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STUDY OF THE INFLUENCING FACTORS OF BUYING DECISION MAKING PROCESS WITH REFERENCE TO CNG CARS IN PUNE & PCMC AREA

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ABSTRACT

The growing environmental concerns clearly shows that CNG (Compressed Natural Gas) vehicles have emerged as a popular and viable substitute for conventional petrol and diesel vehicles. A study has been proposed to research the consumer behavior towards the CNG vehicles with reference to Pune which is one of the largest city in India and also high on pollution. Objectives of the study included studying the steps in buying decision-making process, studying the factors that influence the steps in buying decision-making process, finding out the factors that influence the steps in buying decision-making process for CNG cars, and finding out if there is any significant relationship between the factors that influence the steps in buying decision-making process for CNG cars. This paper presents the outline of the proposed research.

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Keywords: *Buying decision-making process, Buying Behavior, CNG Cars*

Introduction
Background

The air quality in Delhi, the capital of India, according to a WHO survey of 1600 world cities, is the worst of any major city in the world. Air pollution in India is estimated to kill 1.5 million people every year; it is the fifth-largest killer in India. India has the world's highest death rate from chronic respiratory diseases and asthma, according to the WHO. In Delhi, poor quality air irreversibly damages the lungs of 2.2 million or 50 percent of all children. India's Ministry of Earth Sciences published a research paper in October 2018 attributing almost 41% of PM2.5 air pollution in Delhi to vehicular emissions, 21.5% to dust, and 18% to industries.

The Indian automobile industry is 5th largest in the world with a size of $93bn and contributing 7.1% to the GDP in India. Overall 78% of the vehicles on the road are two-wheelers while approx. 14% are passenger vehicles (Source SIAM). The most heartening part is that in the last financial year (17-18) the Indian passenger car market grew by 7.89% and the overall vehicle sales by 14.78% however, at the same time the market in other major economies in the world de-grew. The passenger car density in India is 1.9% as compared to 7.6% in China, 45.5% in the UK, 54.4 in Germany, 36% in the US, 56.2% in Australia, and 22.7% in Brazil (Source SIAM/Economics Times). The growth in the Indian passenger vehicles market could be largely attributed to low passenger car density, growing disposable income, and the unique demographic dividend in India. However, the flip side of this story is that automobiles on the road (Source IPPCC 5th Assessment Report) cause almost 14% of environmental pollution. As per a report by WHO air pollution can lead to respiratory and cardiovascular diseases and resulted into 620000 deaths in 2010 and the expenditure on treatment was to a tune of 3 percent of India's GDP (Source data.gov)

According to World Health Organization (WHO), 13 cities in India are among the 20 most polluted cities in the world, Delhi tops the list and uncontrolled vehicular traffic is the main reason for these alarming levels. Apart from addressing the environmental problem, Compressed Natural Gas (CNG) vehicles have advantages like price, suitability for car engine, lower maintenance costs, safety, etc.

The background discussion clearly shows that CNG (Compressed Natural Gas) vehicles have emerged as a popular and viable substitute for conventional petrol and

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diesel vehicles. The proposed research studies the consumer behavior towards the CNG vehicles with reference to Pune which is one of the largest city in India and also high on pollution.

Concept - Buying Behavior

Buying behavior is the decision process and actions of people involved in buying and using products (Schiffman and Kumar, 2015; S Ramesh Kumar, 2017).

Need to understand buying behavior can be explained through the following points -

- Why the consumers make the purchases that they make?
- What are the factors that influence consumer purchases?
- The changing factors in our society.

The term buying behavior is also called as consumer behavior and it refers to the buying behavior of the ultimate consumer. An organization needs to analyze buying behavior because:

- The buyer's reactions to a firm's marketing strategy have a significant impact on the organization's success.
- The marketing concept stresses that an organization should create a *Marketing Mix* (MM) that satisfies (gives utility to) customers, therefore they need to analyze the what, where, when and how consumers buy.
- Marketers can predict better how consumers will respond to their marketing strategies.

A. *Stages of the Consumer Buying Process*

For complex buying decisions there are generally six stages to the Consumer Buying Decision Process. Actual purchasing is only one stage of the process. Not all the decision processes lead to a purchase. All consumer decisions do not necessarily include all six stages. They are determined by the degree of complexity in the buying decisions.

These six stages are:

1. Problem Recognition (awareness of the need)
2. Information search
3. Evaluation of Alternatives
4. Purchase decision
5. Purchase
6. Post-Purchase Evaluation

Aim

The aim of the proposed research is to study the influencing factors of buying decision making process with reference to CNG cars in Pune and PCMC area. The state of Maharashtra is one of the most progressive states of India and Pune is one of the largest cities in the state.

Objectives

In line with the research questions, following objectives have been formulated for the study–

a. To study the steps in buying decision-making process,
b. To study the factors that influence the steps in buying decision-making process,
c. To find out the factors that influence the steps in buying decision-making process for CNG cars,
d. To find out if there is any significant relationship between the factors that influence the steps in buying decision-making process for CNG cars.

Scope of the study

1. The concept of buying decision-making process would be studied with reference to the six stages – Problem Recognition, Information search, Evaluation of Alternatives, Purchase decision, Purchase and Post-Purchase Evaluation
2. These stages would be studied in the context of CNG cars
3. Since buying decision-making process may differ based on the type of vehicle (two-wheeler, four-wheeler, rickshaw etc.) this study will research only four-wheelers or cars to be more specific.
4. The proposed study would be carried in Pune and PCMC area.
5. Consumers in the age group 30-60 would be studied.

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Literature Review
Research on buying behavior towards non-conventional vehicles

The selection of vehicles like CNG and their sustainable use incorporates two concepts – ecological and social behaviors. Likewise, these two concepts consolidate to shape the base of ecological behaviors, which prompts a sustainable turn of events (Dahlstrom, 2010). In disconnection, neither ecological nor social behaviors guarantee manageability. Improvement in mechanical points of view can protect the environment however can't assist with sparing assets. The current writing reports that some condition well-disposed advancements have adversely influenced asset preservation as the utilization of items expands as a result of monetary proficiency, a marvel known as 'Jevons Paradox' or 'Bounce back Effect' (Jevons, 1906; Saunders, 1992). Late studies inspected the bounce back impact in different settings. For example, Sellen and Harper (2002) detailed that, in spite of general desires for individuals with respect to decreases in paper utilization because of electronic media advances, office paper utilize expanded by 14.7% in the US during the period 1995-2000. Comparative discoveries were accounted for in the vitality division and the vehicle business too (Grant, Jorgenson, and Longhofer, 2016; Arne et al., 2015; Galvin, 2016; York, 2006; Herring and Sorrell, 2009). These studies contend that improving innovation alone may not contribute to long-term sustainability goals. In this manner, understanding consumer behavior both from ecological just as social points of view is basic in sustainable behavior research.

There are a good number of studies on electric vehicles in India (Upadhyayula et. al, 2020, Bharadwaj et. al, 2020, Rokadiya et. al, 2019, Gayathri, 2019, ,Rokadiya et. al, 2019 and others).

Research on CNG Vehicles

There are at present more than 26 million natural gas vehicles and more than 31,000 refueling stations over the world, with over half of these vehicles in China, Iran, and India (Global, 2018). In spite of the fast take-up of natural gas vehicles in creating nations, the Intergovernmental Panel on Climate Change (IPCC, 2013) predicts that by 2050, the greatest vehicle vitality consumers will keep on being North America (by a noteworthy edge), trailed by Europe and China (IPCC , 2013). Be that as it may, most of these vehicles are not freight vehicles, with natural gas HGVs representing about 1% of all out stock in 2015 (IEA, 2017). These rock solid vehicles have been utilized for different applications including reject assortment, transports, and freight conveyance. In the United States, the utilization of natural gas trucks turned out to be progressively appealing with the development of local shale and tight gas production, prompting a sensational drop in wellhead natural gas costs from 2009. The Fixing America's Surface Transportation Act, which necessitates that the United States Department of Transportation sets optimistic focuses for the arrangement of foundation for elective energizes along key halls, has advanced the improvement of natural gas stations since 2015 (IEA, 2017) with the end goal that there are presently 1,680 compacted natural gas (CNG) stations and 144 liquified natural gas (LNG) stations (NGV America, 2018). In the North American market, a few natural gas HGV models are offered from various unique gear makers. The market development for natural gas trucks in China has been driven by a few components including the good value differential to diesel, the low expenses of retrofitting existing vehicles to run on CNG, and government approaches planned for improving air quality. The utilization of natural gas in transport has expanded by a yearly development pace of around 11% somewhere in the range of 2010 and 2016, of which a huge offer is credited to natural gas trucks (IEA, 2017). The quantity of stations providing natural gas in China has developed from around 1,000 out of 2008 to 7,950 out of 2016, and the quantity of LNG uncompromising vehicles developed from

7,000 out of 2010 to 132,000 of every 2015 (IEA, 2017). In the EU, there are roughly 9,350 medium-and hard core natural gas trucks, with over 80% of these trucks working in Italy, Sweden, Spain, and France (EC, 2015). Contrasted with China and the United States, there is to a lesser extent a cost preferred position of natural gas in Europe and less government impetuses have been advertised. Nonetheless, the Alternative Fuels Infrastructure Directive requires EU part states to create national approach systems to advance and build up the significant framework for elective energizes including CNG and LNG. The mandate proposes that the normal separation between refueling stations ought to be 150 km and 400 km for CNG and LNG, separately (Council of the European Union, Directive, 2014). Natural gas is a blend of paraffinic hydrocarbons, for example, methane, ethane, propane, and butane. Modest quantities of higher hydrocarbons, for example, ethylene, might be available and follow measures of hydrogen sulfide and nitrogen may likewise be available. The vitality substance of natural gas (CNG or LNG) per unit weight is roughly 15% higher than diesel fuel (utilizing run of the mill net calorific estimations of 50 MJ/kg and 43 MJ/kg for natural gas and diesel, separately) (Staffell, 2011), showing that natural gas can offer a similar measure of vitality for less weight.

Nomura Research Institute Ltd (NRI Consulting & Solutions) in its report (2019) on 'Transforming Mobility Through Natural Gas' also said the implementation of BS-VI emission norms from 1 April, 2020, will increase price differential between CNG and diesel vehicles, making CNG vehicles more attractive. According to the report, a strong network of 15,000 CNG and 1,500 LNG stations by 2030 would have the potential to transform the Indian mobility scenario, with an expected 33 million natural gas vehicles as compared to 3.3 million in 2019.

Research Gap

a. Studies on factors influencing buyer's decision making process related to non-conventional vehicles in India are quite limited,

b. Further whatever studies are there, they are concentrated on Electric cars.

Studies on factors influencing buyer's decision making processrelated to CNG vehicles are very few. At the same time potential for CNG vehicles is quite promising. Hence the researcher has taken-up this study of factors influencing buyer's decision making processrelated to CNG cars in Pune and PCMC.

Following research questions have been set

1. What are the influencing factors ateach stage of the buyer's decision-making process related to CNG cars?

2. Is there any significant relationship between influencing factors ateach stage of the buyer's decision-making process related to CNG cars?

Research methodology for proposed research

Hypotheses

Following hypotheses have been set for the study -

H1 – There are influencing factors ateach stage of the buyer's decision-making process related to CNG cars

H2 – There is a significant relationship between influencing factors ateach stage of the buyer's decision-making process related to CNG cars

Hypotheses testing

These hypotheses would be tested based on the primary data to be collected by way of a questionnaire.

The sample means would be compared with a hypothesized population means. Since the standard deviation of the population is not known, as is a common practice, we would be using the t-test to test the statistical significance.

Data collection

Close-ended structured questionnaires will be used as the research instrument. There will be six main sections in the questionnaire, each addressing one of the six stages of buying decision making

process – Problem Recognition, Information search, Evaluation of Alternatives, Purchase decision, Purchase and Post-Purchase Evaluation. Under each of the stages, influencing factors would be stated and respondent's agreement/disagreement would be sought on a 5-point likert scale.

Sampling method

Convenience sampling method will be used. Information about the CNG car owners will be sourced from Company dealers.

Data Analysis

The responses would be statistically processed for descriptive and inferential analysis (testing of hypotheses) using spreadsheet software.

The identification of the influencing factors will be done on the basis of testing of statistical significance using a t-test as under–

The mean, standard deviation for the sample will be calculated.

The sample mean (H_0) will be compared with a hypothesized population mean using a t-test at 95% confidence level. For example, if say 75% of the respondents agree to a particular set of factors for the 1st stage of the buyer's decision making. This will be compared with a hypothesized mean of the population (H_1) and based on the p-value of the t-statistic it will be ascertained if the sample mean is statistically significant or not. If the null hypothesis gets rejected then it will be proved that the identified set of factors,are statistically significant. Same methodology would be applied for all the six stages of buyer's decision making process.

A correlation/regression analysis will be used to ascertain if the influencing factors are related with each other or not.

Type of study

This study is descriptive in nature & will largely utilize the primary data. The primary data collection will be from 400 CNG car users from Pune and PCMC.

Population and sample

The State of Maharashtra and the city of Pune and PCMC has been chosen for the primary data collection as it represents the Indian customer in a fairly accurate way given its culture, background, economic status, strategic significance, industrialization etc.

As per The Hindustan Times (2018), there are around 1.80 lakh CNG vehicles in Pune. Standard sample size tables like Krejcie and Morgan (1970) for a population of 20,000,show a sample size of 377; same will be rounded off to 400. The sample size doesn't vary much beyond population of 20,000.If the population of all the CNG vehicles is 1.80 lakhs, it can be safely estimated that the population of four-wheelers or cars of CNG types will be a large population (20,000 or more).

Conclusion

Understanding of buyer's decision-making process is of great significance for marketers. Recent example of rejection of Tata Nano as a "cheap car" by the Indian consumer shows the importance of getting the right pulse of the market. The best of the products can get grounded if marketed poorly. Hence it is of immense importance for marketers and market researchers to get accurate assessment of various aspect of each stage of the buyer's decision-making process. This study is expected to provide valuable inputs in this regard. On the whole, the study will supplement the efforts of researchers and marketers in understanding of consumer behavior towards CNG cars.

The study is expected to make the following contributions -

a. Ascertainment of influencing factors ateach stage of the buyer's decision-making process,

b. Ascertainment of inter-relationship, if any, amongst these influencing factors

c. Getting directions for appropriate actions for marketers in line with the influencing factors at each stage of the buyer's decision-making process.

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