

INNOVATIONS IN GREEN MARKETING: ANALYSIS OF CUSTOMER PERCEPTION TOWARDS GREEN AUTOMOBILES

Ms. Rochelle Ambica Fernandes*
Mr. Anto Shaju Sathish**

ABSTRACT

Green Marketing is a sustainability depicting way towards customer attraction. The automobile industry has been one of the causes of pollution, global warming, CO2 emissions and has raised environmental concerns. Consequently, initiatives have been taken to reduce the harm to environment by introducing green products such as battery electric vehicles, natural gas vehicle, hybrid vehicle, hybrid electric vehicles and so on. This paper highlights the innovations in green marketing focusing mainly on green automobiles. Alternatively, analyses of the perception of the selected sample towards green automobiles has been carried out. The study has been undertaken in the state of Goa. By using convenient sampling method, a sample of 60 respondents have been interviewed. The data is collected from primary as well as secondary sources. Furthermore, the data collected has been analyzed using Factor Analysis and Regression Analysis.

Keywords: *Green Marketing, Environmental Concerns, Automobiles, Innovations.*

Introduction

The long list of threats to the environment has brought about a revolution to protect the environment. Incidents such as the Burning of Amazon forest (2019), the Great Smog of Delhi (November 2016), Gold King Mine waste water spill in Colorado (August 2015), ExxonMobil oil spill in the Niger Delta in Nigeria (May 2010) has raised concern for taking action to protect the environment. The effect of climate change, deforestation, loss of biodiversity, oceanic dead zones caused due to high levels of chemicals in water and global warming is threatening human life on earth. Many Nations, Organizations, Environmentalists are working towards reducing the harm to the environment. Young environment activists like Greta Thunberg, Autumn Peltier-Canada, Ridhima Pandey-India and many more are working towards environment protection. Then, why will those with higher power to influence a change in society can stay behind. The corporates have an influential tool and that is Marketing.

Various environment concerns throughout the globe have brought about the concept of Green Marketing. The term Green Marketing came into prominence in the late 1980s and early 1990s which resulted in one of the first books on green marketing entitled "Ecological Marketing". Green Marketing in simple words means marketing of goods and services based on the environmental benefits. Green marketing can involve a number of different things, such as creating an eco-friendly product, using eco-friendly packaging, adopting sustainable business practices, or focusing marketing efforts on messages that communicate a product's green benefits. Many Automobile Giants like the Tesla, Skoda Auto, Volkswagen Group, Renault, are developing ways through which they can contribute towards Green Revolution.

* Assistant Professor in Commerce, Carmel College of Arts, Science and Commerce, Nuvem-Goa, India.

** Assistant Professor in Commerce, Rosary College of Commerce and Arts, Navelim, Goa, India.

Literature Review

Anuradha Gaikwad, Deepa Ingavale (2011), in their paper titled "A Study of Consumer Awareness for Green Marketing" focused to study the awareness of consumers with respect to green marketing along with finding out the willingness of the consumers to pay more for green products. The study was carried out in Kolhapur taking into consideration 100 respondents for the study. The responses were collected by convenient sampling method. With the help of cross tabulations relation of income, education and occupation with green marketing was analyzed however, it was concluded as no relation. It was found the 60% people were aware although they show no willingness to buy the expensive eco-friendly products.

Aditi Jaju (2016), in her thesis titled "A study of the Impact of Green Marketing on Consumer Purchasing Patterns and Decision Making in Telangana, India" worked on exploring the impact of green Marketing on consumer purchasing patterns and decision making. Survey method was used and questions related to socio-demographic, consumers environmental beliefs and environmental behavior were asked. Descriptive, regression analysis and correlation were carried out in SPSS software. Also, parametric and non-parametric tests have been prominently used along with t-test and ANOVA. Findings are that the respondents were aware about green marketing and showed concern towards environment but they were reluctant in buying green products.

Bikramjit Singh Hundal (2015), in his Paper "Consumer Perception towards Green Products: A Factor Analytic Approach" focuses on studying the consumer perception towards eco-friendly products with the factor analytic approach. A sample of 100 graduates and post graduate students from Amritsar (Punjab) were selected for the study. Seven factors are manipulated in this research paper which is Desire, Trustworthiness, Preference, Ethical, and Awareness, and Initiative, Social welfare for getting the result. It has been found that there is lack of awareness as it is a new product and also there should be a certification given by a quality control board.

Haripriya S. (September 2019), in the paper titled "A Study on Customer Perception towards Green Products in Coimbatore - Empirical Study" has tried to find the relationship of demographic variables such as age, gender, qualification, profession, etc. and consumer perception towards Green Products in Coimbatore, Tamil Nadu. Analysis of collected data is done by using tools like simple percentage method and Chi-square test. It has been found that there is a close relationship between demographic variables (age, gender, educational qualification, profession, income, etc.) and overall customer perception towards Green Products.

Pooja Jain, Praveen Mehta (2016), in her paper titled "Customers Perception about Green Marketing" has made an attempt to study the perception of customers about Green Marketing with special reference to FMCGs. The research has been carried out in Jaipur City in India with a sample size of 200 respondents. Collected data has been analyzed using ANOVA and Frequency Distribution. The sampling method which is used is Non-Probability Convenience Sampling. The demographic factors like gender and age are used. Gender proved that male and female have difference in perception about Green Marketing whereas, age of the customers did not impact satisfaction of the customers.

Prachi Trivedi, Meghna Sharma (2018), in their paper titled "An Empirical Study on the perception of Consumers about Green Products in Delhi" consumers perception has been studied with 120 respondents. For analysis statistical tools like mode, median, frequency distribution, Kruskal-Wallis and One-way ANOVA are used to test the hypothesis. Perception of consumers about Green Products has been tested and found that they have positive perception. Consumer perception about Packaging of Green Products revealed consumers appreciate the packaging of Green Products. Similarly, relation between demographics and perception has been analyzed and results reveal that perception do not differ based on education, income and age.

Research Problem

There has been research conducted in India on Green Marketing, Green Products and Consumer Perceptions. But there is no study carried out so far in India particularly on Customer Perception on Green Automobiles.

Objectives of the Study

- To explore the Innovations in Automobiles with regards to Green Marketing.
- To analyse the Perception of the selected people of South-Goa with respect to Green Automobiles.
- To analyse the impact of Positive and Negative Perceptions of the customers on Purchase of Green Automobiles.

Research Methodology

Research Methodology adopted for the purpose of studying the Customer Perception with respect to Green Automobiles is as under:

- **Universe**

For the purpose of study state of Goa has been selected as the universe.

- **Sample**

In order to carry out this study a convenience sample of 60 respondents have been selected.

- **Period of Study**

The period of Study is the period of Survey i.e. January 2020.

- **Data Collection Method**

The present research study is based on data collected from both primary as well as secondary sources. The primary data was collected by using a questionnaire. The secondary data is drawn from internet and different publications.

- **Hypothesis**

H0₁: There exists no significant relationship between Positive Perception of Customers and Intention to purchase Green Automobiles.

H0₂: There exists no significant relationship between Negative Perception of Customers and Intention to purchase Green Automobiles.

- **Statistical Tools Used**

The following statistical tools are used in this study for the purpose of analysis.

- Factor analysis
- Regression analysis

Innovations in Automobiles with regards to Green Marketing

Green Automobiles often known as eco-friendly vehicles, green vehicles, clean vehicle or environment friendly vehicle are the vehicles of this era. They are gaining importance amidst the critical problems the world's ecosystem is facing. Many Automobile companies are coming up with green vehicles which either use environment friendly parts, reduce on environment harming materials, eco-friendly ways to run them and so on.

Following are the few categories of vehicles which have been so far developed with the aim of being eco-friendly:

- **Electric Vehicles**

Electric cars are the ones which use electricity to operate them and use batteries which are rechargeable. They provide a 0% to 99.9% reduction in CO₂ emissions compared to an ICE (gasoline, diesel) vehicle, depending on the source of electricity.

- **Hybrid Electric Vehicles**

A hybrid car uses two distinct power to run them, they are, fossil fuel/ bio fuel and electricity/hydrogen. The engine used are gasoline or diesel engine or electric engine.

- **Compressed Air Cars**

These are the cars which use a motor which is powered by Compressed air. The car can be either powered by air alone or it can be a combined with gasoline, diesel, ethanol or an electric plant with regenerative braking.

- **Liquid Nitrogen Vehicles**

A kind of vehicle which gets powered by liquid nitrogen which comes filled in a tank. These vehicles have been tested but yet they are not commercial as liquid nitrogen has low boiling point and can explode when stored in a tank.

- **Solar Vehicles**

Solar Vehicles are electric vehicles which run on solar energy when exposed to sun with the help of solar panels set on top of the vehicles. The solar panels convert solar energy into electric energy which run the vehicles.

Over the years the Automobile Industry has come up with many innovations to attract the customers and to keep them interested. Likewise, they are working on and bringing innovative vehicles which are green. The table below show the novel vehicles the Automobile companies have brought till date.

Table 1: Novel Green Automobiles

Type	Vehicle Name	Year of launch	Country	Sales (as of) In Units
Electric car	Nissan Leaf	2010	US	4,00,00 (March 2019)
	Renault Zoe	2012	France	1,33,000 (Dec,2018)
	BMW i3	2013	Germany	37,000 (2018)
	Tesla Model 3	2017	US	3,71,000 (Nov,2019)
	Jaguar I-Pace	2018	Austria	2,195 (Nov,2019)
Hydrogen Cars	Hyundai ix35 FCEV or Tucson FCEV	2013	Korea	
	Toyota Mirai	2014	Japan	5,300 (Dec,2017)
	Hyundai Nexo	2018	Korea	1,000 above
Alternative Fuel Vehicles	Honda Clarity	2016	Japan	
Hybrid Vehicles	Toyota Prius Plug-In Hybrid	2012	Japan	
	Ford Fusion Hybrid	2013	US	2,85,000 and more
	Hyundai Ioniq	2016	Korea	106,300
	Kia Niro	2016	Korea	
	Honda Insight	2018	Japan	143,015

Source: Compiled through Secondary data

Analysis and Findings

Beauty is at its peak in the south-west part of India where lies the extraordinary land of natural beauty. The state of Goa coastline by the Arabian Sea to the west showcasing number of tourist destinations. Now as the state is developing and undergoing a variety of developments there comes threat to this Natural beauty. The concern arises when the age-old trees are cut down and arises many environmental concerns. To manage the environmental concerns enterprises are emerging with Green concepts. Green Automobiles will be arriving in Goa in near future. The present study conducted in South-Goa has taken 60 respondents to find their perception on Green Automobiles.

Table 2: Reliability of Total Variables used for the Study

Cronbach's Alpha	N of Items
.506	42

Source: Compiled through primary data

The above table shows the reliability of the data which will be used to do further analysis. The reliability test conducted with 42 variables provides total reliability of 50% which says that the whole data is reliable to the extent of 50%. Therefore, data collected can be effectively used for analysis.

Determination of factors representing Perception of Customers on Green Automobiles

- **Positive Perception of Customers on Green Automobiles**

For the purpose of finding the factors of positive perception of customers with respect to Green Automobiles, the factor analysis has been conducted. The variables such as Depleting Oil Resources, Authenticity of company, Reduction in Environment Concerns, Reduce Air pollution and diseases, Healthy Environment, sense of responsibility, Inspire to contribute towards environment protection, Inspire to purchase, Positive Image due to Brand popularity, Promote sustainable development, Clarity in Ads leaves good image, Attractive looks, Attractive Ads, Status boost, brand image, happiness and purchase even at high price were used to do the factor analysis in order to reduce the variable into few factors to simplify the study.

Table 3: Factor Analysis on Positive Perception Variables

Factors	Component					
	1	2	3	4	5	6
Depleting Oil Resources	.875					
Authenticity of Company	.831					
Reduction in Environment Concerns	.801					
Reduce Air pollution and diseases	.735					
Healthy Environment		.782				
Sense of Responsibility		.767				
Inspire to contribute towards environment protection		.696				
Inspire to purchase		.651				
Positive Image due to Brand popularity			.782			
Promote sustainable development			.700			
Clarity in Ads leaves good image			.624			
Attractive look of Green Automobiles			.548			
Attractive ads				.723		
Status Boost				.704		
Brand Image				.672		
Happiness					.728	
Purchase even at a high price					.723	
Solve high petrol price issues						.779

Source: Compiled through primary data

From the above table the 5 main factors have been derived which are named as follows: -

- **Environment Solution**

Environment solution is the main factor which talks about the positive attitude towards the Green Automobiles. This factor says customers view Green automobiles as contributing towards solution to the depleting oil resources, reduces a number of environment concerns, reduces pollution of air and reduces the diseases which people suffer from due to air pollution. It also says customers as a result believe in the authenticity of the customers.

- **Inspiration**

The next factor derived by condensing 4 variables is inspiration, as per which the customers think Green Automobiles are a step towards healthy environment. They also leave in the minds of people a sense of responsibility towards nature and inspires to contribute to environment protection. This also says Green Automobiles encourage customers to purchase Green Automobiles.

- **Clarity in Ads**

The factor clarity in Ads talks about the advertisements delivered properly that it leaves customers with spark to make purchase rather than with doubts. It says the more popular the brand the more positive perception of the customers about the Green Automobiles. Customers also perceive that sustainable development is promoted through green products. Also, the attractive look of the Green Automobiles leaves a mark on the customers mind.

- **Status Boost**

The factor Status boost says the customers perceive that Green Automobiles can increase their status in the society. They find the advertisements very attractive that it makes them want to buy Green Automobiles. Here, also the Brand image created by the brand has influence on how the customer perceives the Green Automobiles.

- **Happiness**

This factor says customers feel happy when it comes to Green Automobiles as they can replace the non-eco-friendly automobiles which are currently harming the environment. Hence, the Green Automobiles will be purchased even at a higher price.

- **Oil Prices Solution**

This factor speaks of the perception of customers that green automobiles have the ability to solve the issues related to oil prices.

The Kaiser-Meyer-Olkin Value derived is 0.559, which is more than 0.50 and states that the sample selected is good sample. The significance value comes to 0.001 it means that the data is significant at 5% significant level.

Table 4: Total Variance Explained by Factors representing Positive Perception of Customers on Green Automobiles

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
Environment Solution	4.545	25.252	25.252
Inspiration	2.955	16.419	41.671
Clarity in Ads	1.973	10.963	52.634
Status Boost	1.617	8.984	61.618
Happiness	1.381	7.672	69.291
Oil Prices Solution	1.043	5.796	75.087

Source: Compiled through primary data

After doing the factor analysis total 18 variables which were used to determine positive perception of the customers with respect to Green Automobiles have been condensed to 5 Factors. It was also found that the total data explained is 75.087 % and the remaining 24.913 % is unexplained.

• **Negative Perception of Customers on Green Automobiles**

For the purpose of finding the factors of negative perception of customers with respect to Green Automobiles, the factor analysis has been conducted. The variables such as Unimpressive Features, Unreliable with regards to resources used to run them, No intention to recommend to friends and family, Unattractive design, Embarrassment, No ability to replace Normal Automobiles, Impact Reputation, Only for environmentalists, Can't reduce harm to Environment, Presumed to be high priced, Not for middle income customers, Not convinced to purchase, Charging stations problem, Eco-friendly trait does not attract, Difficulty driving, Doubt on Contribution to environment protection and Smooth functioning were used to do the factor analysis to reduce the variable into few factors to simplify the study.

Table 5: Factor Analysis on Negative Perception Variables

Factors	Component				
	1	2	3	4	5
Unimpressive Features	.913				
Unreliable with regards to resources used to run them	.805				
No intention to recommend to friends and family	.739				
Unattractive design	.693				
Embarrassment	.645				
No ability to replace Normal Automobiles	.584				
Impact Reputation		.789			
Only for environmentalists		.736			
Can't reduce harm to Environment		.546			
Presumed to be high priced		.534			
Not for middle income customers			.878		
Not convinced to purchase			.823		
Charging stations problem			.679		
Eco-friendly trait does not attract			.528		
Difficulty driving				.879	
Doubt on Contribution to environment protection					.807
Smooth functioning					.526

Source: Compiled through primary data

The above table contains the 17 variables which has been condensed to 5 factors namely:

- **Unappealing**

The factor named as unappealing includes customers perception about Green Automobiles as having unimpressive features, unattractive design and unreliable when it comes to the availability of resources used to run them. Resources used, such as electricity charge, sunlight to provide solar energy, liquid nitrogen or compressed air. Customers don't find that the Green Automobiles can certainly replace the Normal Automobiles which are currently ruling the market. As a result, they feel embarrassed to recommend them to their family, friends or anyone.

- **Incredulity**

The Incredulity factor derived states that the Green Automobiles are presumed by the customers to be high priced. They do not contribute to the environment protection or reduce harm to environment. Customers think that these automobiles are for environmentalists and can impact their reputation if they go for Green Automobiles.

- **Funds Constraints**

This factor is named as Funds Constraints as it is about the presumption of customers that Green Automobiles are not suitable for middle income customers possibly due to high price or costly maintenance. Also, they suspect charging stations as a source of input for the Green Automobiles. Moreover, their eco-friendly trait alone isn't found to be attractive and so does not convince them to purchase Green Automobiles.

- **Difficulty Driving**

Customers think of Green Automobiles to be difficult to drive as it has a different technology and different inputs to run them. As they find the Green Automobiles could be difficult to drive they would not go for these automobiles.

- **Functioning**

Functioning means how the automobile works or operates. The perception of the customers is that Green Automobiles might not function smoothly and as a result would not contribute towards environment protection.

The Kaiser-Meyer-Olkin Value derived is 0.715, which is more than 0.70 and states that the sample selected is good sample. The significance of the data is obtained at 5% significant level.

Table 6: Total Variance Explained by Factors representing Positive Perception of Customers on Green Automobiles

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
Unappealing	5.258	30.928	30.928
Incredulity	3.025	17.792	48.720
Budget Constraints	1.915	11.266	59.986
Difficulty Driving	1.739	10.232	70.218
Functioning	1.116	6.567	76.785

Source: Compiled through primary data

The factor analysis used 17 variables of negative perception of Customers towards Green Automobiles and has condensed the variables into 5 factors. It was found that the total data is explained up to 76.785% and the remaining 23.215% is unexplained.

Impact of Positive and Negative Perceptions of the customers about the Green Automobiles on their Purchase Intention.

- **Impact of Positive Perception about Green Automobiles on Customers Intention to purchase Green Automobiles.**

Regression analysis has been carried out on the factors derived through factor analysis to analyze the level of customers intention to purchase Green Automobiles with respect to positive perceptions regarding Green Automobiles. This analysis will also determine which factor positively impacts the intention to purchase.

Table 7: Relationship between Positive Perception of Customers and their Intention to Purchase Green Automobiles

H0₁: There exists no significant relationship between Positive Perception of Customers and Intention to purchase Green Automobiles.

Dependent Variable: Purchase Intention

P-value: .001^b **R²:** .545 **F:** 10.565

Independent Variable	Beta	t	P-value
Constant	2.267	26.860	.001
Environment solution	.401	4.716	.001
Inspiration	.383	4.496	.001
Clarity in ads	.347	4.073	.001
Status Boost	.055	.645	.522
Happiness	.143	1.676	.100
Oil Prices	.090	1.060	.294

Source: Compiled through primary data

The above regression analysis table displays R² which explains the impact of the 6 factors of Positive Perception of Customers on Purchase Intention of Green Automobiles. The impact these factors is to the extent of 54% and leaves a scope for further study with 46% being unexplained.

The data has been analyzed with the help of regression using SPSS where Purchase Intention has been taken as Independent variable. The 6 independent variables are Environment Solution, Inspiration, Clarity in ads, Status Boost, Happiness and Oil Prices Solution which are considered to have impact on the Purchase Intention.

If the relation has to be explained in terms of equation, it would be presented as under: -

Purchase Intention = 2.267 + (0.401)Environment Solution + (0.383)Inspiration + (0.347)Clarity in Ads

• **Impact of Negative Perception about Green Automobiles on Customers Intention to purchase Green Automobiles.**

Regression analysis has been conducted on the 5 factors derived through factor analysis to analyze the level of customers Intention to Purchase Green Automobiles with respect to Negative Perception regarding Green Automobiles. Regression analysis will help to identify which factors positively impacts Purchase Intention.

Table 8: Relationship between Negative Perception of Customers and their Intention to Purchase Green Automobiles

H0₁: There exists no significant relationship between Negative Perception of Customers and Intention to purchase Green Automobiles.

Dependent Variable: Purchase Intention

P-value: .001^b **R²:** .354 **F:** 5.916

Independent Variable	Beta	T	P-value
Constant	2.267	22.761	.001
Unappealing	-.314	-3.125	.003
Incredulity	-.105	-1.041	.303
Funds Constraints	.330	3.285	.002
Difficulty Driving	-.283	-2.815	.007
Functioning	.013	.127	.899

Source: Compiled through primary data

The above regression analysis table shows R² value as 0.354 which explains the impact of the Independent variables of Positive Perception of Customers is to the extent of 35% and there exists scope for further study with 65% being unexplained part.

The data has been analyzed with the help of regression using SPSS where Purchase Intention has been taken as Independent variable. The 6 independent variables Unappealing, Incredulity, Funds Constraints, Difficulty Driving and Functioning are considered to have impact on the Purchase Intention.

If the relation has to be explained in terms of equation, it would be presented as under: -

Purchase Intention = 2.267 + (-0.314) Unappealing + (0.330)Funds Constraints + (-0.283)Difficulty Driving

Conclusion

The study is about the Green Automobiles which are a trend to be in near future. The study has been conducted on 60 respondents both male and female. One of the aim was to identify the perceptions of the customers with respect to Green Automobiles which has been achieved by dividing the variables as positive perception and negative perception. The relationship between perceptions and purchase intention brought to light Environment Solution, Inspiration and Clarity in Ads as the positive perception factors. Similarly, Unappealing, difficulty driving and funds constraints, negative perception factors which were found prominent and showed relationship with customers intention to purchase Green Automobiles

Throughout the study it has been observed that there is a need to bring awareness about Green Automobiles among the target customers. This can be done by adopting Marketing techniques that provide clear information about the products to the customers and minimizes any misconceptions about the products in the minds of the probable customers. Once people are made aware about the benefits as well as drawbacks about the Green Automobiles, they can take a good purchase decision. Moreover, in a country like India where pollution is becoming a burning issue the Green Automobiles if Marketed compellingly can be conveniently accepted by the customers.

References

1. Anuradha Gaikwad, Deepa Ingavale (2011), "A Study of Consumer Awareness for Green Marketing"
2. Aditi Jaju (2016), "A study of the Impact of Green Marketing on Consumer Purchasing Patterns and Decision Making in Telangana, India", National College of Ireland.
3. Bikramjit Singh Hundal (2015), "Consumer Perception towards Green Products: A Factor Analytic Approach", *Pacific Business Review International*.
4. Haripriya S. (September 2019), "A Study on Customer Perception towards Green Products in Coimbatore - Empirical Study", *Infokara Research Journal*.
5. https://en.wikipedia.org/wiki/List_of_environmental_disasters
6. https://en.wikipedia.org/wiki/Green_marketing#cite_note-3
7. <https://learn.g2.com/green-marketing>
8. <http://www.skyline-etips.com/what-is-marketing-how-10-experts-define-it/>
9. https://en.wikipedia.org/wiki/Green_vehicle
10. <https://www.shopify.in/encyclopedia/green-marketing>
11. Pooja Jain, Praveen Mehta (2016), "Customers Perception about Green Marketing", *International Journal of Development Research*.
12. Prachi Trivedi, Meghna Sharma (2018), "An Empirical Study on the perception of Consumers about Green Products in Delhi", *International Journal of Engineering and Technology*.

