905	Significantly
		Glass ceramic hob	0.905	different
Ecoenamel	19.6	YES	1.262	Significantly
		NO	-1.262	different
Image of producer	11.0	Producer 1	0.301	Significantly
		Producer 2	-0.301	different

The probability of the new products' success is estimated by their market shares calculated by maximum utility rule which is appropriate choice rule for high-involvement purchases and durables that customers purchase infrequently (Lilien and Rangaswamy, 1998). For the first three most attractive new products, their attributes' values and market shares are presented in Tables 11 and 12 for both levels of the respondents' incomes.

Table 11: the market shares of cookers with attributes of group *B*

Rank	Oven	Hob	Ecoenamel	Producer	Market share
1	Multifunctional oven with steam	Glass ceramic	Yes	1	0.28571
2	Multifunctional oven with steam	Hotplates and gas burners	Yes	1	0.17347
3	Multifunctional oven with steam	Glass ceramic	Yes	2	0.14286

Table 12: the market shares of cookers with attributes of group *B* at increased incomes

Rank	Oven	Hob	Ecoenamel	Producer	Market share
1	Multifunctional oven with steam	Glass ceramic	Yes	1	0.29747
2	Multifunctional oven with steam	Glass ceramic	Yes	2	0.18987
3	Multifunctional oven with steam	Hotplates and gas burners	Yes	1	0.10601

4 Conclusions

Considering the information that the highest total market share belonged to the types of cookers assigned to the first segment, we can conclude that the large part of buyers decided to purchase a not too expensive cooker. The research showed that SIT 50,000 was the maximum price that this large group of buyers was willing to pay for a cooker. Surprisingly, the number of accessories had an important impact on the purchasing behaviour. This finding was confirmed also by a conjoint analysis made one year later.

The results obtained enable us to conclude that buyers associated the quality of a cooker assigned to the first segment with price, brand name, number of gas burners and hotplates as well as accessories. Because the types of cookers assigned to the first segment were pretty similar in technical features and aesthetic appearance, the attribute

accessories which differ from type to type therefore had an important impact on the buyers' purchasing behaviour.

In literature (Zeithaml, 1988), two reasons for the cases when consumers' purchasing decisions depend on extrinsic attributes more than intrinsic ones are mentioned:

a) the evaluation of intrinsic attributes requires more effort and time than the consumer perceives is worthwhile, and

b) the quality is difficult to evaluate.

The answer to the question as to which type of attributes – intrinsic or extrinsic – is more important would help companies decide whether to invest resources in product improvements (intrinsic attributes) or in marketing (extrinsic attributes) to improve perception of quality.

The results obtained by conjoint analysis provide the producer of cookers with useful information on consumers' response to the new attribute. The significant result is that the group of consumers who prefer more sophisticated cookers will perceive new and environmentally responsible attributes as better quality. It can be expected that these attributes will probably be perceived as differentiator or even exciter. The decision to offer consumers two different groups of attributes enables a decision-maker to test the sensitivity of consumers' preferences on different factors.

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