

# Chapter 13

## Automobile Exterior Design Model Using Customer Science Principles

### ABSTRACT

*As customer values become increasingly diverse, automobile exterior design is becoming one of the most critical elements influencing customer purchase behavior for automakers. The author develops a scientific approach to identifying customers' tastes, called Automobile Exterior Design Model (AEDM). To address this issue, the author uses Customer Science Principle aiming to achieve Intelligence Design Concept Method (CS-IDCM) developed elsewhere. AEDM improves the design business process so that implicit knowledge on customer is turned into explicit knowledge. To strengthen automobile exterior design, AEDM contributes to the following: (1) improvement of design business process methods for automobile profile design, (2) creation of automobile profile design using "psychographics" approach methods, and (3) actual studies on automobile profile design, form, and color matching methods. The validity of the proposed model was verified through case studies of the actual application of AEDM.*

### INTRODUCTION

At present, global marketing of automobile industry is growing rapidly. It is important for mapping up exterior design strategies to study on "what style of vehicles would lead the world market in the future?" However, in many cases, automaker's vehicle designers do not have a clear idea of future vehicle styling (Nunogaki et al., 1996). In order to respond to such a trend of vehicle exterior design, it is essential to conduct a scientific approach to customers' tastes whereby the customers' tastes are accurately grasped and reflected in the vehicle designing process by means of statistical science named Science SQC (Amasaka, 1999a, 1999b).

A specific commercialization study was conducted through academic-industrial cooperation, and substantial results have been obtained in the innovation of the vehicle designing process for 4-wheel vehicles (Amasaka et al., 1999; Nagaya et al., 1998; Okazaki et al., 2000; Amasaka and Nagaya, 2002).

DOI: 10.4018/978-1-7998-8746-1.ch013

This task is to be undertaken by the vehicle designing department. It is deemed important to determine the customers' desires in a precise manner, and to provide the vehicle designers with a clear-cut styling concept based on research of psychographics by the viewpoint of customers' life stage and lifestyle. As customer values become increasingly diverse, an automobile exterior design becomes an important element for automakers. Unfortunately, as people's values and subjective preferences become more varied and complex, it becomes increasingly difficult to accurately define their wants and needs.

As providing what customer's desire before they notice their wants becomes an essential part of any successful vehicle designing business, the author creates Automobile Exterior Design Model (AEDM) for customer value creation. To do the development of ADEM, the author applies "Customer Science Principle" that captures the customers' tastes by employing profile design concept support tool named "Customer Science aiming to achieve Intelligence Design Concept Method" (CS-IDCM). CS-IDCM utilizes SQC Technical Methods, which is one of the core methods of Science SQC (Amasaka et al., 1999; Nagaya et al., 1998).

AEDM takes a scientific approach to customer preferences and verbalizes (imagines or conceptualizes) the customers' feelings (which is implicit information). It conducts intelligence designing (i.e., converting implicit information into explicit information) in such a way that it reflects the information onto the design drawings. As an original idea, the author has developed a vehicle proportion, form, and color matching methodology based on AEDM. AEDM combines (A) Improvement of Design Business Process Methods for Automobile Profile Design, (B) Creation of Automobile Profile Design using "Psychographics" Approach Methods, and (C) Actual studies on Automobile Profile Design, Form and Color Matching Methods.

As research examples of the actual application of AEDM, the authors applied this model to the product design process and obtained the results in the development of Toyota Lexus and others (Amasaka and Nagaya, 2002; Nakamura et al., 2008; Amasaka, 2004a,b, 2015, 2018, 2022).

## **CUSTOMER SCIENCE PRINCIPLE**

### **Issue in Automobile Marketing, Product Planning and Designing**

Today, an increasing number of companies both in Japan and abroad try to grasp the unprejudiced desires of their customers from the viewpoint of customer-oriented business management and to reflect these desires in future product development (Amasaka, 1995; Evans et al., 2004). However, the actual behavioral patterns of designers in trying to grasp latent customer desires depend heavily on their empirical skills (Amasaka, 1999a, 1999b, 2003b, 2004b). Designers of vehicle designing department often proceed with product development using implicit business processes (Amasaka et al., 1999; Amasaka, Ed., 2007).

Accordingly, their performance is measured by sales results, and their efforts to improve business processes for future jobs may be insufficient as implicit prescriptions. Furthermore, designers often worry that their current business approaches are likely to depend on job performing capabilities and on the sensitivity (or intuition or knack) of individual persons, which does not improve the probability of success in future (Mori, 1991; Shinohara et al., 1996; Moriya and Sugiura, 1999). It is, therefore, important to establish a scientific approach that improves powers of product conception or a new model that assists the conception of strategic product development and tests its validity (Amasaka et al., 1999; Yamaji and Amasaka, 2009).

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