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PASSENGER CAR AS COMPLEX EXPERIENCE

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Passenger cars are complex products that consist of millions of parts. Cars have different shapes and colours giving persons different emotional feelings. Therefore the car as a complex product is suitable for marketing specialist for comparing other products through cars. Authors are describing the mathematical background of the theoretical investigation and the practical results of such examination.

Keywords: cars, emotions, experience

1. Introduction

Passenger cars are very complex products. Passenger cars consist of millions of parts. Furthermore passenger cars are not only a complex mechanical and technical product but they are also as a complex meaning psychology. Cars have different shapes, colours, sounds, volume giving persons different emotional feelings. Therefore the car as a complex product is suitable for marketing specialist for comparing other products through cars. Authors are describing the theoretical investigation of such a qualitative examination and the practical results. This comparison possibility that is associations based as a tool is developed in psychology but the usage with stricter regulation in marketing investigation is far more suitable in projective techniques. Everyone has an opinion about cars; most of us even have experience as well. In this paper, authors have introduced a general framework for experience of passenger car as a product that applies to all affective responses that can be experienced in human-product interaction. The passenger cars as products have influence to all human sensors (visual, auditory, tactile, taste, smell, movement) in fact the further more beyond sense passenger cars cause emotions (social factors, emotions, behaviour). Distinct components or levels of product experiences are discussed. All level is distinguished in having their lawful underlying process [1].

Product experience

Before starting the discussion on human-product experience from passenger cars and marketing perspectives it is important to summarize the theoretical background of product experience. Product experience is always resulting from some interaction of the user and a product. This interaction is not necessarily restricted to instrumental or non-instrumental physical action, but mostly also consists of passive (often visual) perception, or even remembering or thinking of a product [1]. Human-product interaction and product experience is closely interwoven. Figure 1 provides a model of human-product interaction [2].

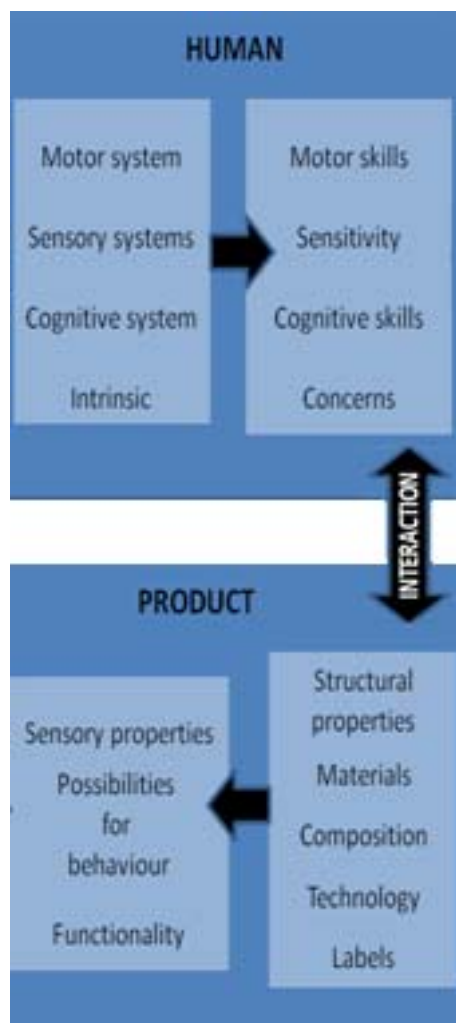


Figure 1. Model of human-product interaction
(source: [2])

Humans are able to interact with their environment (and the products) by motor system, sensory systems, cognitive system and instinct. Passenger cars have countless relationships with humans from the point of view of product experience. They interact with humans through concrete levels: visual appearance (shape, colour, material, display), tactual experience (touch of controls, seats, etc.), audio experience of the passenger car (for example, buzzing of the engine or the sound of closing the door), smell (for example, “smell of the new car”) and the multi-sensory experience (like driving experience). On the other hand, cars interact with humans mostly by abstract, subjective way or emotional “symbolic” level, and they help create the “owner loyalty” like aesthetic experience (for example, the subjective meaning of “beauty”), brand experience (like the producer image, or the consumers self image when possessing the car), social level (the experience of belonging to a certain group), shopping experience, and the satisfaction with dealer service. It is clearly visible that passenger cars product experience is significantly more than the using experience.

Colours, shapes, sounds (or music) and words almost always have an emotional meaning. This emotional meaning is in part innate but also learned from our cultural environment. It is a question of design: design elements will only be successful if they hit the desired emotional spot. Nowadays dealers are selling complex product experience instead of cars, and therefore designers have to plan experiences for customers, and the producers have to design the whole production, dealing and service process around the consumers’ product experience. Cues, sensory, verbal and visual stimuli must be optimised not only the level of product, but also the whole purchase and consumption process. In this area is particularly difficult to compete with merely the quality of product therefore new management solutions are formed

focusing on emotional experiences. This new focus appears as emotional and symbolic product attributes emphasizing positioning, and these decisions of product development in which aim at to impress all senses of the customer. (Cue-management) from Porsche design process it is a good example for cue-management approach to the acoustic design planning [3]. They employ more than 80 “tuner” (acoustic expert) in order to develop the best audio experiences, like 911 characteristic motor “buzzing” sounds or the typical and unique “blubb” sound when the car is closing. All sound and every acoustic effect is a message, which increases or decreases the product’s value. In order to be successful on the market, the brand of a car must have a clear emotional place in the mind of the consumer. This emotional brand essence results from the sum of all experiences that come from human-product interaction in both tangible and abstract levels. The subsequent implementation in marketing and brand communication is derived from the emotional brand positioning.

2. Methodology

The projective techniques derived from the practice of psychology. Projective techniques that were originally developed by clinical psychologists were adapted for use in consumer and marketing research. In marketing the projective technique is used with limited boundary conditions than in psychology. Passenger cars as complex systems are well known base of projection due to their technical and caused emotion complexity. The passenger cars as complex systems are devoted as complex product experience. In psychology, a projective test is a type of test in which the individual offers response to ambiguous scenes, words or images or make connection between two different types of products. This type of test emerged from the psychoanalytic school of thought, which suggested that people had unconscious thoughts or urges. Firstly, the feelings about the explanatory products are questioned. Then the connection between the explanatory products and the investigated products is analysed. As the connection revealed explanation could be done about the feelings of investigated products. These projective tests were intended to uncover such unconscious desires that were hidden from conscious awareness. Specifically, cars were used as a means of projective techniques. Authors in this article are only dealing with human feelings about passenger cars (*Fig. 2*). On the figure it can be seen that one man can have opinion on multiple mediate product. Each product can be connected with multiple revealed preferences. All this chain is designed in order to get to the examined products. With this type of complex association chain the end product could be investigated through other products and hidden preferences can be revealed by the mediate products.

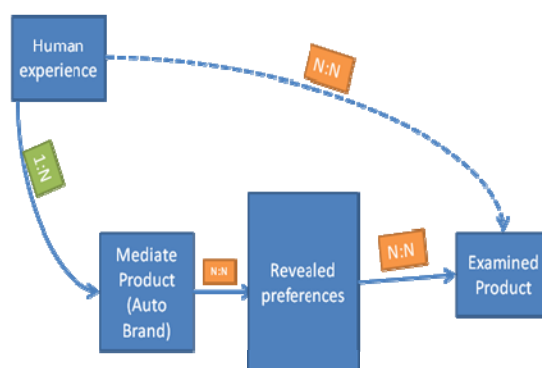


Figure 2. Model of methodology
(source: own compilation)

Passenger cars are really good mediating products. They can be used as a media in order to reveal hidden preferences of other investigated products. That is, why cars and transport vehicles are good media.

3. Analysis

A sample of 18-person in the preliminary investigation were used to test the car related emotions. 28 different cars were selected (*Table 1*).

Table 1. Investigated auto brands

Alfa Romeo
Audi
BMW
Citroen
Dacia
Fiat
Ford
Honda
Hyundai
Jeep
Kia
Land Rover
Lexus
Mazda
Mercedes
Mini
Mitsubishi
Nissan
Opel
Peugeot
Renault
Saab
Seat
Skoda
Suzuki
Toyota
Volvo
VW

(source: own compilation)

The aim is to subsequently identify associations related to the product, to the passenger cars, to their level of experience. Authors have investigated the revealed associations that are invited by the varieties of car brands. Experience is shaped by the characteristics of the user (e.g., personality, skills, background, cultural values, and motives) and those of the product (e.g., shape, texture, colour, and behaviour). All actions and processes that are involved, such as physical actions and perceptual and cognitive processes (e.g., perceiving, exploring, using, remembering, comparing, and understanding), will contribute to the experience [4]. In addition, the experience is always influenced by the context (e.g., physical, social, economical) in which the interaction takes place. The association questioners have been statistically analysed; frequency (Eq. 1):

$$\varphi_i = \frac{v_i}{\sum_{i=1}^n v_i}, \quad (1)$$

where

φ_i : frequency of auto brands in the sample [-]

v_i : number of answers in the sample [-]

n : total number of brands in the sample

and cumulated frequency (Eq. 2) is calculated:

$$\Phi_j = \sum_{k=1}^j \varphi_k, \quad (2)$$

where

Φ_j : cumulated frequency of auto brands in the sample [-]

φ_k : number of answers in the sample [-]

In addition frequency the emotional content of responses is examined. Four different cases are distinguished for emotional content:

- 1) **Positive emotional content:** respondents described positive feelings or experiences with auto brand. For example: “*This brand refers with high quality for me!*”, “*It is my favourite auto brand, because it is very hot and smart!*”, “*It is a luxury car brand, and I like it very much!*” etc.
- 2) **Neutral emotional content:** respondent formulated feelings without positive or negative content. For example: “*It is an average auto brand, I think it is reliable but not excellent!*” etc.
- 3) **Negative emotional content:** respondents described their negative feelings with chosen auto brands. For example: “*This type of cars are poor quality of level!*”, “*Poor people like this auto brand!*” etc.
- 4) **Ambivalent emotions:** sometimes respondent cannot formulate clear emotional content; they use a car brand and speak about their reasons. For example: “*It is high quality and prestige car brand, but when I could have bought one I choose another brand!*”, “*People like this brand, and I believe it is a good car, but it is not enough attractive for me!*”

Further on attitude (negative, neutral, positive, ambivalent), it has been investigated by gender. This equation (Eq. 3) can be described by a number of evaluator as the function of brand of autos and attitude.

$$N = f(\alpha, \beta), \quad (3)$$

where

N : number of evaluators [-]

α : attitude [-]

β : brand of autos [-]

In order to analyse the changes and differences the gradient function has been derived from Eq. 3:

$$\nabla N = \frac{\delta N}{\delta \alpha} i + \frac{\delta N}{\delta \beta} j, \quad (4)$$

where

∇N is a matrix returns the α and β components of the two-dimensional numerical gradient.

$\partial N / \partial \alpha$ refers to the differences and changes in α direction, which means how the number of evaluators changed with the changing of attitude when the brand of autos remained constant.

i : is the unit of α

$\partial N / \partial \beta$, refers to the differences and changes in β direction, which means how the number of evaluators changed with the changing of auto brands when the attitude remained constant.

j : is the unit of β .

Unfortunately in our case the function is not continuous. In order to solve the problem Eq. 4 need to be rewritten in a discrete form:

$$\nabla \widetilde{N}_k = \frac{N_{k+1} - N_k}{\alpha_{k+1} - \alpha_k} i + \frac{N_{k+1} - N_k}{\beta_{k+1} - \beta_k} j, \quad (5)$$

where

$\nabla \widetilde{N}_k$ is a matrix of discrete function that returns the α and β components of the two-dimensional numerical gradient.

$N_{k+1} - N_k$

$\alpha_{k+1} - \alpha_k$, refers to the differences and changes in α direction, which means how the number of evaluators changed with the changing of attitude when the brand of autos remained constant.

i : is the unit of α .

$N_{k+1} - N_k$

$\beta_{k+1} - \beta_k$, refers the differences and changes in β direction, which means how the number of evaluators changed with the changing of auto brands when the attitude remained constant?

j : is the unit of β .

4. Results

Firstly, the descriptive statistics are presented (Fig. 3).

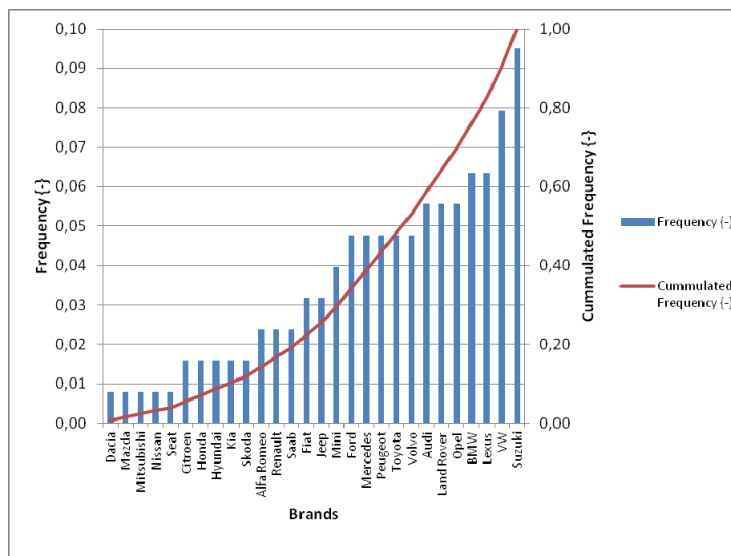


Figure 3. Frequency of Auto Brands in association questionnaire
(source: own compilation)

As it can be seen from Figure 3 in the association questionnaire Suzuki, VW and Lexus were mentioned mostly; represented auto brands and the frequency of emotional content in the responses from Fig. 4. It can be seen Audi and Lexus were used frequently to describe Positive feelings or experiences. Very interesting and Hungarian characteristic reflected in the ambivalent responses, because BMW and Opel were the mediate product to formulate respondents ambivalent feelings. Opel is a very (or too) average family car, and BMW often identify the “not honest business men” car; with Suzuki and VW mixed feelings and emotions are described.



Figure 4. Frequency of Auto Brands in association questionnaire
(source: own compilation)

Significantly different attitude has been found by gender (Fig. 5). Negative attitude was coded with -1, neutral with 0, positive with 1 and ambivalent with 2.

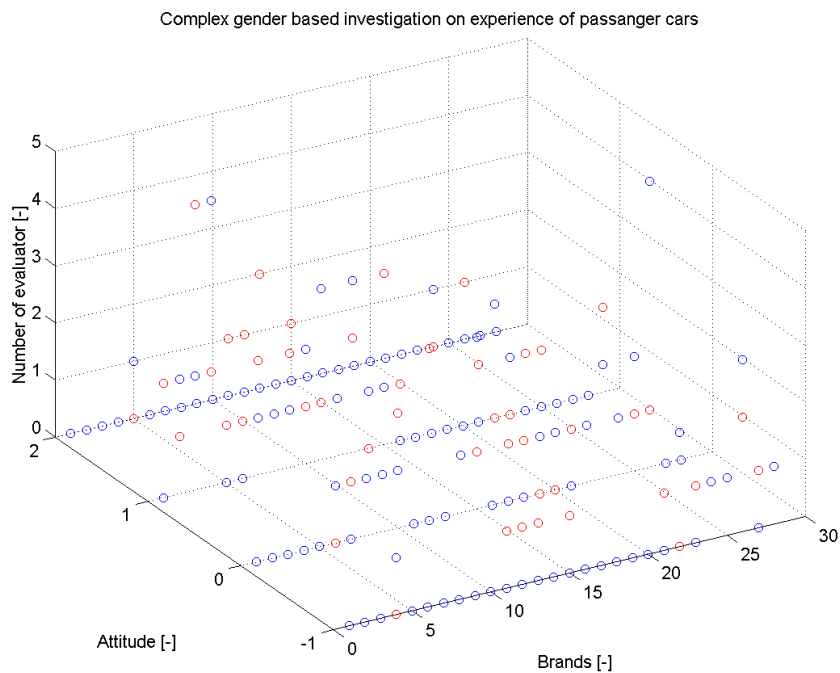


Figure 5. Differences of attitudes connected to Auto Brands
(source: own compilation)

Vectors as arrows has been displayed. The origin of vectors refers the attitude and auto brands and the combining components are $(\frac{N_{k+1} - N_k}{\alpha_{k+1} - \alpha_k} i + \frac{N_{k+1} - N_k}{\beta_{k+1} - \beta_k} j)$ as described in methodology. By definition arrows can overlap that sometimes makes the understanding harder.

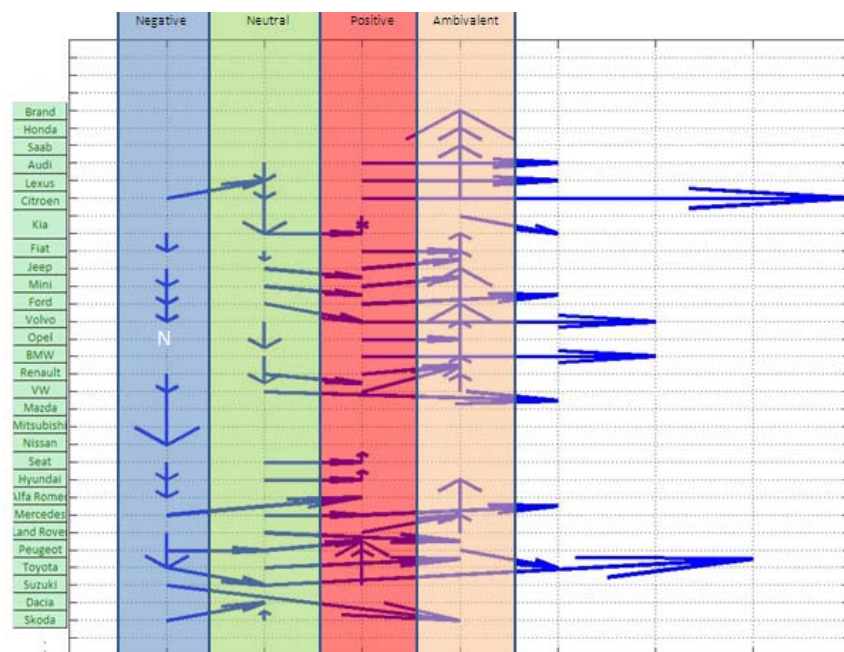


Figure 6. Visualisation of male gradient matrix
(source: own compilation)

As it can be seen from Figure 6 Lexus, Volvo, BMW, Audi, Saab have the major positive attitude in decreasing order VW and Land Rover have the major negative attitude in Hungary by male evaluators.

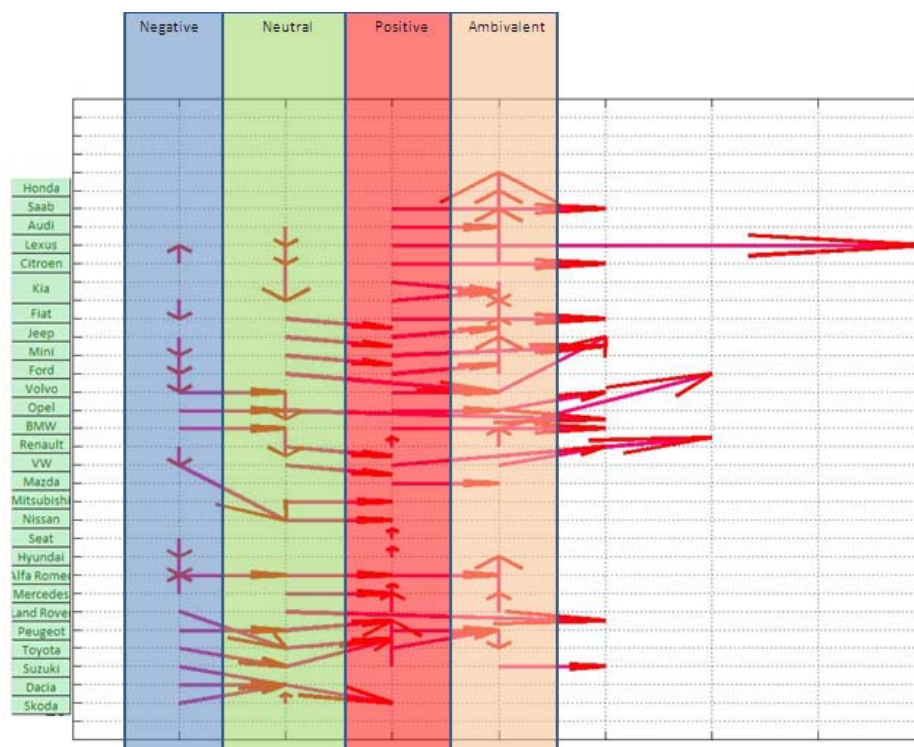


Figure 7. Visualisation of female gradient matrix
(source: own compilation)

As it can be seen from Figure 7 Lexus, Saab, Citroen have the major positive attitude in decreasing order VW and Opel have the major negative attitude in Hungary by female evaluators.

5. Conclusions

Passenger cars are very complex products. Furthermore passenger cars are not only a complex mechanical and technical product but they are also as a complex meaning psychology. Cars have different shapes, colours, sounds and volume giving persons different emotional feelings. Therefore the car as a complex product is suitable for marketing specialist to compare other products through cars. Authors are describing the theoretical investigation of such a qualitative examination and the practical results. This comparison possibility that is associations based as a tool is developed in psychology. Everyone has an opinion about cars most of us even have an experience as well. In this paper, authors have introduced a general framework for experience of passenger car as a product that applies to all affective responses that can be experienced in human-product interaction. Authors have investigated the attitudes that are connected to passenger car brands. Further on authors have investigated the gender factor of such psychological environment and found significant differences.

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