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MEASURING THE CUSTOMER'S PERCEPTION OF DESIGN CHARACTERISTICS AS INDICATORS FOR ADDED VALUE

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1. Introduction

1.1 Dimensions and importance of different product values

The greater the value of a product for the customer, the more likely s/he will decide to buy that product. The value of a product is here defined as the "degree to which the customer's needs are fulfilled by using the product". According to the variety of existing needs, there exist different kinds of values. On one hand, there is the practical value (e.g. the original functionality of the product); on the other hand, there is the added value which can be divided into two sub-values: Prestige gains and individual pleasure [Vershofen 1940, Mason 1992].

Products with prestige value can be used to demonstrate the customer's own social status to others, and to gain acceptance and a better reputation by certain others [Vigneron 1999, Berry 1994]. In contrast, individual pleasure is a very personal value, independent of the opinion of other people. The value of individual pleasure indicates how much the customer likes a product because it goes with his internal concepts and own preferences.

Our studies have demonstrated that the value of individual pleasure influences buying decisions much more than the prestige value, because that kind of product value has to do with personal pleasure [Oberender 2003]. For example, a customer will not buy a car if he does not like the design or other attributes of the car, even if it is affordably priced and has convincing technical data.

Thus, products do not only have a practical function, but also informational and "enjoyment" functions. In order to successfully launch a product on the market, it has to contain not only practical value, but also one or more of those added values [McCarthy 1987]. This factor is as relevant for marketing departments as for product developers because they decide what type of attributes a new product will have. A product that does not meet the customer's expectations – whose value is not apparent to the customer – is difficult to market. The product developer should try to get to know the customer's demands on the product, not only the functional aspects but also the social and individual pleasure aspects.

1.2 Influence of added value on environmental impacts

In connection with the added values there arises another problem: Eye-catching product characteristics which evoke added value cause additional environmental impacts during the production and end-of-life of a product. Initial estimates indicate that relevant adverse effects on the environment are caused particularly in the areas of consumer products and luxury goods. Primarily luxury goods are sold

predominantly due to their added values, often based on their attractive design. When creating environmentally friendly products, relevant aspects of prestige gains or individual pleasure are often neglected. This results in a significant loss of acceptance by the customers. In order to avoid creating the "ecological shelf-warmer", i.e. a product that is environmentally friendly, but not marketable, this is not really an adequate solution.
Another possibility to create more eco-friendly products is the application of substitute materials which cause less environmental impacts without reducing the aspects of prestige and individual pleasure. Regarding design characteristics, it is especially the basic material and the design of the surface which determine the added value, and thereby influence the decision to buy. The optimal external impression is, therefore, one of the most important aspects for product developers. By using substitute materials, e.g. PVD-plated plastic, the effort is made to create more eco-friendly products which nevertheless have high added value.

1.3 Methodical problems in analyzing added values

Besides the questions concerning the added values themselves, there is a methodical problem when analyzing the customer's estimation concerning the added values: It would be very costly and time-consuming to create a realistic research design to analyze the customer's perception of different product alternatives. Especially since there are several product attributes with numerous variants (e.g. colour red or blue, surface coating bright or matt), the number of necessary product samples would be very high. Every interesting product sample would have to be produced before in order to present it to the customer.
Because of the high costs of studies using real product variants, other less costly methods to test product variants would be interesting. One possibility would be to change the way products are presented, for example, by showing pictures and samples of product variants instead of the real products. If it could be shown that the method of product presentation does not influence the results, surveys could be carried out which are less time- and cost-consuming.

2. Objectives

Based on the aspects described above and based on the results of former studies [Oberender 2003], the following questions will be examined:
1. Is there a difference in the realization of prestige value and the value of individual pleasure? To meet the customer's expectations concerning the two kinds of added value design characteristics is especially important: On one hand, design characteristics have an informational function because they inform others about the personality and the status of the owner [Ropohl 1999]. On the other hand, they are product characteristics which are perceived immediately and which remain visible all the time, even when the product is not in use. Therefore, design characteristics strongly influence the customer's estimation of the attractiveness of the product. In the area of consumer goods, customers who go in for prestige or personal pleasure often choose products with especially eye-catching design characteristics [Kröber-Riel 1992]. Due to the similarity of the indicators of both kinds of added value, it might be assumed that it is not necessary to distinguish between them when designing and developing a product. Perhaps it suffices to speak of only one added value without breaking it down into several parts. If this were acceptable, the requirements on product development would be easier to fulfil.
2. In several cases, the environmental impacts of substitute materials (PVD-plated plastics) are lower than those of the original materials, e.g. metals. Therefore, a further undertaking could analyze the acceptance of substitute materials in comparison to the originals. It would be interesting to investigate for which product groups substitutes are accepted by the customer.
3. To reduce the effort and cost of further surveys, a study dealing with the customer's perception of product attributes will examine if and how product presentation effects that perception. Several forms of presentation are compared to find out if there are acceptable alternatives to the presentation of real product variants.

3. Research design and data collection

To examine the research questions, a coffee jar has been chosen as the product sample. Several variants were used to compare different specifications of added value, whereas the variants consisted of different materials and surface coatings which indicate prestige value and value of individual pleasure. The following samples of materials and surface coatings were presented: brushed high-alloyed steel, bright high-alloyed steel, plastic, brushed PVD-plated plastics (substitute material), bright PVD-plated plastics (substitute material) (Figure 1, left).

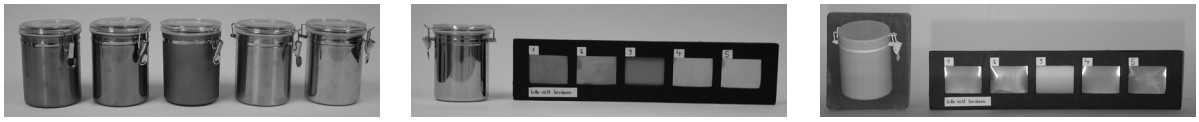

Figure 1. Real coffee jars (left), real samples of the materials and real coffee jar (middle), real samples of the material and CAD-illustration (right)

To collect the data, a number of n=64 subjects have been asked to judge the different product samples. In random order, each subject was confronted with the product samples in one of the following presentation forms:

- Real coffee jars, whereas the kind of material was told to the subjects (Figure 1, left)
- Real coffee jars, whereas the kind of material was not told to the subjects
- One real coffee jar combined with real samples of the different materials (Figure 1, middle)
- Picture of a coffee jar combined with real samples of the different materials (Figure 1, right)

The subjects (divided into 8 groups of 8 people each) were asked to judge either the prestige value or the value of individual pleasure of each product sample, depending on which group they were assigned to. In summary, the research design can be explained as follows (Table 1):

Table 1. Research design consisting of different product presentation forms and the two kinds of added value

	presentation form			
kind of added value	real coffee jars – kind of material known to the subjects	real coffee jars – kind of material unknown to the subjects	coffee jar and samples of materials	picture of a jar and samples of materials
prestige value	N=8	N=8	N=8	N=8
value of indiv. pleasure	N=8	N=8	N=8	N=8

The collection of the data took place in regional trains in Germany, since people often have more time during their journey and are therefore more willing to take part of a survey. Of course, the participation was voluntary. The distribution of the subjects concerning gender, age and education level is shown below (Table 2):

Table 2. Description of the random sample by gender, age and education level

gender	women 50%	men 50%		
age	18-25 years-old 50%	26-35 years-old 20%	36-50 years-old 20%	51-71 years-old 10%
education level	working 42%	student 33%	trainee 10%	other 15%

First, the collected data have been analyzed statistically using methods of descriptive statistics (means, standard deviation, frequencies, and correlations). Additionally, inference statistic methods were carried out to test the correlations and identify differences in means. The analysis has been carried out using the statistical program SPSS (Statistical Package for the Social Sciences).

4. Results

4.1 The difference between prestige value and value of individual pleasure

The comparison of the answers of the "prestige value groups" to the answers of the "individual pleasure groups" reveals interesting results:
The ranking of the importance of certain attributes for prestige value and value of individual pleasure are different (statistically significant): For example, concerning the value of individual pleasure, functional aspects are most important (e.g. hygienic, easy to clean) (Figure 2). Concerning the prestige value, the most relevant characteristics are design characteristics (e.g. aesthetically appealing, high quality) (Figure 3).

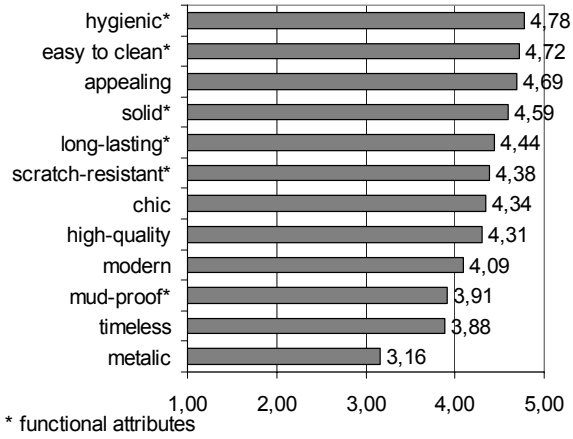

Figure 2. Important attributes for the value of individual pleasure

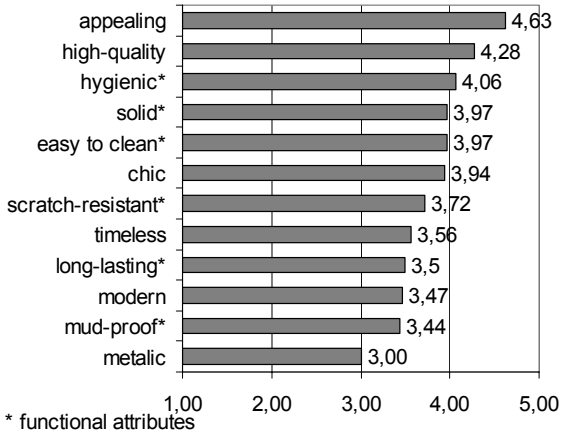

Figure 3. Important attributes for prestige values

Similar results appear when considering only male subjects who favour functional attributes for individual pleasure and design attributes for prestige value. The results are slightly different for female subjects, who are mostly influenced by design attributes but for whom functional aspects (e.g. "easy to clean") are important for individual pleasure as well. In terms of prestige value, women mainly prefer functional attributes, but they also emphasize the importance of a product's appearance. Thus, male subjects clearly focus on either functional or aesthetic attributes, while female subjects prefer both kinds of attributes for both kinds of added value with only a slight emphasis on one or the other group of attributes.
In spite of the different ratings concerning the relevance of the attributes for the added values, there is no difference between the two groups in their preference of a coffee jar made of a certain material: Most of the subjects favoured the brushed high-alloyed steel the most and the PVD-plated plastics the least (Figure 4), irrespective of the group to which the subjects belong.

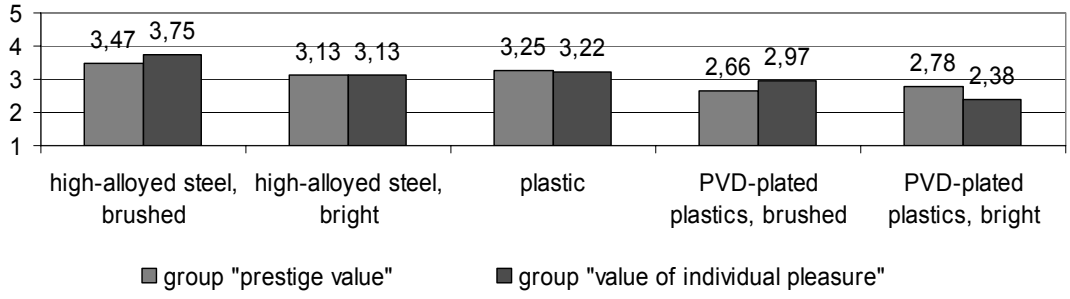

Figure 4. Preference of materials in the case of prestige value or value of individual pleasure

The age and education level of the subjects did not play a role in their judgment concerning the prestige value and the value of individual pleasure.

4.2 Acceptance of substitute materials

As mentioned before, substitute materials often have fewer environmental impacts compared to the original materials, especially when plastics are used as the basic material. The subjects were asked about their acceptance of substitute materials with the following result: Overall, the subjects preferred the high-alloyed steel and pure plastic to the substitute materials (Figure 5, left). In other words, the subjects preferred the "original" material to the substitute even in the case of plastics. This is interesting because one intention when creating substitute materials is to enhance the plastic by giving it a metallic look. But in the study, this idea was not accepted by the subjects. Substitute materials are like "bluff packages" which do not show the advantages either of the metal or the plastics. The subjects accepted the substitute materials most readily when they were not tactile (Figure 5, right)

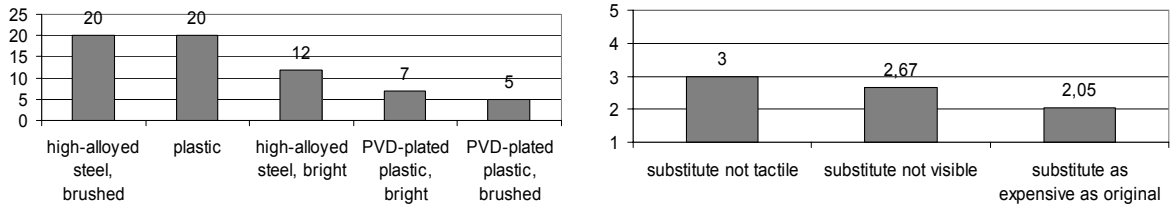

Figure 5. Preference of different materials (left), acceptance of substitutes (right)

Furthermore, the subjects more readily accepted the substitute materials for products where the practical value is clearly more important than the added values. They were least willing to accept them for both large products and products which are frequently used.

Overall, the acceptance of substitute materials, which are defined as plastics which look like metal, is rather low. If the product is made of a substitute material, the customer wants to receive some other value in return, e.g. a lower price.

4.3 Influence of the presentation form on customer ratings

The third research question asked if there are any differences in the subject's ratings between several forms of product presentation. To answer this question, we compared the different presentation forms and the answers to the questions "What do you think about the quality of the material?" and "How much would you pay for a product made of the following material?". In no case could a statistically significant difference be found. Overall, there was no difference in the product ratings when using real product variants, real products combined with samples of materials or product illustrations combined with samples of material.

Furthermore, two groups of subjects received different information about the materials presented: One group was told which material the sample was made of, while the other group was not. They could only guess at what kind of material it was. It was tested to see if there is a difference in preference for the one or the other material when the subjects knew what kind of materials were used and when they did not know. Again, there was no significant difference between the two test groups when answering both of the above questions.

5. Conclusions for product development

As can be seen, high prestige value and high value of individual pleasure are not evoked by the same attributes: Design characteristics are most important for the prestige value, whereas functional aspects are more relevant to the value of individual pleasure. Thus, both kinds of added value should be realized separately in product development. At the same time, there are materials and surface coatings which gain both prestige value and value of individual pleasure, e.g. brushed high–alloyed steel which is functional because it is easy to clean, and looks good due to its brushed surface.

A further result of the study is that male and female customers consider different attributes important for the two kinds of added value. This result shows how customer groups can differ in their expectations of a product. They do not only have different expectations concerning the practical value of the product, but also the prestige value and value of individual pleasure.
Based on these results, the following recommendations can be made to product developers: In order to increase the attractiveness and marketability of a product one should not only invest in a non-specific high added value; it is important to meet the customer's expectations concerning both prestige and individual pleasure. To achieve this, it is necessary to clearly define the target customer groups and to examine their specific expectations concerning the added values.
During the data collection process, it is sufficient to present samples of materials instead of the real product variants.
In maintaining the attractiveness of a product, it should be considered that the utilization of substitute materials is generally not accepted by the customer in either case. Before deciding to create a product with substitute materials, one should check that the substitute materials do not go against the customer's expectations. The acceptance of substitutes is especially low for large and frequently used products.

Acknowledgement

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