CONSUMER PRFERENCES FOR HYDROGEN FUELCELL VEHICLES IN INDIA

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ABSTRACT:

Now-a-days, due to the reduction of fossil fuels and the increase in pollution, most of the countries are adopting electric vehicles which most probably run on batteries and they are also successful in deploying them with the help of various policies from the government. But in addition to the electric vehicles, the world of automobiles must also move to the hydrogen fuel cell vehicles [HFCV'S], and as far as this concern, this paper examine the preferences of Indian citizens (or) consumers for hydrogen fuel cell vehicles through a stated preference choice method which also involves the attributes and policies as choices to prefer. By this, we have also used multi nominal logistic regression method of the data obtained to extract the one's importance or preference of HFCV'S in India. Whereas, the consumer preference of HFCV'S in India is remarkably less than when compared to conventional vehicles, but due to the advantages of various policies and attributes such as reduction in taxes, Free parking, can be more effective in preferring HFCV in the long term cause in India.

Index terms: *Consumer Preferences, Hydrogen Fuel Cell Vehicles, Policy Incentives, Survey, Awareness, Barriers.*

1. INTRODUCTION:

This research is to study on Hydrogen Fuel Cell Vehicle considering conditions based on Indian Market. In recent years, pollution across the globe has become a major threat for every living-organisms on the earth, and automobiles with conventional engines are one of the major contributors. This has been a major problem especially in India. As per the data acquired from the case study in 2016 , at least 140 million people in India breathing the air that is 10 times or more over the WHO safe limit. Traffic congestion in extremely severe in India which adds to the existing problem. Traffic congestion reduces the average traffic speed.. So India of all countries seriously needs to look for alternate fuels to tackle this issue. In order to reduce the emissions of conventional fuel engines, many countries are adopting emission free vehicles like Battery Electric Vehicles, Plug In Hybrid Vehicles & Hydrogen Fuel Cell Vehicles. These vehicles have a significant reduction of greenhouse gas directly emitted by the fleet of light duty vehicles. Compared to Battery Electric vehicles and Hydrogen Fuel Cell vehicles Plug In Hybrids have significant tail pipe emissions but not as high as a Conventional Gasoline vehicle. So Battery Electric vehicles and Hydrogen Fuel Cell vehicles are the ones which are truly emission less vehicles, but these vehicles have a significant disadvantage in terms of refueling. With our current Technology, it takes a considerable amount of time to recharge the batteries of Battery Electric vehicles. Hydrogen Fuel Cell vehicles allow an almost double driving range with a single charge or refill of the tank and more than ten times the fueling/charging rate compared to batteries.

There are still debates on whether Battery Electric Vehicles or Hydrogen Fuel cell vehicles is the future. Battery Electric vehicles for now have the upper hand and are preferred by all in various countries due to the technological limitation and low awareness in Hydrogen Fuel Cell. But compared to Hydrogen Fuel cell, Battery Electric vehicles put a lot of stress on the Power Plant and most the Power Plant run on conventional sources like coal, etc. So though Battery electric vehicles are emission less vehicles, they do produce emissions indirectly unless all the Power Plant runs on clean sources like Nuclear, Solar, wind, etc. This particularly noticeable in India as most of India's Power comes from coal power plants.

Hydrogen is one of the small number of energy carriers with the potential to supply the majority of the world's transportation energy demand with near-zero carbon emissions. Others include electricity, bio-fuels and synthetic liquid fuels. All sustainable energy sources face significant challenges and hydrogen isn't any exception. Hydrogen will be produced relatively economically from a spread of energy sources, will be delivered into a vehicle quickly and when wont to produce electricity in a very electric cell produces only water as a byproduct.. Hydrogen fuel is fastest in terms of refueling when compared to other Alternate Electric vehicles. These are the main advantages which motivates the government and automobile manufacturing companies to shift to HFCV's. The barriers for introducing FCV's are still significant. There are still issues which require improvements like hydrogen fuel storage, hydrogen transportation, cost reduction, and the costs associated with developing hydrogen refueling infrastructures. In addition to these challenges, implementing requires consumer awareness and acceptance. There are still some notable differences between HFCV's and internal combustion engines. To overcome these issues related to acceptance of new technology, consumers need awareness about different perceptions.

In this study, the HFCV responses was measured by a survey. This survey assesses people (or) consumer perception regarding the technical aspects of a vehicle, such as technology development, advantages of using a HFCV, safety conditions, the infrastructure facilities, in contrast to conventional vehicles, and their inclination towards the zero emission vehicles. During past, stated preference[SP] method has been very largely used method in different fields, such as New technology acceptance, Transport study, to predict the decisions and also it helps in giving counsel of idea which helps in improving situations, with regards to particular set of alternatives to the participants. The remaining of this paper is classified as follows, the following part will discuss about the literature review on consumer preferences for AFV's and their need in developing HFCV's in Indian market. The third part will discuss about the methodology (or) survey design and which expresses the dataset approach used. The outcomes of the model estimation are exhibited in the fifth part and the various policies and incentives & also the conclusions are presented in the sixth and final parts of the paper respectively.

2. LITERATURE REVIEW:

During the past years, there are many experimental studies have been conducted on the consumer preferences for Alternate Fuel Vehicles which include, Electric vehicles, Plug-in hybrid vehicles. Many of the researches have used discrete choice method to extract the preferences of consumers where there are provided with different policies and with different attributes. The main purpose of this method is to help the government on which the policies can be drafted and to implement them based on the responses obtained from discrete choice methods. Now a day's many countries are rapidly moving to zero emission vehicles, this method which was conducted can encourage the manufacturing companies to introduce new fuel technologies and with less harmful greenhouse gases. This research study primarily focuses on the development of new and less harmful fuel technologies in India.

2.1 ADOPTION OF BEV's:

Over the years, studies were made on AFV's, and in early 1990's; focus shifted to BEV's. For example Beggs At Al. 1981 calculated the interests for BEV's by using an ordered logit model to stated preference data. Bunch Et Al 1993 calculated the demand for BEV's applying nested logit (NL) and multinomial logit (MNL) models. Ewing And Sarigollu 1998 studied the preferences for vehicles with zero emission fuels with help of discrete choice stated preference model which reported a massive demand for electric vehicles.

In survey, consumers are given with different set of choices which contain vehicle attributes like purchase price, driving range, vehicle fuel type, refueling time and governmental incentives. As per the previously reviewed literature, some researchers mainly focused on vehicle attributes and socio-economic characteristics of an individual for obtaining consumer preferences towards AFV's. Daziano 2012; Achtnicht 2013; Shin Et Al 2019.
Lin And Greene 2011 examined the impact of recharge availability and emphasized the huge impact of home recharging improvement on BEV. Huang And Qian 2018 states that consumer preferences for electric vehicles in china, explains the behavior of vehicle consumers being more sensitive to vehicle cost, subsidiary during purchase and charging stations.
Omkar Tupe, 2020; The respondents preferred eco-friendly vehicles over conventional vehicles. Vehicle cost, infrastructure availability like charging stations and refueling time are the main limitations in boosting the confidence of consumer.

2.2 OVERVIEW OF POLICY INCENTIVES:

Now a days, most of the consumers are mainly preferring to purchase the goods which has the high advantages and has government incentives or benefits. As the policy attributes have been more useful in a good impact on the particular person to purchase or to adopt battery electric vehicles; Xiao-Wu-Wang,2021. And because of these incentives from government plays a major role in adopting BEV's in any market based on financial policies or socio-economic policies, and also these policies can be different among different countries. For example, in china, which is the largest market for electric vehicles is encouraging the consumers to purchase BEV's through different government policies like free parking and taxes reduction, etc. and they are also becoming successful in promoting.

This research study also focuses on the impact of various policy attributes on the individual perception to consumers of hydrogen fuel cell vehicles in the Indian market conditions. From different previous researchers, it is proven that most of the consumers are not much aware of hydrogen fuel cell vehicles and their advantages and their market is not well developed. As we have stated in the first part introduction in this research focuses on the impact of policy incentives on the adoption of HFCV's in the Indian market.

2.3 OVERVIEW OF CONSUMER PERCEPTION ON HFCV'S:

There are some studies related to behavioral response and perception towards HFCV's across groups and North America. Lopez Jaramilla ef al (2019), Reveals the perceptive of twelve HFCV drivers that they preferred HFCV's because of their long range, faster refueling time, incentives and concerns about environment. Hardman et.al.(2016) is an attempt to study the major barriers like lack of knowledge on hydrogen technology, cast and lack of refueling infrastructure in the successful adoption of the technology.

Table1: Research studies on the adoption of AFV's based on policy incentives

Authors	Policy incentives	Vehicle type &area	Comments on policyincentives
Hardman(2019)	1.parking incentives 2.HOV lane access 3.toll fee waivers 4.licensing incentives5.tax exemption	BEV (Globally)	Policy incentives can play a major role in adoptionof new fuel technologies, butit differs from region to region due to different travelpatterns and preferences.
Ziegler (2012)	1. Electro mobility subsidies 2. Tax incentives.	FCVs, PHEVs, BEVs (Poland)	The rate of adoption will be increased for AFV's with the implementation of these policies.
Hoen andKoetse (2014)	1. HOV lane access 2. Tax incentives 3. Parking incentives	FCVs andPHEVs, (Netherlands)	Lane access can significantly increase theadoption rate of AFVs.

Ministry of petroleum and natural gas in India initiated a corpus fund of Rs.100 crore of starting up hydrogen research activity with IOCR&D as nodal agency. There are two measures initiatives on transport and power generation. The former on is Green initiative for future transport (GIFT) and the later one is green initiative for power generation (GIP). The former initiative targets to develop one million hydrogen powered fuel cell based vehicles IIT, Delhi (2009). This research paper determines the preferences of consumers for HFCV, which include policy incentives by applying a discrete choice analysis and the other factors like social status and vehicle attributes of Indian automobile market, the policy incentives and vehicle attributes are carefully selected for our stated preference survey.

3. SURVEY DESIGN AND DATA:

For this Survey, We had conducted a web-based survey. Information collected around 250 responses around the country, which includes all types of age groups, different states in India and also awareness of Respondents on HFCVs, we further enquired whether they would prefer to purchase HFCV. If they choose HFCV, then they would be able to complete the next section which includes different questions related to Hydrogen Fuel Cell Vehicles and their attributes and policies. If they not to prefer the HFCV, then they have to be specify the reason regarding it. Two sections are there in this survey, first one is related to Socio-economic characteristics such as Age, State of Residence, Qualification, Employment status, Frequency of travelling, vehicles in household, Annual Income and their willingness to prefer HFCV's in future. Second one is related to Incentives, company preference, Refueling time and Infrastructure Availability. The observations collected in the survey is used for estimation using multi-nominal logistic regression.

The Respondents who are participated in this survey have been keen to taking this survey and they have provided with genuine answers. These Participants have been provided with different set of choices, which contain different types of fuel technology they might prefer. Also they provided the information regarding the preferred years to buy the Hydrogen Fuel Cell Vehicle and the cost that they would prefer for HFCV. We also gathered the information about the vehicle manufacturing company which they might prefer to buy HFCV. This information might helpful for companies to start the manufacturing of HFCV's from their vehicles. In survey, we had asked the participants to choose the time required for Refueling and Distance between the Refueling stations for acquiring the necessary information for Government to develop the infrastructure and incentive policies in the country and to reduce the emissions from transportation.

After choosing the attributes and their corresponding levels, it is required to create choice sets and to obtain a large number of choicesets a full factorial design is needed; Wang N. Tang L. Pan H,2017
Due to consumer limitations, it is difficult to make a choice when facing too many options. In Tanaka et al, 2014 the analysis was done among Japanese and US consumers, where Japanese consumers are more sensitive towards range of driving and tail pipe emissions.

In Castrol study, 2020 consumers are positive in switching to AFV's (green vehicles). Although in India consumers expecting the lower price point compared to consumers in other countries. For adoption of AFV's in India, consumers are also willing to prefer a slightly longer refueling time and a slightly shorter driving range.

This Study provides the importance of various financial & Non-financial incentives for the successful distribution of hydrogen fuel cell vehicles in India. The policies used in this study can made a huge impact in purchase of these vehicles. Egner And Trosvik (2018), have concluded that the public charging infrastructure and parking policies had been more of the cost effective rather than providingpurchasing subsidies in their research study on Sweden citizens. While Huang And Qian (2018) had conducted a research in china by using stated preference method which states that the consumers are more attracted to purchase vehicles on the basis of Purchasing incentives and the development of Infrastructure. Based on these studies, the focus is mainly based on the important policy incentives. In this study, we introduced some incentives for the hydrogen fuel cell vehicles in the stated preference method. For the successful propagation of HFCV's, we have included some of the incentive policies based on the previous studies which impacts in the adoption of BEV's. Hardman,2019; Liao et al. 2017; Wang et al.2017

●   Reduction in Vehicle Taxes.
●   Toll Exemption
●   Reduction of price in Refueling Stations.
●   Free Parking Facilities.

Other than this, we have determined the impact of consumers based on their socio-economic characteristics that stated in the statedpreference method.

Table 3 represents actual choice set

Table 4 represents the demographic characteristics of the potential 254 car buyers, female respondents are 36% of the sample population, whereas the survey is dominated by male respondents that accounted for 70.8% of the sample population.

Table2 The data is collected with the help of online survey. As we have already mentioned, that we have collected 254 observations from thepotential respondents and transformed our collected data into duplicated variables coded for categorical event.

Although, the demographic characteristics of our survey respondents does not correspond to the rest of the population of India. Theaverage household owns 1.2 cars. The data is collected with the help of online survey. As we have already mentioned, that we have collected 254 observations from thepotential respondents and transformed our collected data into duplicated variables coded for categorical event.

Table2: Variable definitions

Variable	Definition
Vehicle type	1 if vehicle type is Battery electric vehicle2 if vehicle type is HFCV 3 if vehicle type is petrol/diesel vehicleRefueling time in
Refueling time Refueling distance	minutes.
Purchase price Qualification	Distance in Kms. Purchase price in Indian Rupees1 if under 12th 2 if under diploma level 3 if under graduation level 4 if under post- graduation level
Awareness on HFCV's	5 if respondent is at doctorate level 1 if respondent choose yes2 if respondent choose No
Preference for HFCV'sGender	1 if respondent choose yes2 if respondent choose No
Age	1 if respondent is male, 2 if respondent is female.1 if respondent is between 18-25 years 2 if respondent is between 25-40 years 3 if respondent is above 40 years
Policy incentives	Free parking, reduction of charge in refueling,purchase subsidies, reduction of vehicle taxes.

Fig1 Factors considered in purchasing the vehicle by respondents in the survey for different fuel technologies. To get a wider perception of respondents adoption of different fuel technologies. A question is asked for the participants regarding interest in different fuel technologies. The interest rate of respondents for conventional vehicles is less than the respondents who are currently owning the conventional vehicles, which says the ownership rate of alternative, fuel vehicle will increase in future. In the discrete choice experiment, 28.7% of the participants choose HFCV's as their future vehicle. Furthermore, 47.2 % of the participants are interested in BEV's. For the development and adoption of these fuel technologies (BEV's and HFCV's), the government should implement the incentive to increase the market shares. To boost the Electric mobility the Indian government implemented the schemes [FAME, India] which increased the sales of BEV's. For adoption of HFCV's similar type of schemes and policy incentives can be beneficial in Indian market.

4.   ANALYSIS:

In this research, consumer preferences of HFCV's and policy intervention impact are studied by parameter estimates created by discrete choice methods. The most widely used model is Multi-Nominal logistic regression [MNL] model, due to its fast and straight forward parameter estimations. For the multi- nominal logit model, it is used to predict the categorical placement in the category membership on a dependent variable which is based on multiple independent variable. The multi-nominal logistic regression model, assumes that data are case specific, i.e. each independent value has a single value for each case. This multi-nominal logit provides us the linear predictor function which is a set of co-efficient and explanatory variables, whose value is used to predict the outcome of a dependent variable most researchers prefer the MNL method   because it can achieve the probability of an outcome based dependent variable.

Table 3: Choice set provided to respondents.

Conventional vehicles	Electric vehicles (Battery)	Fuel cell vehicle
[purchase price] :5-7 lakh INR	[purchase price] :14-16 lakh INR	[purchase price] :40 lakh INR
Driving range with onerefueling: 700 kms	Driving range with onerefueling: 400 kms	Driving range with one refueling:600 kms
Refueling time: 10minutes	Refueling time: 3 hours	Refueling time: 5 minutes
Environmental impact:80%	Environmental impact:zero tail pipe emissions	Environmental impact:zero tail pipe emissions
Preferences:Nill	Preferences: Reduction in rechargingtime	Preferences:Free parking Purchasing subsidiesToll exemption

From the survey we obtained data regarding purchase preferences of different vehicles which are calculated and the results are providedin the form of Venn diagram.`
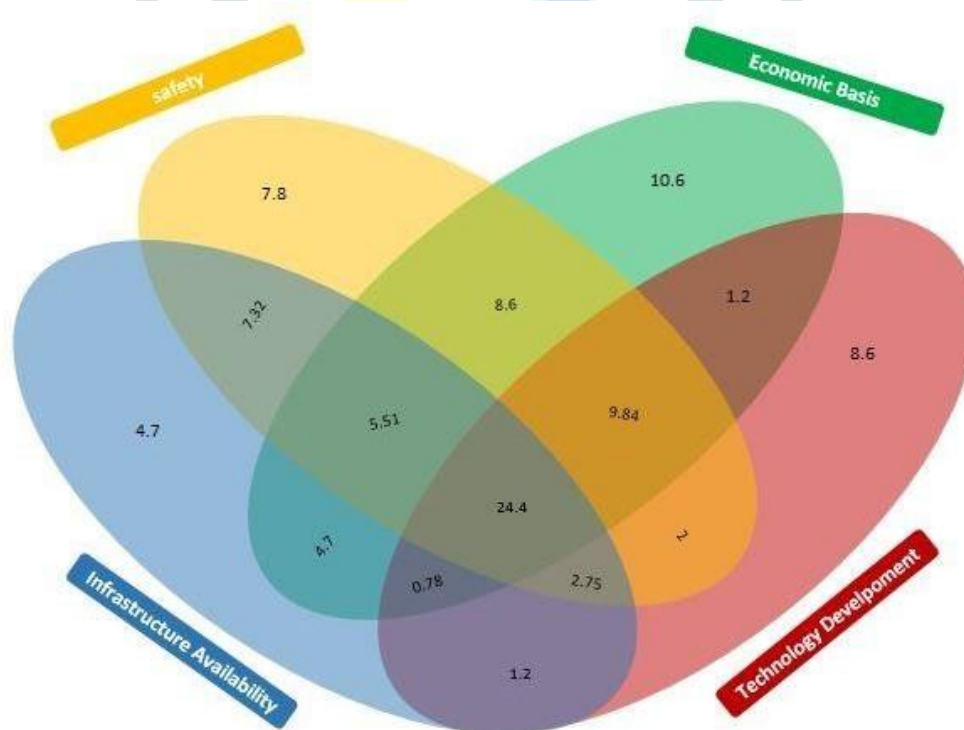

Fig1*: Factors considered in purchasing the vehicle by respondents.*

In Discrete choice experiment method, the attributes regarding the AFV's and socio-demographic characteristics of the respondents areincluded in the choice sets [Huang and Qian, 2018] shows the impact of policy incentives for AFV's.

Table 4: General Characteristics of Respondents (N=254)

Socio-demographic characteristics	Level	Percentage %
Gender	Male Female	72.4 27.6
Age	18-25 years 25-40 years Above 40 years	66.24 29.13 4.72
Education	12th DiplomaGraduate Post-graduateDoctorate	6.69 11.81 59.45 17.72 4.33
Employment status	Government job/PSUPrivate job Self employedOthers	7.09 39.76 7.09 46.06
Annual income	Below 4lac4-7 lac Above 7 lac Not applicable	27.17 23.62 12.20 37.01
Car ownership	ZeroOneTwo Three or more	37.8 42.91 16.54 2.76
Travelling frequency(per month)	Upto 500 kms 500-1500 kms Above 1500 kmsNot applicable	40.94 36.22 7.48 15.35

5. RESULT:

This study applies Multi-Nominal logistic regression [MNL] model, which provides us the probability of outcome over a repeated choices by each respondent. Table5 provides us the estimations of MNL model. During the estimation, The Alternative Specific constants[ASC's] are observed as negative because individuals are preferring current vehicles as a good preference when compared to other alternative Fuel Technologies.

Table5: Parameter estimates for the MNL model

Vehicle	Variable	Mean	Std. deviation	Std. Error	p-value
Battery Electric Vehicle.	Fuel time Awareness Qualification Income Price Current owners ofcars	1.1186 1.2542 4.0508 2.5762 1.305 1.7966	0.3261 0.4391 0.8184 1.2892 0.5648 0.8666	0.702 0.438 0.435 0.49 1.217 1.107	0.042 0.012 0.015 0.030 0.035 0.047
Petrol/ Dieselvehicle	Fuel time Awareness Qualification Income Price Current owners ofcars	1.2051 1.3333 3.7435 2.8574 1.3076 1.4571	0.409 0.4775 1.0187 1.3137 0.5208 0.6013	0.622 0.493 0.7824 0.53 0.907 0.2595	0.023 0.010 0.035 0.017 0.025 0.002
Hydrogen fuelcell vehicle	Fuel time Awareness Qualification Income Price Current owners ofcars	1.125 1.1111 4.0277 2.7083 1.3333 1.9722	0.333 0.3164 0.949 1.1801 0.5814 0.8876	0.702 0.438 0.562 0.49 1.217 1.107	0.035 0.150 0.028 0.036 0.045 0.487

Discrete choice analysis is conducted by Mabit And Fosgerau,2011 which shows that most of the female respondents preferred HFCV and BEV over Convention Vehicles. Our analysis provides the data that less number of male respondents have preferred HFCV. Respondents who are currently having vehicles are more likely sensitive to purchase price of AFV's, which is quite rational. As the appropriate price of HFCV's is reported as 45lakhs INR, which is much higher than the respondent's current vehicles and this shows negative effect on the adoption of HFCV's in India.
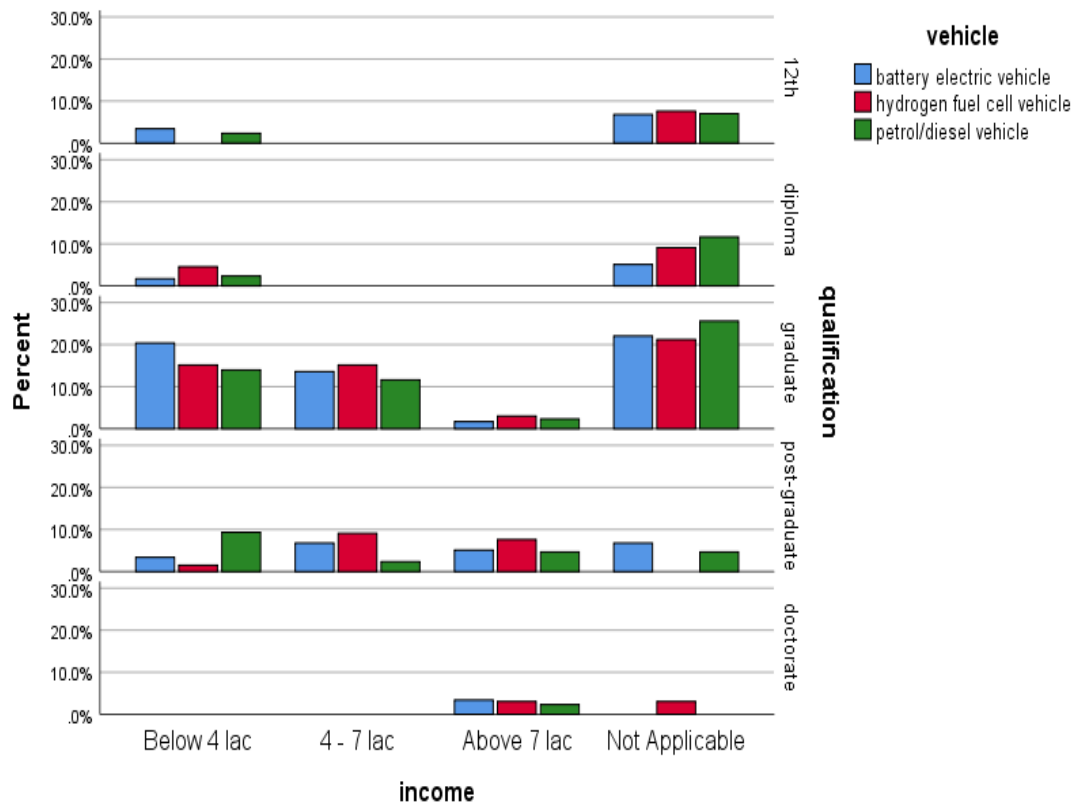

Figure2: *Preference of vehicle type according to different socio-economic characteristic*

From **Figure2**, we obtained significantly positive responses for HFCV's from participants with graduate level of education. These results supports other Discrete-choice experimental studies, which states that those with higher education levels have preferred HFCV's Martin Et.Al. 2009. According to the study, Non-owners of vehicle have preferred BEV's over HFCV's in Alternative Fuel vehicles (AFV's). Respondents who gave their positive ideas for the preference of HFCV also provided on different policy incentives.
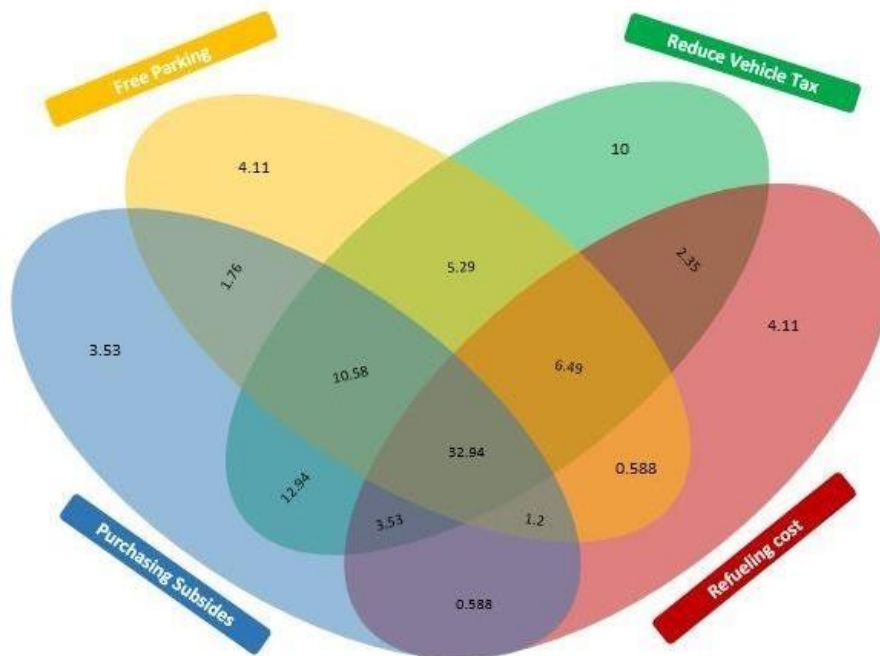

Figure3: *Policy incentives preferred by the consumers*

However, policy incentives boosts the buyers to adopt HFCV's to a greater extent. The current policy incentives are not so attractive to the consumer to prefer HFCV's in Indian market. In Norway, Government initiated various policy incentives, which was successful in the adoption of BEV's and this should be remembered by policy makers in India. **Figure3** indicates that consumers are more towards the vehicle which has more policy incentives, if the Government can finance the consumer with incentives which could be the best possible way to adopt the HFCV's in market, These incentives can make the price affordable to consumers. These policy incentives are separated into financial and Non-financial incentives. Financial incentives can be used to lower the purchase price for consumers such as, Purchasing Subsidies, Tax Reduction. Non-financial incentives such as Free parking, toll exemption in express way can be used after the purchase of vehicles. These financial and non-financial consumer incentives could help in successful adoption of New Technology in the market.

6. CONCLUSION:

The Global Warming has been increasing at an alarming rate due to pollution from various sources and gasoline vehicles have a considerable percentage in it. Global warming has adverse effects on our planet and cannot be ignored. It is observed that if the global warming is left unchecked and increases at the same rate, within 50 years our planet might face huge climatic changes which in turn causes a plethora of problems. The population growth does not help either. It is discovered that the population might quadruple in 5 years.

Our fuel reserves cannot sustain this and will run out. To tackle this issue, a lot of research is put on Alternate fuel and alternate propulsion technology and most of the countries in the world are deciding to shift from gasoline engines to alternative fuel engines. Many of the countries have also succeeded in implementing these alternative fuel vehicles.

As of today Electric vehicles have shown promising results and seems to be the future. Now basically two main systems have been developed to power the Electric vehicles: Battery operated electric vehicle and Hydrogen fuel cell vehicle

As explained in this study, Hydrogen Fuel cell have significant edge over the battery operated electric vehicles. Hydrogen Fuel cell can be replacement for our current gasoline vehicles if implemented properly. The only major issue is that Hydrogen Fuel cell have a high Capital Investment to start but this can be reduced significantly once consumers start accepting fuel cell vehicles.

India suffers heavily due to this pollution. We can see how the pollution has affected India just by seeing the news. India's average air quality is actually less compared to the minimum air standard by WHO. Major cities like Delhi, Mumbai, and Chennai suffer major effects. This is mainly due to the density of population living in those cities and amount of vehicles they use on the road. In the past 5 years, Delhi has been suffering from Smog problems which is mainly due to carbon and Sulphur emitted by the vehicles. India has been importing fossil fuels from other countries since we don't have strong fuel reserves. This can be somewhat solved if adopted a different form of transportation method like Electric Vehicles. Majority of electric power in India comes from coal power plants, so turning to Battery electric vehicles would just transfer the emission from tailpipe to chimneys unless non-conventional power source becomes the major contributor. So Hydrogen fuel cell vehicles have a tremendous potential in India.

Recently Indian government has also been striving to adopt the HFCV's. We identified consumer behavior towards HFCV through discrete choice experiment methods which was the most successful method. This experiment has conducted among 254 respondents who are potential car buyers. This study most significantly indicates that the policy incentives attract most of the consumers and will be helpful in the transition from Conventional Gasoline vehicles to Hydrogen Fuel Cell vehicles. We have mainly focused on the preferences for HFV's with the help of different attributes and incentive policies. In support of the previous study Qian And Soopramanien 2011, we have included different vehicle attributes and incentive policies in our survey. Which are considered as most important in the adoption of HFCV's. (Example: - purchase price, refueling time, free parking, reduction of taxes, purchasing subsidies).

This study finds respondent's greater valuation of refueling cost and reduction in vehicle tax over purchasing subsidies. These incentives may prove to be beneficial in buyer's positive attitude towards HFCV's. Current owners and those with higher education would prefer Alternate Fuel as their vehicle of choice. The implementation of these policy incentives alongside the availability of hydrogen fuel cell infrastructure could be helpful in the future. The limiting factors for the adoption of HFCV include high prices, lack of awareness, lack of refueling infrastructure.

The Indian government plans to reduce CO2 emissions in the transportation section under the 'no new coal' policy by 30% by 2040. This goal encourages the investors to invest heavily in new technologies like hydrogen-related infrastructure. Large-scale exhibitions should be conducted regarding hydrogen fuel cell technology to attract consumer support and awareness.

Hydrogen Fuel Cell vehicles can be a great game changer for India if implemented properly. There are efforts being taken for Hydrogen fuel cell vehicles and lot of research and funding is going to implement them. TATA Motors have actually introduced the first hydrogen fuel cell bus along with ISRO called "TATA STARBUS". Many manufactures have started to pioneer and make efforts in this technology, Toyota and Hyundai are largest players in the consumer market for Hydrogen Fuel Cell Vehicles now.

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