

# Quantifying Aesthetic Form : A Review



## Engineering

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### ABSTRACT

*One of the greatest challenges in product development is creating a form that is aesthetically attractive to an intended market audience. Market research tools, such as consumer survey, are well established as a functional product features but aesthetic preferences are as varied as the people that respond to them. This paper demonstrates how the qualitative attribute form cannot only be represented qualitatively, but how the customer preference can be estimated as utility function over the aesthetics space.*

### 1. Introduction

Design methods and the study of form in product design processes are important because they allow designers to structure their work in a methodical and reasoned way while

At the same time, leave room to intuition and creativity to flourish. The study of the perception of the products and their relation to the observer's emotional response is one of the newest discipline. Consumer surveys, created using design of experiments, are then used to capture an individual preference of the indicated attributes and thus the form. Once preference is summarized in the utility function the utility function can be used as the basis for form generation or design verification. Emotional product characteristics, especially shape, cannot be ignored during the design process because they have considerable influence on consumer purchase decisions [1-2].

Mokariani (2007) developed a study that the tested aesthetic value of formal balance in objects. The author highlights the problem that presents the presentation of engineering design objects to the public, as its primarily focus is on the functional aspects, not the aesthetics ones. None the less the study of two main hypothesis: the first is that you can make a classification of formal variables from the design in terms of their functional relevance, ergonomics and aesthetics, resulting in attractive objects. This conclude that to have an effective integration of the functional, ergonomic, and aesthetic variables in the design of new objects, there is the need for an analysis and a classification of formal variables in the design.[3]

### 2. Literature Survey

The quantification of aesthetic preference could be used by the designer as evidence to support certain product forms when engineering and manufacturing decisions are made that that might adversely affects the aesthetics of the product form. Researchers have carried out the research work in the field of Quantifying Aesthetic form, some of which are listed below.

**Seth orsborn** et al [4] investigated that the overall gestalt of the vehicle is described through an atomization of the form. Separating the form into characteristics describing each characteristics with a set of curves and representing each curve with a set of atomic attributes. SAS design and BTL method is used for analyzing respondent results.

**Tahira N. Reid** et al [5] tested hypothesis, two survey to elicit opinions objectives, evaluations and interferences. The questions pre-tested in a pilot study and through peer review. The product categories tested included cars and coffee carafes that were each created using design of experiments. Each survey used two representations modes: Version one showed the products as computer sketches and FSV silhouettes; Version two showed the products as simple and realistic renderings. Renderings of cars were created using **MAYA (Autodesk, Inc, San Rafael, CA)**, and FSV of these renderings were then transported to

adobe Photoshop (Adobe systems, Inc, San Jose, CA) A Taguchi design experiment was used to manipulate 5 variables with levels. In order to examine hypothesis three **Bradley-Terry logit model** for paired evaluations was used to determine the relative strength of preference (SOP) for paired choice questions.

**Neether Abu-obied** et al [6] quantifying the aesthetics of non conventional structures. A group of 150 respondents (divided into three equal sub-groups of architects, structural engineers, and non-experts) were selected to participate in the main study, which used 14 different non-conventional structural systems. The images of these systems were derived from an earlier pilot study. The evaluation tool included 38 semantic items, also derived from the pilot study. Two statistical analyses were applied to the collected data: factor analysis and ANOVA.

**Sayed javed Zafarmand** et al [7] investigated the evaluative analysis of the aesthetics characteristics of the prevailing Brands mobile phones in Iran market. In order to study their aesthetics specifics, similarities, differences, and the relationship between various form categories and different price ranges some research phases and steps are used. These phases and steps are aesthetics analysis, price range analysis, and user investigation.

**H.C.Yadav** et al [8] proposed a sequential approach to design a car profile with aesthetic aspects. Selection of shape parameters with customer satisfaction is critical in aesthetical designed a challenging task for designers. The methodology is based on Kano model that provides a frame work to incorporation of customer satisfaction with design requirements. Further, Taguchi robust design is used to find the optimum level of parameters to achieve initial design estimates and thereafter RSM (Response Survey Method) is applied to define the optimum levels.

**Atsushi Akiike** [9] Propose that appearance and usability of products influence premium price and customer satisfaction and these effects increase as product mature. For this a mobile phone industry in Japan is chosen as the market in which to test these hypothesis empirically. The results in this study have no effects on product price but have positive effect on customer satisfaction. These effects increase with the maturing of the product. To assess the effect of product appearance and usability of products with premium price and satisfaction with product is analyzed by multiple regression method.

**Peter. H. Bloch** [10] The physical form and design of a product is an unquestioned determinant market place success. A good design attract consumers to a product communicate to them and add values to the product by increasing the quality of experiences associated with it. "Seeking the ideal form" for a product remains a significant goal for both designers and marketing management. For this a design of survey is taken and after that the conjoint analysis method is used to analyses for evaluating product design signs.

**Fernan Acevedo Lopez** et al [11] investigated that to know the individual contribution of each formal element to know the attractiveness of a product was decided to conduct a survey that was processed through the conjoint analysis.

After survey the data was processed by **SMRT Saw tooth software Inc.** The data analysis was conducted by using multiple regressions.

**Wong compared** [12] rough and ready prototypes to interface designers to focus on high level issues "by leaking out a mediocre solution, the term was free to Brainstorming on new ideas and not focus the critique placeholders that were obviously weak. They assessed the effect of non photorealistic rendered images in CAD.

### 3. CONCLUSION

In this study we could observe and verify the existence of the relationship between the perception of abstract forms and the concrete forms of the products in the mind of consumers, which can generate a whole new line of research according to this finding. When a product is designed, it is necessary to account for factors that influence the choice of product and purchase decisions' of the consumers. So before designing a new product the designer should focus on aesthetics or outer form of the product that can attract costumers in first impression.

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