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How Do Mobiles Communicate?

The Role of Product Design in Product Related Consumer Responses: The Case of Mobile Telephones

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Abstract

Reconciling artistic approaches to industrial design and consumption studies we set up a conceptual model for assessing the impact of industrial design, product form in the case of ordinary objects from two perspectives: in the context of making choices and its influence on the usage experience. Propositions are given to study relating consumer responses with respect to characteristics of product form, individual differences: materialism and processing preferences.

Underlying empirical research has been executed in Hungary, in the case of mobile telephones. We set test our model in an quasi experimental study. We report on product related consumer responses with respect to differences in mobile design and also to the impact of personal and attitudinal factors. The theoretical consequences of the empirical outcomes will be discussed.

How Do Mobiles Communicate?

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Objective

Objective of our study was to explore the impact of product design (mobile design) on the buyer decision making process, and consumption related responses and attitudes. Reconciling artistic approaches to industrial design and relating consumption studies present paper gives a theoretical framework for the study of the role of product design in the case of *ordinary objects* in both contexts suggested by the two streams of literature: in the context of making choices and in the context of the usage experience.

Applied Concepts

The quality and nature of the consumption experience is not only determined by the type and application of its object itself and its context, but *also by the quality of the execution of this object: its form or design*. This form communicates to and persuades potential and actual consumers to make choices, but the *quality and nature of the usage experience* is also determined by this form. Furthermore, ordinary objects also serve as tools for communicating about and to users.

Until now product form / design has mainly been investigated as a decisive element of consumer choice and its role of attraction at the potential consumer and product encounter. Studies on consumption and usage experience have been more focusing on particular contexts, situations, occasions and on objects that were more special in their nature like the aesthetic products, the arts or extraordinary activities.

We set up a model incorporating the following components: product design, usage and choice contexts, individual characteristics (such as materialism (Richins & Dawson 1992), visual vs. verbal information processing preferences (Childers, Houston & Heckler, 1982)) and product related consumer responses (judgment of *utility, usefulness* (Margolin-Buchanan, 1996); *experience, enjoyment of use* (Holbrook - Hirschman 1982); *communicative power, expression* (Richins 1994; Csikszentmihályi, 1981)).

Design as a problem-solving activity can *never, by definition, yield the one right answer*: it will always produce infinite number of answers, some “righter” and some “wronger.” Purely functional designs are hardly possible to make (Pye, 1978). It is these characteristics of design that are substantial to identify. Product form cannot be evaluated on single, separate compositional elements, it is a combination of compositional elements that are chosen and blended into a *whole* to achieve a particular sensory effect (Bloch, 1995).

Despite the best efforts of designers to determine the precise nature of products, the career of products in human experience depends as much on the ability of human beings to make sense of the artificial world as it does on the intentions of the designer. (Margolin, Buchanan, 1996). Consumers' relation to product form is dependent on their personal characteristics, their

personal relations to surrounding products (Richins & Dawson 1992), but also their preference, proneness to considering visual qualities (Childers, Houston & Heckler, 1982).

Utility, usefulness. A given form contributes to the fulfillment of the object's purpose. It determines whether this purpose is fulfilled in a comfortable and efficient way, whether it advances the quality of the users' life. (Margolin-Buchanan, 1996).

Experience, enjoyment of use. Product form in fulfilling a given purpose is capable of creating enjoyable activities, sensual pleasure, aesthetic experience. (Richins 1994, Holbrook - Hirschman 1982).

Communicative power, expression. Objects fulfil an important role in the expression and symbolization of personal roles, influencing personal relations. Most products hold messages that are meaningful to a particular group, and that its owner wants to communicate about him- or herself (Richins 1994). Furthermore, objects are assimilated into personal, private lives and are given symbolic meaning as expressions of the order of private experiences. (Csikszentmihályi, 1981).

Empirical Research

Based on extensive exploratory qualitative research (sentence completion) underlying research has been conducted in an attentive and responsive environment, Hungary in the case of a product category that has become widely available recently and holds strong practical, but also symbolic and communicative implications: *mobile phones*. We tested our model in a quasi experimental design where we controlled for the impact of brands and ownership of mobile telephones as well.

Our preliminary qualitative findings suggest that in the *case of mobile telephones' form / design plays a crucial role* for owners and non-owners in the formation of choices, but also product related responses such as the quality of the experience of use, expression, communication about oneself to others, but also to the user himself or herself as well. From several perspectives in their answers both owners and non-owners have indicated their preferences *of a modest and delicate, but at the same time state-of-the-art form, which was not a representation of a status symbol*. Respondents admitting that the telephone is a very close, might even be built in the users, implies very strong user concern and high consumer expectations of mobile telephones' form.

Users and especially non-users draw conclusions upon form about functionality and even aesthetics of use. Respondents also admit that mobile telephones on the other hand can serve as a handy gadget that can be a sign of personal excellence, achievement or sophisticated taste, but also a tool for someone himself or herself having his/her own choice of being or not being alone, being reachable.

We will present our empirical result of the consecutive survey study concerning the usage and choice context of mobile phones, concerning product related consumer responses and individual differences. Furthermore, we try to give a forecast of probable buying behavior in the case of mobile phones. Results will be presented in our presentation extensively.

Introduction

The quality and nature of the consumption experience is not only determined by the type and application of its object itself and its context, but *also by the quality of the execution of this object: its form or design*. This form communicates to and persuades potential and actual consumers to make choices, but the *quality and nature of the usage experience* is also determined by this form. Furthermore, ordinary objects also serve as tools for communicating about and to users.

Until now product form has mainly been investigated as a decisive element of consumer choice and its role of attraction at the potential consumer and product encounter. Studies on consumption and usage experience have been more focusing on particular contexts, situations, occasions and on objects that were more special in their nature like the aesthetic products, the arts or extraordinary activities.

Phenomenon of Industrial Design - Manifestation of Product Form

Understanding Industrial Design

Understanding the nature of industrial design and the impact of its product: *form*, lies in the understanding its process. The designer's task is to *express an abstract purpose* - for example providing a stable hold, facilitating a comfortable handling - *in a tangible, material form*. As a result, the designer-artist's freedom of creation is limited: it is restricted by the common

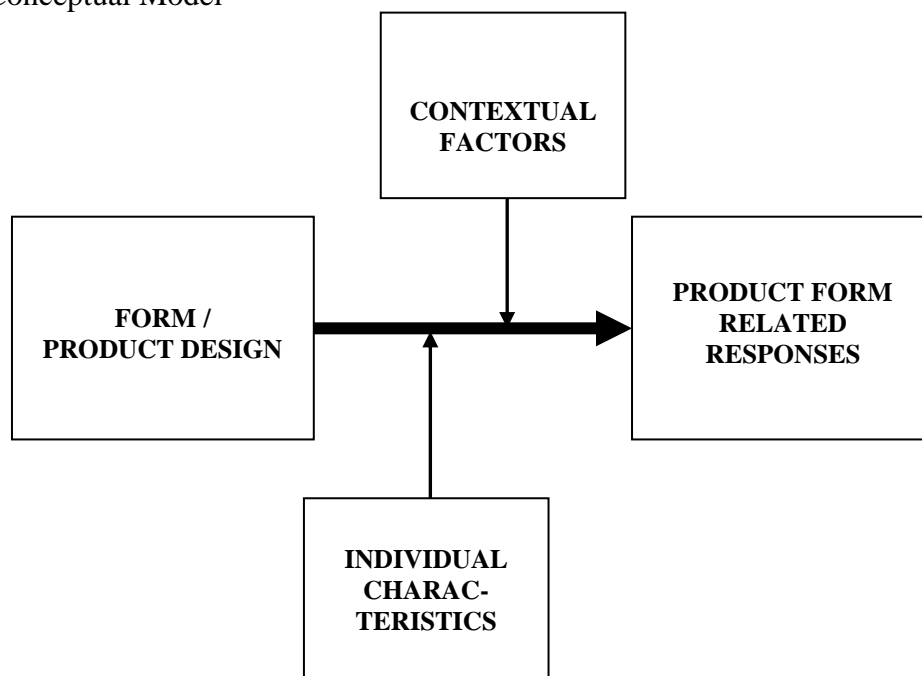
influence of the design, engineering and marketing disciplines and by production, market and consumption requirements and constraints. The result of the industrial designer's work is a *final form* of a given purpose: *entirety* of product function, appearance, aesthetics and ergonomics *in accordance with market requirements* (Pye, 1978). The primary aim of this final form, is not only to attract consumer attention, but also to assist and facilitate use. Good design, therefore, derives from the interaction of the maker (designer) and the user (consumer).

Overall it is the designer's task to express a given purpose in a meaningful and *distinctive form that sells*. Nevertheless, it is also core nature of product form that it can only be *wholly explored* by the users only through and *during usage*. Setting the objective of investigating industrial design, product form requires the investigation of all of its manifestation: its power at the point of choice and its impact on the usage experience as well.

Conceptual Model

Based on both, industrial design literature and relating marketing research the following conceptual model can be formed, that provides a framework for investigating product form.

Figure 1. Conceptual Model



Theoretical Concepts

Product Form

Design as a problem-solving activity can *never, by definition, yield the one right answer*: it will always produce infinite number of answers, some “righter” and some “wronger.” Purely functional designs are hardly possible to make. Whenever humans design and make a useful thing they invariably expend a good deal of unnecessary and easily avoidable work on it which contributes nothing to its usefulness. Never do we achieve a satisfactory performance. All useful devices have got to do useless things which no one wants them to do but they are also equipped *with new functions and meanings that was never intended by the designer* (Pye, 1978). It is those characteristics of design that determine consumer responses that are substantial to identify. Product form cannot be evaluated on single, separate compositional elements, it is a *combination* of compositional elements that are chosen and blended into a *whole* to achieve a particular sensory effect (Bloch, 1995).

Characteristics of product form have an impact on product form related consumer responses. It is stated in the industrial design literature that form should guide and facilitate use. Product form in itself is to express all about the product (Margolin & Buchanan, 1996; Papanek 1971; Lissák, 1998). Consistency in appearance and consistency between the fulfilled purpose supports choice and use, therefore consumers' product related responses. In their study Veryzer & Hutchinson (1998) have shown that higher level of unity in appearance results in more positive aesthetic responses.

Individual Differences

Despite the best efforts of designers to determine the precise nature of products, the career of products in human experience depends as much on the ability of human beings to make sense of the artificial world as it does on the intentions of the designer. The meaning of products is constructed through personal interactions, and user - object interactions that are not entirely within the control of designers (Margolin & Buchanan, 1996). Consumers' relation to design, product form is dependent on their personal characteristics, their personal relations to products that surround them, but also their preference, proneness to considering visual qualities such as product appearance.

Materialism

The importance consumers attach to products plays a role in their choices and judgements (Csikszentmihályi & Prochberg-Halton, 1988; Holt, 1995; Richins & Dawson, 1992).

According to the level of materialism (Richins & Dawson, 1992) consumers are more receptive to different manifestations of product form. Richins (1994a) showed that for materialist consumers it is products' utilitarian benefits, their potential to express personal success, enjoyment of their acquisition that is important; product appearance and qualities of form determine their choices. On the contrary, non-materialist consumers appreciate their possessions, for them, enjoyment lies in their use and also memories they evoke.

Processing Styles

Several studies have been dealing with consumers' affective and cognitive responses to product related verbal or visual stimuli. Relating research, where visual stimuli are used and

individual processing styles are assessed vary according to research objectives, research objects and subjects. Several of the researches offer measurement instruments to assess visual processing styles (Childers 1985; Bamossy, Scammon and Johnston 1983; Hirschman 1986; Veryzer 1993) and / or estimate underlying design dimensions of research objects (Veryzer 1993, Henderson & Cote 1996).

Gould (1990) has shown that there is a relationship between involvement with different types of products and individual processing styles. Consumers with visual processing preferences are more involved with products that are more visual oriented in their use i.e. cameras, clothes. As a result of higher involvement in these, they are more concerned about all product characteristics that are a result of their own form or design.

Contextual Factors

Context of Choice

Product form determines the first potential consumer and product encounter, the moment of making choices, purchase decisions. "Industrial design is *to be extended to the act of the interpretation, perception* of the product." (Lissák, 1998, p. 161). Design is not only for giving a tangible, physical form of an abstract function, but it is to give a *distinctive* form (Rassam, 1995). Design as the tool of expression plays a crucial role in market competition: communicates and positions, influences choices, attracts consumers, users and is capable of communicating with them - catches attention, provides information (Bloch, 1995).

Context of Use

The use, consumption of products does not simply imply their primary functional use, but they

also serve as sources of expression, self-expression, enjoyment and hedonism. When buying a particular product consumers not only seek its primary function, but further contents and value. Consumption and product use is a kind of creative process, source of individuality and difference (Hirschman & Holbrook 1982; Holbrook & Hirschman 1982; Richins 1994a; 1994b, Solomon 1983, Belk 1988, Firat & Venkatesh, 1995). It is *through use that a product can wholly be explored and therefore the impact of product form be investigated* (Margolin & Buchanan, 1996; Lissák, 1998). Anticipation of future experience with a given product may not be as expected, may not be correct.

Consumer Responses to Product Form

Product form determines *every manifestation* of the product. Consumer evaluations of, responses to products influenced by the quality and the nature of the form: like and dislike, its perceived usefulness, utility, enjoyment of its use, communicative and expressive power.

Products that have very powerful design *properties not only fulfil the functions for which they were intended*, they also possess an aesthetic and societal dimension that builds up entirely new relations between themselves and their users.

Utility, Usefulness

A given form contributes to the fulfilment of the product's purpose. It determines whether this purpose is fulfilled in a comfortable and efficient way, whether it advances the quality of the users' life. (Margolin & Buchanan, 1996; Spangenberg, Voss & Crowley, 1997).

Experience, Enjoyment of Use

Product form determines the *quality and nature* of fulfilling a given purpose, it is capable of creating enjoyable activities, sensual pleasure, aesthetic experience. (Richins 1994a; Holbrook & Hirschman 1982; Spangenberg, Voss & Crowley, 1997).

Communicative Power, Expression

Objects fulfil an important role in the expression and symbolization of personal roles and influencing personal relations. Most products hold messages that are meaningful to a particular group, and that *its owner wants to communicate about him- or herself (public meaning)* (Richins 1994b). Furthermore, objects are assimilated into personal, private lives and are given symbolic meanings as expressions of the order of private experiences. Objects take on symbolic value, *private meanings with reference to one's own personal history* (Csikszentmihályi & Rochberg-Halton, 1981).

Empirical Research

Context and Background of the Research

Underlying research is being executed in Hungary. As a result of changes in the economic conditions and the society, therefore, ways of living, consumption itself, acquiring, possessing material things has become especially important. The general availability of all sought goods on the one hand, and the increased importance of their expressive power from the other explains current strong general attentiveness and sensitivity to material objects and their quality of design and form in Hungary.

Applied Research Objects: Mobile Phones

The objects that are investigated are mobile telephones that became increasingly popular and wide spread among a wide range of groups. Within the past four years the number of subscribers of mobile telephone services has increased sevenfold. This year the number of subscribers has exceeded 1 million (close to 10 % of the population). Service providers estimate 15-16 % further increase for the coming year. It is mainly entrepreneurs and company owners (29 %), highly educated employees (17,2 %), but the portion of students among mobile phone owners is also surprisingly high (10 %).

Preliminary Exploratory Qualitative Research

A preliminary qualitative research was conducted for exploring the existence of the above described product form related consumer responses and further investigating their contents. The research was conducted among third year university students, for whom it was part of their course requirements (Marketing Principles) to participate in the research¹.

368 third year students participated in the research of which 33 % own and 67 % do not own a mobile telephone. Special about the students of the university of economic sciences as respondents is that they are to fill in managerial positions, become decision makers, even opinion leaders in the near future, of which they are already aware of, behave and hold attitudes accordingly already. This special position is reflected in the responses.

In the preliminary qualitative research sentence completion technique was used. Uncompleted sentences related to respondents' view about the utility, usefulness; experience, enjoyment of

¹ As a result of the circumstances of the research in the case of each question some respondents (10-15 %) gave rejecting answers expressing their unwillingness and objection to their participation in the research. However,

use and communicative power of mobile telephones.

Conclusions of the Exploratory Study

The insight that our exploratory study gave suggest that in the *case of mobile telephones form plays a crucial role* for owners and non-owners in the formation of choices, but also product related responses such as the quality of the experience of use, expression, communication about oneself to others, but also to the user himself or herself as well.

From several perspectives in their answers both owners and non-owners have indicated their preferences *of a modest and delicate, but at the same time state-of-the-art form, which was not a representation of a status symbol*. Respondents admitting that the telephone is a very close, might even be built in the users, involves very strong user concern and high consumer expectations of mobile telephones' form.

In the case of mobile telephones' form, especially appearance communicates to users, forms expectations (even by such characteristics as size, external color and shape) and even the experience of use. Users and especially non-users draw conclusions upon form about functionality and even aesthetics of use.

Mobile telephones on the other hand can serve as a handy gadget that can be a sign of personal excellence, achievement or sophisticated taste, but also a tool for someone himself or herself having his/her own choice of being or not being alone, being reachable.

Underlying Survey Research

even these responses were most of the time meaningful and possible to interpret.

We conducted a survey research focusing on consumers' perception of product (mobile phone) design. The questionnaire served as a base to validate our conceptual model. The four components of our model - illustrated below – product design, contextual factors, individual characteristics and the design related consumer responses were all covered in our questionnaire (Figure 2).

The structure of our questionnaire was set up accordingly. The first section of the questionnaire focuses on the consumers-object relation, and covers, how consumers perceive design, what design means for them in general. The dimensions of the concept design we used in the questionnaire were explored on the basis of a previous explorative, qualitative study. This section was followed by the recording of individual differences that can have an impact on design related consumer responses, these are materialism (Richins & Dawson 1992; Price & Ridgway 1983), processing styles (Childers, et al., 1982) and relevant demographic characteristics were also included.

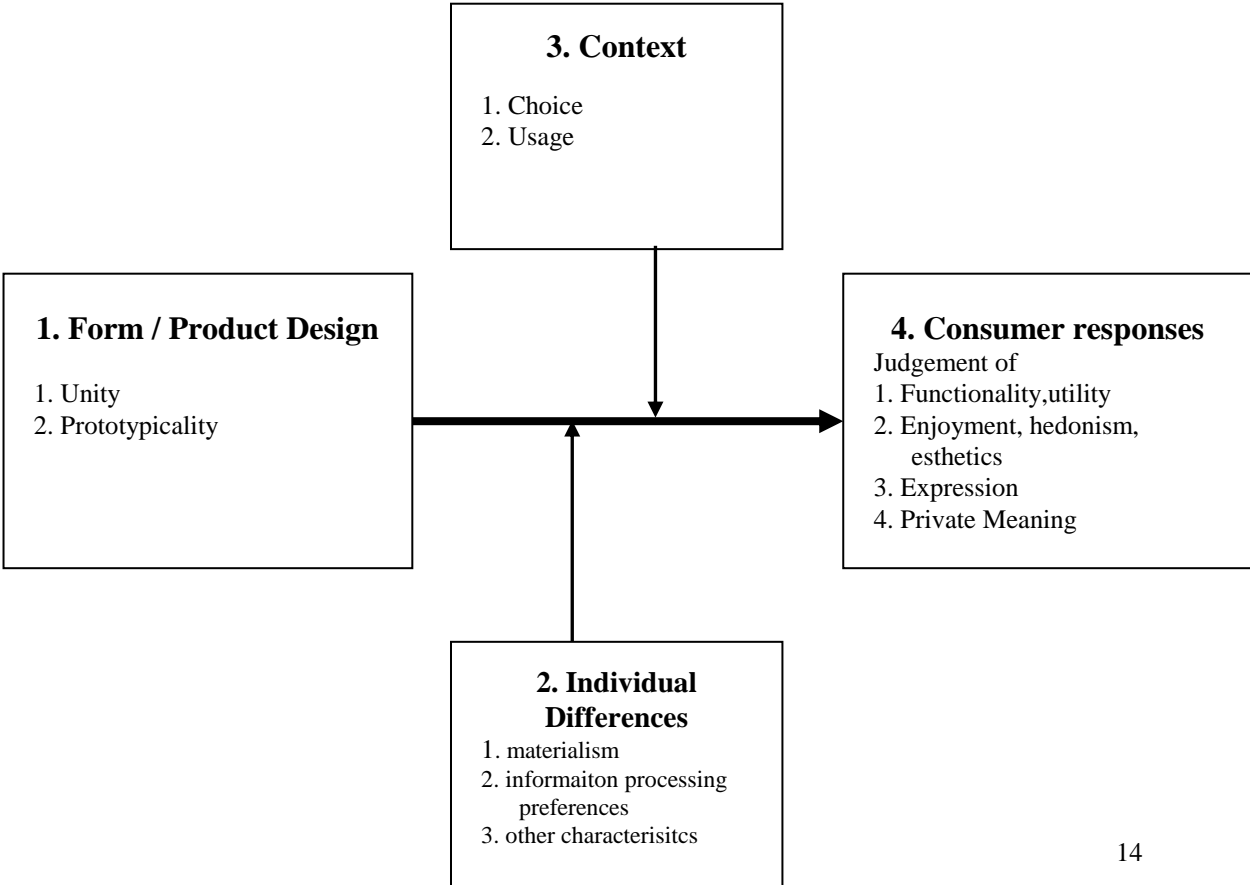


Figure 2. Summary of theoretical concepts used in the empirical study

The second part of our questionnaire deals with mobile design in general, inquiring the same factors that were used for general objects in the first part. The purpose was to explore consumers' perception and evaluation in general and in the case of mobile telephones. Next we focused on the usage context by asking respondents about their own mobile phones, including circumstances of buying, purchase decision and design related consumer responses.

Next we put our respondents into a choice situation. The choice context was stimulated by a situation where respondents could choose from four state-of-the-art models. We showed the respondents four different Nokia mobile phone models (Nokia 3310, Nokia 6210, Nokia 8210, Nokia 8850), which were not on the market at the time of the survey, so the respondents did not have any previous knowledge about them. However this cannot be taken for granted in a global context, but they were not present on the Hungarian market.

We presented the respondents the four types of Nokia mobile phones, which they could have a look at, hold in their hands, which is similar to a buying situation. We asked respondents to make decisions about the telephones, while extraneous variables (information processing , price, design, brand) were controlled. This way we tried to explore a cause-and-effect relationship, first of all to be able to determine the cause and the effect of product form,

design and try to exclude other external variables that are likely to influence the decision making process of the respondents.

We used different decision frames to be able to determine the impact of design in product related consumer responses. In each decision frame respondents were asked to choose one out of the four offered mobile phones independent of what they chose in the previous decision frames. Decision frames are the following:

1. The first factor we tried to explore was design, product form, therefore we asked respondents to choose from the four phones spontaneously at the first sight. This was to measure design, with the assumption that respondents do not know anything about them.
2. In the next question we let the respondents think, that all phones were equal concerning functions and price. Here the aim was to measure indirectly the effect of design controlling for both price and functions posing them as two external variables.
3. Then we asked them to choose one that seemed most functional, whereas we think that design will determine the way the respondents' think of the functionality of the chosen design.
4. After we provided respondents with the users' manual of the four mobile phones, and asked them again to choose accordingly, which serves as a good base for comparison and evaluation of information processing abilities.
5. In the next context we asked them to choose one, they would be glad to have as a gift they could win in return of their participation in the survey, which was the real incentive for respondents to take part in our research. This way we tried to control for the effect of prices.

6. Next, we provided respondents with the probable price of the phones and asked them again to make a choice.

7. Finally we asked for the effect of design directly, whereas we try to examine that to what extent questions 1., 2 and 7 vary together, and try to explore the potential sources of differences. We also focus on the differences between the process of information processing, and the perception of design.

Table 1. Evolvement of respondents' choices in different decision frames explained above:

1. question	2. question	3. question	4. question	5. question	6. question	7. question
Nokia 3310	83,5 %	27,8 %	19,0 %	49,4 %	62,0 %	73,4 %
Nokia 6210	83,1 %	79,7 %	83,1 %	83,1 %	72,9 %	76,3 %
Nokia 8210	89,4 %	24,7 %	18,8 %	65,9 %	35,3 %	84,7 %
Nokia 8850	80,4 %	27,5 %	33,3 %	81,4 %	32,4 %	83,3 %

Numbers represent, how many percentages of the respondents chose in the next decisions frames (2-7) the type of mobile phones they chose in the first context.

In both contexts in the usage context and the choice context (in the case of the model chosen as a prize, question 5) we asked respondents' product and form related responses, like and dislike, evaluation of utility and usefulness, experience and enjoyment of use (Spangenberg, Voss and Crowley, 1997), expressive characteristics (Richins, 1994b) were.

Respondents

Our sample consists of 326 respondents. The respondents are students of the Budapest University of Economic Sciences in Hungary. The age structure of the sample strongly support our experimental design, namely we tried to focus on a very homogenous group of respondents, which is a disadvantage as well at the same time, because it lowers the external validity of our research.

Our study has been executed among mobile telephone service subscribers, users of pre-selected models therefore ensuring to record consumer responses in the context of use.

We set up our sampling design according to the type of mobile phone owned. We planned our sample to include one third Nokia users (Nokia 5110 and Nokia 3210 owners), one third users of any other type of phones and one third of non-users.

Mobile phones as research objects

Besides the strong implications of the results of our preliminary qualitative research all models of mobile phones used in the research - used by owners and offered as prizes - are described by experts on the dimensions of prototypicality and unity. "Predetermined standards of value agreed upon by experts provide an 'informed judgement' of the aesthetic worth of a stimulus. Subjects' judgements of the stimulus along various dimensions are then rated as more or less relevant with these expert opinions as *benchmarks*." (Bamossi et. al, 1983, p. 686).

Presentation of results

In our paper we present our empirical result concerning the usage and choice context of mobile phones, concerning product related consumer responses and individual differences.

Furthermore, we try to give a forecast of probable buying behavior in the case of mobile phones. Results will be presented in our presentation extensively.

Contribution of the Research

Current research builds on a definition of industrial design which not only considers product form as determinant of product appearance as a decisive element of choice, but extends the investigation of design, product form to the context of use. Contrary to previous research in present research real, existing products are used for the assessment of consumer responses. Responses in the context of use and choice are recorded and compared. The concept of materialism is applied in an Eastern European setting, with relation to responses to a very popular object: mobile telephones.

We assume, that this survey will serve as a starting point for further research in this theme in our country. We believe, whereas we live in the era of communication, there will be an increasing need for perfection of communication tools, which should serve people as much as possible. Beyond this, this survey can be extended for other products as well, where the involvement of respondents of higher extent as it was in this case.

Recommendations for Future Research

Building on the theory of industrial design it is important to investigate the impact of product of form not only in the context of choice, but also in the context of use as well. Responses to

product form not only derive from the aspects of product appearance, but also from the consequences of the way form and appearance influence the usage experience. Using the proposed conceptual framework in the case of other groups of products, in other cultural environment would provide further insights how product form does influence, how it communicates to and about users.

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