

## **Perception of E-Mobility related OEM-brands – an evaluation of potential influencing variables**

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### **Abstract**

In the 21st century where the energy conservation, the environmental protection and sustainable issues are growing concerns, the development of electric vehicles gets more and more important especially against the background of the increasing population in the near future. Increased environmental awareness and the dependence on crude oil import require new vehicle drive technology. Many global automobile companies are planning to sell electric vehicles by 2012. We assume that the preference of specific car brands influence the perception of product competence of the consumer in the development of E-Mobility related OEM-brands. The success of an electric mobility strategy of an OEM depends in our opinion on the consumer perception of their electric vehicle development competence. In this paper we review new empirical research findings on the perception of E-Mobility related OEM-brands.

**Key Words:** consumer perception, electric vehicles, e-mobility, development competence, brands

### **1. Introduction**

Around the world there are more than hundreds of millions vehicles on the road. These vehicles burn over a billion cubic meters petrol/gasoline and diesel fuel annually. Negative effects on the environment (e.g. due to high CO<sub>2</sub> emission) as well as increasing oil prices are only two of the numerous consequences. The number of vehicles will increase in the near future not least because of the developments in the newly industrialized countries like China and India. New environmentally friendly and affordable drive technologies advances are essential in order not only to reduce CO<sub>2</sub> emissions (fuel consumption) but also to disengage from the country's dependence on fossil fuels in general and crude oil import specifically. Germany imported 97.6 million tons of crude oil with a value of Euro 30.9 billion in 2009 ([www.destatis.de](http://www.destatis.de)). This situation leads to the focus of interest for green energy in Germany. In 2009 the German federal Government approved the National Development Plan for Electric Mobility which provides the framework for technological developments as well as for the market introduction of plug-in hybrid and electric vehicles (battery and fuel cells). The German Government wants to bring more than a million electric vehicles onto the street by 2020. This focused strategy harmonizes and coordinates all relevant actors through interactions between the science, the industry and the politics. Whilst hybrid vehicles (combination of a gasoline engine and an electric motor) entered the market in 1997 and expanded rapidly in the last years, many major automobile companies plan to have versions of electric cars by the end of 2012. The serial production of electric vehicles will start in the next few years. The crucial question will be to what extent the worldwide OEM (Original Equipment Manufacturer) have the ability to compete in this segment. Will the buying behavior of German consumers only focus on German automobile manufacture? Competitive ability is demonstrated on the one hand by the range of products and the objective technical competence of the automobile manufacturer on the other hand the ability to compete is demonstrated by the subjective consumer perception of the OEM competence. The paper tries to get answers if consumer preferences for car brands correlate with the perception of competence in terms of E-Mobility related OEM-brands. The success of an electric mobility strategy of an OEM depends on this partial indicator.

## **2. Theoretical background**

The issue of “branding” is one of the most crucial topics for marketing management (Aaker 1996; Esch et al. 2006). Brand is the image that consumers have in mind (Aaker 1991). The brand issue is discussed in many contexts (e.g. brand preference, brand awareness, brand loyalty, brand association) and from different perspectives (e.g. customer-based, financial). Brands play a significant role not only for the improvement of consumers' lives but also for the enhancement of the financial value of firms (Kotler & Lane 2006). Brands differentiate products or services in a functional, rational or emotional or intangible way from competitors (Esch et al. 2008). In order to reach a brand attractiveness brand concepts must address customer interest (Wonglorsaichon & Sathainrapabayut 2008). This study focuses on brand perception. Main element in the branding process is the creation of a brand identity and a positive brand image (Kuhn & Zajontz 2011). How does the consumer view the product? Brand perception is consumers' ability to identify the brand under different conditions (Kotler & Lane 2006). The brand perceived quality, brand attributes (e.g. functional, emotional aspects) as well as the brand image are important factors for the brand preference (Scharf et al. 2009). Brands were generated by life experience. They were stored as semantic networks in the memory of persons. These networks were activated by key stimulus (Scharf et al. 2009). The more specific associations a consumer relates with a brand, the clearer is its brand image. This study is focused on the perception of OEM-brands (automobile industry) and the transferability of the brand perception to the perception of competence in developing electric vehicles.

## **3. Research Question and Methodology**

Against this theoretical background two main questions arise. To what extent does the consumer preference for car brands correlate with their perception of product competence in the development of E-Mobility related OEM-brands? Can the general brand perception of an automobile company be transferred to the perception of their competence in the development of electric vehicles? An attempt to answer to these research questions a concept for primary research is inevitable. The following results are based on a two-step empirical research design which includes a secondary data analysis and a quantitative research method (Berekoven, Eckert, and Ellenrieder 2009). According to the defined research question, the available research method is an internet-based standardised questionnaire survey among German consumers. In a period of four weeks 852 questionnaires were completed which corresponds with a rate of return of 11,3%. The survey represents a representative cross-section generated by the quota sampling. The research design is supposed to shed light on the consumer perception of competence of E-Mobility related OEM-brands.

## **4. Key Findings**

Descriptive statistics were used to describe the basics of the data in the study. Correlation analyses were applied to identify whether there are relations between the brand perception and the perception of competence for e-mobility. Premium OEM-brands (e.g. Audi, BMW, Mercedes) were more associated with “emotional” attributes (e.g. design, driving pleasure, elegance) by the consumers whilst middle-class OEM-brands (e.g. Toyota, Opel) were more related with “rational”/functional attributes (e.g. cost/performance ratio, quality, reliability) (see figure 1).

Audi	<ol style="list-style-type: none"> <li>1. design (62,5%)</li> <li>2. Quality (46,8%)</li> <li>3. driving pleasure (33,6%)</li> </ol>
BMW	<ol style="list-style-type: none"> <li>1. driving pleasure (51,7%)</li> <li>2. quality 49,0%</li> <li>3. design (44,8%)</li> </ol>
Mercedes-Benz	<ol style="list-style-type: none"> <li>1. quality (55,3%)</li> <li>2. elegance (48,7%)</li> <li>3. design (31,6%)</li> </ol>
Toyota	<ol style="list-style-type: none"> <li>1. reliability (69,2%)</li> <li>2. good cost/performance ratio (61,5%)</li> <li>3. environmental awareness (53,8%)</li> </ol>
Opel	<ol style="list-style-type: none"> <li>1. good cost/performance ratio (59,3%)</li> <li>2. „made in Germany“/ reliability (51,9%)</li> <li>3. quality (37%)</li> </ol>

Figure 1: Brand perception of OEM

Regarding the question of the perception of competence in developing electric vehicles, the results show that German OEM-brands (Audi, BMW, Mercedes) performed better than OEM from other countries. Toyota is the only exception. We assume this result depends on the high, well-established activity of Toyota in developing alternative drive concepts.

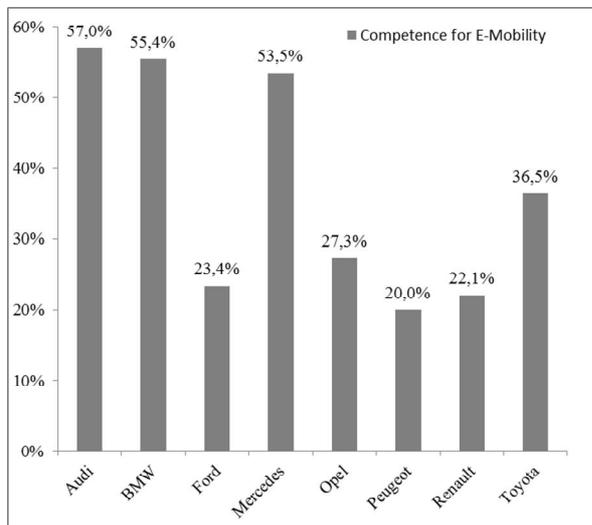


Figure2: Perceived competence for the development of electric vehicles

Regarding on the brand preference and the perceived development competence of the consumers, figure 3 shows that the transferability of the brand preference to the perception of competence for e-mobility is given. Nevertheless differences between the OEM-brands in terms of the competence in developing electric vehicles are existent.

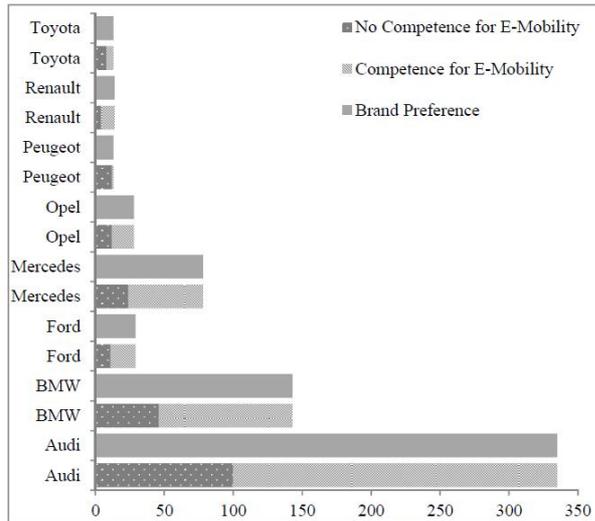


Figure3: Brand preference vs. Competence for E-Mobility

	Chi-Square	Phi	p
Toyota	0,556	0,028	0,456
<b>Renault</b>	15,123	0,145	0,000
Peugeot	1,315	0,043	0,251
<b>Opel</b>	10,412	0,12	0,001
Mercedes	4,559	0,08	0,033
<b>Ford</b>	19,449	0,165	0,000
BMW	3,235	0,067	0,072
<b>Audi</b>	12,746	0,133	0,000

Table 1: Statistical parameters

## 5. Conclusion

Concluding, OEM in the premium brand segment are ranked high concerning the ability 6 to develop electric cars. These brands reached a high perception of competence for emobility. We assume consumer associate the perceived brand quality (e.g. caused by the market position) with the competence in developing electric vehicles. Especially the German OEM have an excellent reputation concerning the new field of E-Mobility. If these findings are also reliable for international respondents should be the content of a following international study. To summarize briefly the main result: If consumers prefer a certain brand they transfer this perceived brand image to the competence in managing new challenges of e-mobility.

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