

Who should Communicate to Make the World a Greener Place? Car Brand Loyalty as an Essential Attribute of Pro-Environmental Education

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Abstract: This article aims to investigate the socio-economic nature of car brand loyalty. The hypothesis is that brand loyalty is a complex structure with a complicated socio-economic background. Nowadays, massive research is focused mainly on the psychographic background of the brand loyalty phenomenon. However, a socio-economic aspect of consumers is also entering into brand loyalty creation. It is supposed that brands with loyal consumers have more educative strength than brands where brand loyalty is missing. As it is challenging to identify consumers with a psychographic profile suitable for loyal brands, the changes in consumer behaviour are hard to reach. However, if the socio-economic profile of loyal consumers is detected, environmental education can be focused precisely and with higher effectiveness. Some preliminary data have been collected in Slovakia to investigate the socio-economic background of car brand loyalty. To collect these data, a questionnaire survey has been used. It was realised in the last quarter of the year 2021 on the sample of 2035 Slovak inhabitants older than 15 years. Statistical analysis has been provided via a decision tree approach. It has been found that two relevant factors significantly influence brand loyalty - respondents' age and income. Based on these findings, it can be stated that, in general, brands with the higher pro-environmental communication potential in the case of the Slovak Republic are Škoda, Audi and BMW. An approach that includes the strength of pro-environmental orientation of consumers (focusing on age categories) confirms this order. However, in the case of the income perspective, Peugeot's list of car brands should be extended, which has been surprisingly identified as a car brand with the potential to be used widely in the scope of pro-environmental education in specific area's conditions in the Slovak Republic.

Keywords: brand loyalty; branding, car brand; green marketing; environmental education

1 Introduction

The need for sustainable development should be the imperative of corporate existence in contemporary markets [1]. Corporate mature sustainable activity has a positive effect on resilience or financial performance and ensures protection against economic downturns caused by various types of crises [2]. Among other things, even future industry 6.0 focuses on sustainability [3]. Thus, even though many companies who own reputable brands across a variety of sectors invest much money to the socially responsible projects focused on changing the consumer behaviour in favour of green products and pro-environmentally oriented technologies, the situation worldwide remains without any significant change if the legislative stimulus for such behaviour is not applied [4].

Although the perspective of sustainable activity of enterprises is not as pessimistic it has used to be [5], the shift in pro-environmental orientation is still more formal than real [6]. It means that, despite the corporate effort (corporate social responsibility) and changes in consumer behaviour (personal social responsibility) the real effect is still low – or at least slower in progress than it would be required [7, 8].

One of the possible reasons for such a situation can be the absence of connection and relationship between sender and relevant receiver of the message. In detail, even if the message is well formulated, the communication with educational background is not effective if the receiver of the message is not perceptive to the message. One of the factors which can positively affect the perceptiveness of the receiver of the message is brand loyalty [9]. There are two fundamental dimensions of the relationship between the sender and the receiver of educational messages: 1) receivers are willing to be influenced by the brands to which they are loyal, and 2) only brands with loyal consumers are prospective efficient message senders. Thus, there is a close relationship between the brand and its loyal consumer in positions of educator and educated. Although contemporary scientific literature states this relationship, the more profound analysis of relevant brand educators with a significant impact on consumer buying behaviour in environmentally harmful sectors is missing [10]. Individual transport belongs to the category of environmentally most harmful sectors [11] due the fact that the transportation sector is one of the largest emitters of CO₂ [12] and is growing steadily [13].

There are two main ideological flows focused on the environmental harming effect of passenger car usage: 1) emissions and 2) urban factors. While the second focuses on excluding individual passenger cars from the city centres, the first one

has a less ambitious goal – if the left of car usage is impossible, then at least less harmful fuel technologies should be used [14].

Although consumers are aware of the pro-environmental benefits of abandoning traditional combustion fuels and preferring public transport, respectively, car-sharing, their real buying decisions still dominate existing patterns, and new fuel technologies are accepted with suspicion [15]. Sustainable buying behaviour is traditionally discussed in the scope of 1) food consumption and 2) package and recycling [16, 17].

The situation is that while many types of research focus on the psychological background of the buying behaviour (trying to analyse pro-environmental buying decisions ex-post) [18], the ex-ante analysis would be much highly appreciated to predict the buying behaviour and to create a more effective platform to influence it in the required way. As a consequence of this need, the profile of green consumers is analysed. Contemporary, mainly: 1) generational and 2) national approaches are used [19, 20]. However, the sector analysis is quite fragmented – luxury goods, services and physical products [21-24]. Surprisingly, such an approach is not massively used in the most polluting sectors [25].

Most of these analyses apply the psychographic approach [26]. On the one hand, such a fact is entirely understandable as the motivation to pro-environmental behaviour is more behavioural than cognitive, on the other hand, the strong potential of the socio-economic perspective is missing. Thus, the phenomenon of green persona is mainly connected with psychographic characteristics, which are problematic to be detected when any communication activity with educational potential is planned [27].

Many car brands focus their innovative activities on achieving sustainable goals and being environmentally oriented [28, 29]. Although many car producers are aware of the need to act pro-environmentally as a sign of their corporate citizenship, their effort is enormous, and their investments are not turning back. The reason is that consumers are sceptic, and they are still preferring traditional technological solutions. In this situation, car producers' intrinsic and extrinsic motivation decreases, and their effort is stimulated mainly by national governments and international pro-environmental legislation. Thus, a shift in buying behaviour patterns is required. It has been highlighted that a possible way to reach goals set on the platform of sustainable development is systematic education of consumers and legal stimulation of companies [30-32]. Thus, the only possible way to reach this status is to educate the consumers and act strategically. However, this education should not lie on the shoulders of the educational systems, and there should be an active, practical approach to the corporate sphere itself [33-35].

The strong educative potential of valuable brands has been already detected [36-37]. On the other hand, the educative potential of brands with loyal consumer platforms has been just slightly indicated [38]. Traditionally, brand loyalty is

discussed in the scope of its individual value sources – mainly relevant factors of brand attributes, attitudes, benefits and imageries [39]. The socio-economic analysis of the profile of loyal consumers is rather exceptional. Thus, it is not essential to identify brand loyalty sources (in the case of branding, yes, it is), but the socio-economic profile of loyal consumers. And not only this. Also, the status of the brand has loyal consumers. Unfortunately, not each brand considered valuable also has a reliable consumer platform. This explains shifts in brand value ranking and its sensitivity to changes in the macro-environment.

Therefore, the study presented in this paper aims to investigate the socio-economic nature of car brand loyalty. Thus, significant educators and educated can be determined to achieve higher environmental engagement of consumers. The article is structured as follows: the methodology is described after the introduction and literature review that forms the research question. In the methodology section, the detailed statistical tools of survey assessment are written. The results are being analysed and compared with contemporary scientific literature in the results and discussion part. Finally, the conclusion is drawn where the managerial implications, limits and barriers of the research and possible future research directions in this area are highlighted.

2 Methodology

The questionnaire survey, which is the elementary data source for the own analysis has been realised via the CAWI method in the last quarter of the year 2021 on the sample of 2035 respondents – Slovak inhabitants older than 15 years. Such an age limit has been set because the survey has been widely focused on four specific product categories, which represent quadratic concepts of buying behaviour patterns (complex buying behaviour, dissonance-reducing buying behaviour, habitual buying behaviour and variety-seeking behaviour). The basic presumption for statistic sample creation was the autonomous buying behaviour of respondents. This can be assumed from 15 years of age in the Slovak Republic as this is the legal limit for entering into labour law relations. Car brands have been chosen as adequate representatives for complex buying behaviour where the consumer's involvement is high and the differences between brands are low. For such a large sample size, sample distribution approximates a normal distribution, which a central limit theorem can prove. The questionnaire has been composed of two parts: (1) socio-demographic profile of respondents and (2) individual brand value sources perception in selected categories of representatives of buying behaviour patterns.

Statistical analysis has been provided via a decision tree approach. Decision trees are widely used machine learning methods that find their application in classification and regression tasks. In principle, it is a hierarchical, multi-stage

binary decision making system in which the fulfilment / non-fulfilment (if / else) of decision criteria or conditions is gradually evaluated until it is reached an accepted class or solution. The decision making process proceeds from the tree's root gradually through the individual nodes, which form branches with leaves. Although there are several different types of decision trees, the creation of tree structures is mainly governed by the fact that the decision criteria in the individual nodes are arranged according to information importance. The flag or criterion that has the most weight and allows you to best separate the input data into two binary classes (yes / no) becomes the root of the tree. The other nodes are gradually made up of the remaining criteria with less weight, with each node creating two binary descendants. The decision making process follows the individual branches of the tree until we reach the required class or solution (leaf).

The decision tree is a structure used to divide a large set of cases (cases are statistical units, in our consumer analysis) in a database into smaller sets of cases with the gradual application of simple decision rules. The decision tree consists of rules - rules (rules are relationships between variables) to divide a large heterogeneous population into smaller, more homogeneous groups (a group of cases is called a node) concerning the relevant output variable. When creating a decision tree, the criteria divided into individual nodes are critical. The criterion based on which the variable to be used at the appropriate branch level is selected depends on the nature of the output variable. The basic idea of tree growth is related to the theory of data purity. The criterion for selecting a branch is to increase the purity of the child nodes (a net node is considered to contain only cases of one class of output character).

Decision trees are used to identify groups discover relationships between them. It features visual classification to categorise the results and more clearly explain the analysis. Create classification models for segmentation, stratification, data reduction and variable screening. In this case, an ordinary top-down auto-scale decision tree was used, where the decision parameters were sex, age category, education level, size of the city, number of members of the household, and the dependent variable was car brand. A statistical multi-way tree algorithm was used to ensure that every combination of predictor variables was investigated and only the effective combination was visualised. The CHAID (Chi-Square Automatic Interaction Detection) algorithm checked the cross-correlation between predictor variables to examine all possible splits for each predictor (independent) variable category. CHAID creates all possible cross-tabulations for each categorical predictor until the best outcome is achieved, and no further splitting can be performed.

We used entropy as a branching criterion in the case of decision trees, which we created on data sets from market research. The entropy concept is often applied objective weighting method, which works based on recognising the best splitting attribute [40-42]. The entropy model is often used as a typical method of quantifying contamination while the randomness or impurity of data sets is

qualified by the decision tree [43]. When defining entropy, we consider a training set of n cases. The value of input character A describes each case, and the value output character Y . Let the input character take the values a_i ($i=1,2,\dots,k$) and let the output character m have different values - classes y_j ($j=1,2,\dots,m$). Let the probabilities of occurrence of the class y_j ($j=1,2,\dots,m$) of the output character Y denote p_j ($j=1,2,\dots,m$). The entropy of the output character Y can be expressed in the Equation (1):

$$H(Y) = - \sum_{j=1}^m (p_j \log_2 p_j) \quad (1)$$

where p_j is the probability of occurrence of class j of the output character.

The probabilities p_j can be estimated using relative abundances: $\frac{n_j}{n}$, where n_j is the absolute abundance of class y_j ($j=1,2,\dots,m$) in a set of training cases. We then adjust Equation 1 to Equation (2):

$$H(Y) = - \sum_{j=1}^m \left(\frac{n_j}{n} \log_2 \frac{n_j}{n} \right) \quad (2)$$

Entropy is measured between 0 and 1. Entropy is a measure of disorder or uncertainty. When branching, the variable with the lowest entropy value (attribute information value rate) is used; therefore, finally, the combination of the lowest entropy variables leads to the lowest entropy model. Because if it is known how to measure disorder, it was evident that the reduction of disorder (RD) in our dependent variable due to the additional information (independent variable) can also be measured see Equation (3):

$$RD(Y) = H(Y) - H(Y|X) \quad (3)$$

This can be easily derived from Chi-Square Automatic Interaction Detection.

3 Results and Discussion

In the questionnaire, there were 2035 respondents country-wide. Of all the respondents, 49,9 % were male, and 50,1% were female. Their age distribution is shown in Figure 1.

Detailed analysis of the questionnaire showed a significant spatial difference in passenger car brand preference, but choosing no car was insignificant that strengthened the status symbol idea. The detailed systematic analysis showed that spatial-socio-economic parameters have a significant effect on the chosen brand of passenger cars (Figure 2).

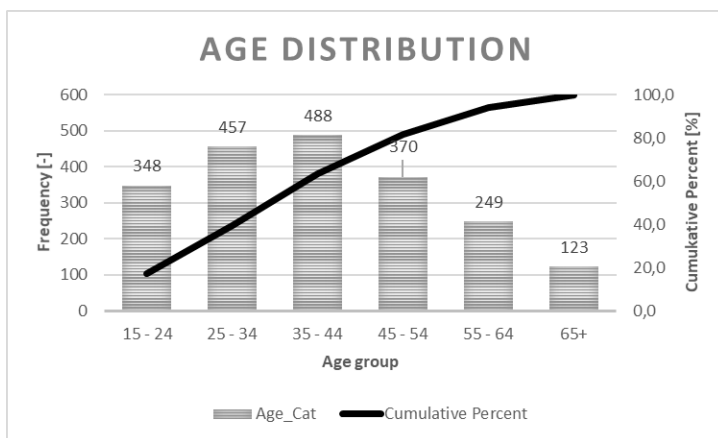
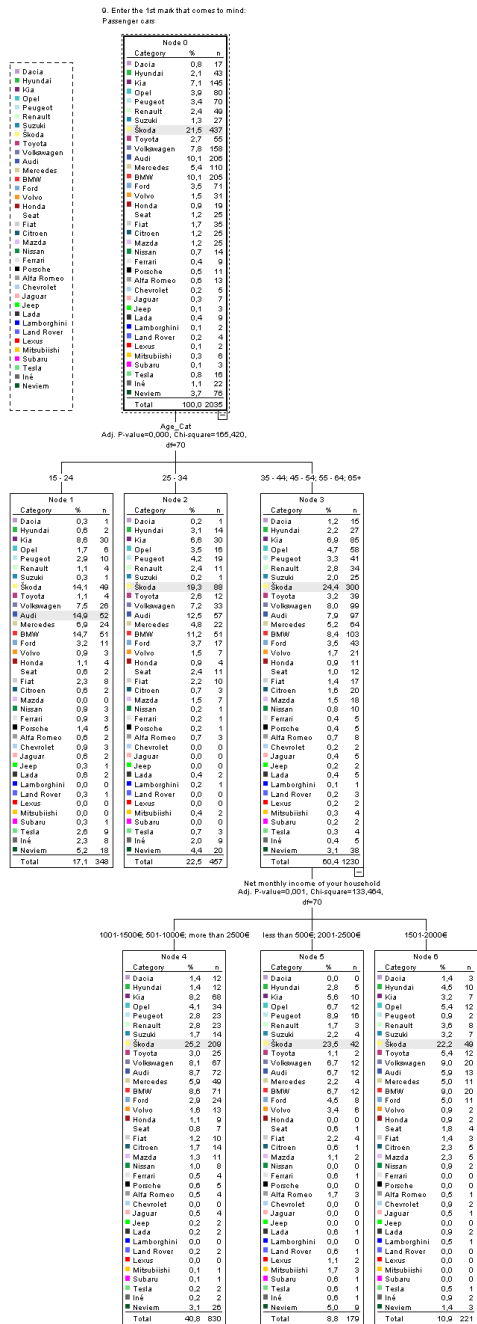


Figure 1

Age distribution in survey

Based on the decision tree analysis, two significant factors could be determined: the respondent's age and income could significantly influence brand loyalty. The Pareto solution of the decision tree can be seen in Figure 3.

Based on the research results, age and income are significant parameters of brand value recognition in the case of Slovak consumers. Thus, the educational activity of car brands should be realised following the finding that the brand loyalty phenomenon in the case of consumers under 35 years are influenced simply by this characteristic. In comparison, income is another relevant characteristic in the case of consumers above 35 years. In other words, in the case of younger consumers, their loyalty is not connected with their financial status. This fact is significant in the case of prospective pro-environmental orientation studying. As it has been already stated that typical green consumer is from Generation Z (those born since 1997) or from the generation of so-called Millennials (those born between 1981 and 1996), the future of pro-environmental orientation of passenger car consumers is green [36]. It declares the generational approach of Moslehpour et al. [19]. Consumers are not influenced by their income when considering brand loyalty. It means that: 1) their price sensitivity is less and 2) if there is no disposable income, the branded product would not be purchased, but the consumer would remain still loyal. From the point of view of the passenger car brands (and their sales goals), where higher prices manifest the pro-environmental innovations, the income parameter is still crucial, while from the point of view of general pro-environmental attitude, this situation is beneficiary. In this aspect, Silvestre & Tirca theory has been verified [28]. They have stated that many car brands focus their innovative activities on achieving sustainable goals and being environmentally oriented.

Figure 2
Visualisation of decision tree

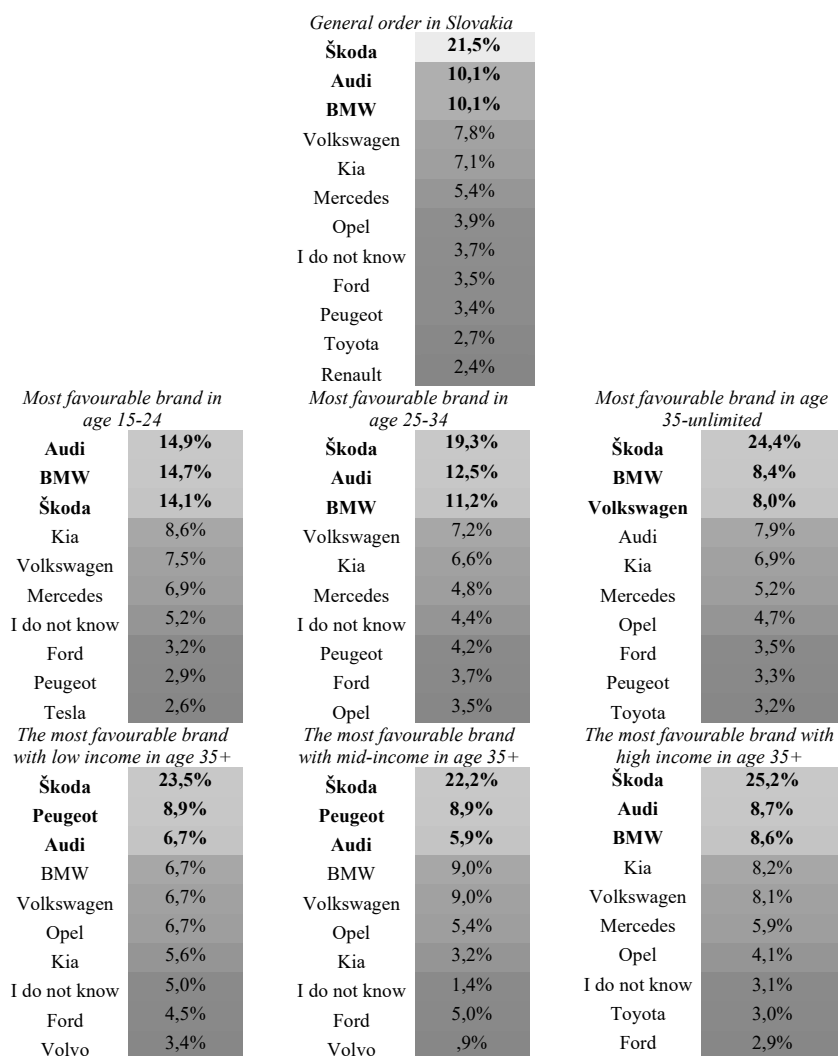


Figure 3

Node components of decision tree based on survey results

**Please note that as Pareto solution, only 80% of cumulative relative frequency were shown*

Consumers from younger generations (Generation Z and Millennials under 35 years) are surprisingly loyal to brands sold for prices above their disposable. It means that even though the purchasing experience of such consumers is missing in many cases, the brands are detected as highly valuable from the point of view of this category of consumers. Thus, a simultaneous special effect could be observed – as these consumers are not loyal based on their previous purchasing experience, a possible source of loyalty lies in the convergence of the pro-

environmental orientation of these brands and the generational green orientation. Such loyalty can be considered a special symbolic relationship between consumer and brand. From this point of view, Audi, BMW and Škoda are socially beneficial as they have solid educative potential towards consumers under 35 years and can be considered attitude makers in the broader perspective. That means that the trends they set are accepted by loyal consumers and transmitted to their consumer behaviour in the scope of other product categories. However, the environmental load of passenger car usage is not solved in such a case. At least not by switching to the usage of environmentally innovative cars produced by these brands.

On the other hand, possible side-effects can increase car sharing or public transport usage. While the situation in case of consumers under 35 years is quite clear – this category of consumers tends to pro-environmental purchasing behaviour and car brands with whose they are loyal to, strengthen this attitude generally (regardless of real purchasing decisions in favour of these brands), in case of age category above 35, the situation is different. Here, income is also a significant phenomenon of brand loyalty, and thus, the spectrum of car brands where consumer loyalty could be detected is broader. Therefore, if the consumer is above 35, also the income matters and instead of BMW, for this category of consumers from low or middle-income class, Peugeot is a car brand with a significant prospective impact on the pro-environmental purchasing and consumer attitudes. This potential has not been significantly recognised and used so far. Thus, the Peugeot car brand could solve environmental damages caused by traditional combustion engine passenger car usage by focusing more on eco-innovations and educating loyal consumers in favour of higher environmental engagement of their purchasing behaviour. Summarising the above-mentioned, for the consumers under 35 years, the most relevant car brands with educative potential are Audi, BMW and Škoda regardless of their income categories, while for the consumers above 35 years, the income category is relevant. Thus, the identified loyal car brands Audi, BMW and Škoda are capable of influencing the pro-environmental purchasing behaviour of a high-income category of consumers, while in the case of low and middle-income categories, BMW is replaced in the scope of loyalty ranking by Peugeot. In this aspect, the importance of Peugeot is even more remarkable because this category of consumers does not belong to the category of green consumers and thus, as Peugeot is considered a valuable brand, its loyal consumers are willing to buy it regardless of its eco orientation. Thus, it has been extended the theory of Xiao *et al.* has just slightly indicated the educative potential of brands with reliable consumer platforms [38].

While the managerial implications are apparent, some limitations should be accepted. Thus, the results are not generally applicable without reconsidering the specifics of the national environment. Even though it has been detected that psychographic specifics are not taken into account, instead of them, attention is paid to the socio-economic nature of brand loyalty, the psychographic nature of the market cannot be abandoned, primarily because of different levels of eco-

awareness and distribution of capital in the society. In other words, the research results should be revised before applying them in specific national market conditions. In this aspect, tradition and the brand's long-term image in society can be considered an essential pillar of brand loyalty. In the case of, the Slovak Republic, it is visible in the case of the Škoda car brand, which is still considered a former national brand due to the common socio-political development of the Czech and Slovak Republic during the 20th Century.

Similarly, from the psychographic point of view, this brand has a robust love brand status because of the very dominant position of this car brand in Slovak families in the past. However, this phenomenon is evident mainly in the case of older consumers (35 years and more). In the future, the aim of the study could be extended, and a deeper analysis of car brand innovation and educational activities should be realised. In such a case, it would be confirmed whether the innovative and educational activities are homogeneous across the age and impact categories as in the case of Audi, BMW and Škoda for consumers under 35 or Audi, Peugeot and Škoda for low and middle-income consumers above 35. If not, it would be helpful to be detected because of the theory and practice of eco-educational activities oriented to consumers. So far, it has been mainly stated the non-effectiveness of certain eco-education in general and not in a broader perspective that should explain the internal variability of eco-educational activities.

Conclusions

This paper aimed to investigate the socio-economic nature of car brand loyalty. It has been supposed that brands with loyal consumers have more considerable educative strength than brands lacking brand loyalty. The data for the research has been collected in Slovakia to investigate the socio-economic background of car brand loyalty. To collect these data, a questionnaire survey has been used. It was realised in the last quarter of the year 2021 on the sample of 2035 Slovak inhabitants older than 15 years. Statistical analysis has been provided via a decision tree approach. It has been detected two significant parameters – age and income.

Based on these findings, it can be stated that for the consumers under 35 years, the most relevant car brands with educative potential are Audi, BMW and Škoda regardless of their income categories, while for the consumers above 35 years, the income category is relevant. Thus, the identified loyal car brands Audi, BMW and Škoda can influence only the pro-environmental purchasing behaviour of the high-income category of consumers. In contrast, in the case of low and middle-income categories, BMW is replaced in the scope of consumer loyalty ranking by Peugeot. In the scope of the above-mentioned, Audi, BMW, and Škoda are socially beneficial as they have solid educative potential towards consumers under 35 years and can be considered attitude makers in the broader perspective. That means that the trends they set are accepted by the platform of loyal consumers and transmitted by them to their consumer behaviour also in the scope of other product

categories. On the other hand, the importance of Peugeot is even more significant because consumers over 35 years do not belong to the category of green consumers, and thus, as Peugeot is considered a valuable brand, its loyal consumers are willing to buy it regardless of its eco orientation. Here, not only the educative but eco-innovative potential is equally important.

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