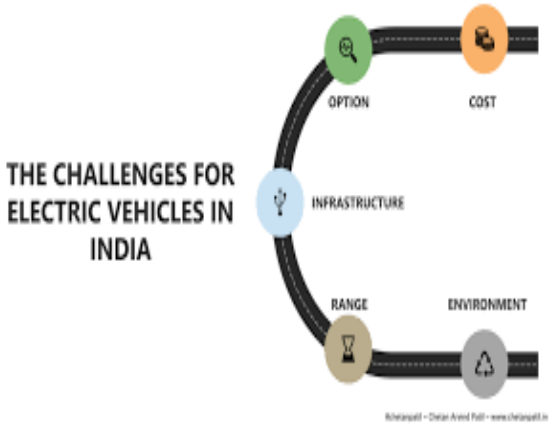
INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

Department of Industrial and Management Engineering

MBA633A
MARKETING RESEARCH



Project Report

A Market Research Project on

Analysis of Hurdles in Evolution of EV's in India

Submitted to:

Prof. Shankar Prawesh

Submitted By:

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Problem definition:

This research is done to know peoples perspectives for electric vehicles and to know their requirement or expectations for electric vehicles.

Management decision Problem	Market Research Problems
Should price of electric vehicles reduced?	What range of price preferred by customers?
Should charging time of electric vehicle reduced?	What range of charging time preferred by customers?
Is there any need to change advertising campaign?	To study the efficiency of current advertising campaign.

Problem approach:

We target peoples of age group 20 – 30 and prepared questions on Google form and then circulated the form to target population for data collection for further data analysis and findings insights from data. The questions prepared in context of problem and by doing a small survey among 10 peoples.

Research Questions:

1. Will Electric vehicles reduce air and noise pollution?
2. Is cost of electric vehicles higher than other?
3. Is it cheaper to operate an electric vehicle per kilometre than it is to operate other vehicles?
4. For a full charge, what should the charging time for an electric vehicle be in hours?
5. How far should an electric vehicle travel on a single charge?

Survey Design:

After preparing questions on Google form with keeping in mind problem definition and completing pretest, We Circulate it among large number of target population for data collection.

Pretesting:

As I mentioned earlier we discuss and circulated our question with our batch mates and get their review or reactions before conducting survey. Based on the feedback we modified our questionnaire before floating it to large audience.

Data analysis and Results:

Data Collection and Cleaning:

We collected 207 instances in data collection and we don't have any null values. Further we have many categorical data so that we did data labelling inn order to carry out the analysis in SPSS.

Data labelling:

strongly disagree	1
Disagree	2
Neutral	3
Agree	4
strongly agree	5
charging time in hours	
2.5 to 3	4
2 to 2.5	3
1 to 1.5	2
0.5 to 1	1
Distance covered in one charging	
50 km - 100 km	1
150km - 200km	2
200km - 400km	3
more than 400km	4
Yes	1
No	0

One tail test in SPSS

Since in SPSS, We can only do two tail test and power of two tail test is lower than one tail test, therefore To do a single tail test with a 95% confidence level,, we will conduct two tail test with 90% significance level and we will divide output P value by two (2) so as to get p value for one tail test with 95% confidence level.

Research Question 1: Will Electric vehicles reduce air and noise pollution?

One tail test on RQ 1 in SPSS

One-Sample Test

	Test Value = 3					
					90% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Air and noise pollution will be reduced by electric automobiles.	25.440	206	.000	1.454	1.36	1.55

Result from Question 1:

Null Hypothesis – Electric vehicles will not improve air and noise pollution

Alternative Hypothesis – Electric vehicles help to reduce pollutants in the air and noise.

H0: $\mu \leq 3$, Ha: $\mu > 3$

Interpretation: p value is <0.05 i.e. (0.00/2) so we reject our null hypothesis which means **Electric vehicles reduce air and noise pollution.**

Research Question 2: Is cost of electric vehicles higher than other?

One tail test on RQ 2 in SPSS

One-Sample Test

	Test Value = 3					
					90% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Cost of electric vehicles is higher than other	15.048	206	.000	1.010	.90	1.12

Result from Question 2:

Null Hypothesis: Electric vehicles are less expensive than conventional vehicles..

Alternative Hypothesis: Electric vehicles are more expensive than conventional vehicles.

H0: $\mu \leq 3$

Ha: $\mu > 3$

Interpretation: p value is <0.05 i.e. (0.00/2) so we reject our null hypothesis which means **Cost of electric vehicles is higher than other**

Research Question 3: Is it cheaper to operate an electric vehicle per kilometre than it is to operate other vehicles?

To analyze this RQ we tested our question in SPSS

One tail test on RQ 3

One-Sample Test

	Test Value = 3					
					90% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Electric vehicles offer a low per-kilometer operating cost.	17.010	206	.000	1.126	1.02	1.23

Result from Question 3:

Null Hypothesis – Running cost per km of electric vehicles not lower than other.

Alternate Hypothesis – Running cost per km of electric vehicles lower than other.

H0: $\mu \leq 3$

Ha: $\mu > 3$

Interpretation: p value is <0.05 i.e. (0.00/2) so we reject our null hypothesis which means **Running cost per km of electric vehicles lower than other.**

Research Question 4: For a full charge, what should the charging time for an electric vehicle be in hours?

One-Sample Test

	Test Value = 2					
					90% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
For a full charge, what should the charging time for an electric vehicle be in hours?	1.385	206	.168	.101	-.02	.22

Result from Question 4:

Null Hypothesis – Charging time for an electric vehicle should be less than 2 hours.

Alternate Hypothesis – Charging time of an electric vehicle should be between 2 to 4 hours

H0: $\mu \leq 2$; Ha: $\mu > 2$

Interpretation: p value is >0.05 i.e. (.168/2)so we fail to reject our null hypothesis which means **Charging time for an electric vehicle should be less than 2 hours.**

Research Question 5: How far should an electric vehicle travel on a single charge?

One-Sample Test

	Test Value = 2					
					90% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
How far should an electric vehicle travel on a single charge?	6.971	206	.000	.425	.32	.53

Result from Question 5:

Null Hypothesis – Distance covered by Electric Vehicle in one charging should be less than 200KM

Alternate Hypothesis – Distance covered by Electric Vehicle in one charging should be greater than 200KM (200-400KM)

H0: $\mu \leq 2$; Ha: $\mu > 2$

Interpretation: p value is <0.05 i.e. (0.00/2)so we reject our null hypothesis which means **Distance covered by Electric Vehicle in one charging should be greater than 200KM (200-400KM).**

Limitations:

1. The majority of respondents are adamant about not finishing the survey.
2. We find it difficult to cover up people of all age groups equally since not all elder people use smartphones.
3. We felt that most of the people want EV which charge quickly and cover large distance but they are not willing to pay more cost for it most of them are going towards lowest price range of our data.

Findings:

1. 35.7% of the family currently own only 1 vehicle and 30.4% of the family own 2 vehicles
2. 96.6% respondents have never owned an electric vehicle which provides the great chance of improvement in this region. 62.8 percent of our respondents said that they will buy an electric vehicle in the future.
3. 72.5% of respondents prefer electric two wheeler costing between 60k-80k.
4. 68 percent of respondents believe that an electric vehicle's charging time should be less than 1.5 hours and 42.5% say that in single charge it should cover distance of 150-200 km
5. 83% of respondents seek the need of improvement in EV infrastructure and 86.5 % of them believe that there is a need of advertising campaign to boost interest among people for Electric Vehicles.

Suggestions:

- there is a strong link between customer awareness of E-Vehicles and purchasing patterns, the government should aim to raise awareness and impose rules such as one electric vehicle per household. Most environmental concerns can be solved through sustainability, and electric vehicles and hybrid electric vehicles are examples of this.
- The government should provide a subsidy in order to increase the number of customers for EV. We can greatly reduce pollution and contribute to the betterment of society and future generations by doing so. Also, existing EVs have a significant maintenance cost; Customers will gladly purchase one once this issue has been resolved. Because taxis make up the bulk of vehicles on the road, companies like Ola and Uber can focus more on getting EVs to market.

Conclusion:

EV have their own opportunities and obstacles, but it all comes down to us how we choose to see it, therefore through this study we want to see what are the difficulties involved in evolution of EV's in India. Customer wants Electric Vehicle to get fully charged within less than 2 hours and must cover distance of 200 km or above on single charge and must cost between 60-80k but a typical EV takes around 8 hours to get fully charged and costs more than the petrol or diesel vehicles.

We should put greater emphasis on product innovation and charging infrastructure, as this is widely thought to be the primary cause of limited battery life.

Team Member Contributions:

Team Member	Contribution	Rating(out of 10)
Pushkar Awasthi	Preparing Survey questionnaire Report Making	9
Ramnivas jat	Preparing Survey questionnaire SPSS Analysis	9
Drumil Bhalani	Preparing Survey questionnaire Data collection	9

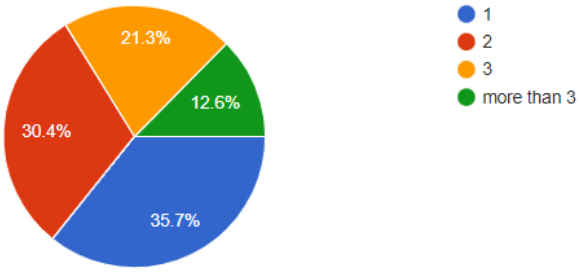
Appendix:

Graphical Analysis of Data:

1.

How many vehicles do you and your family currently own?

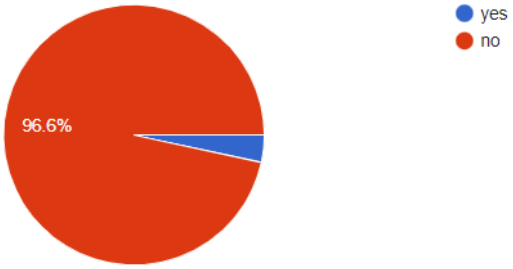
207 responses



2.

Have you ever owned an electric vehicle?

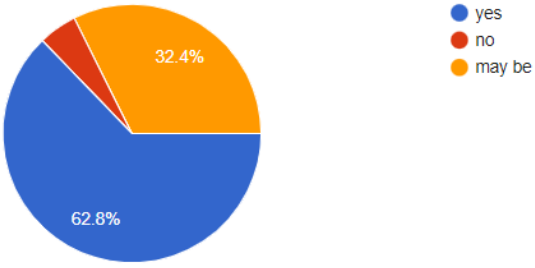
207 responses



3.

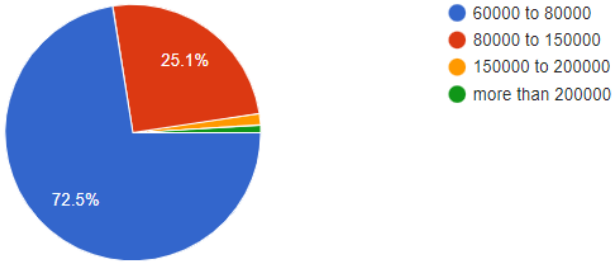
Will you buy an electric vehicle in future?

207 responses



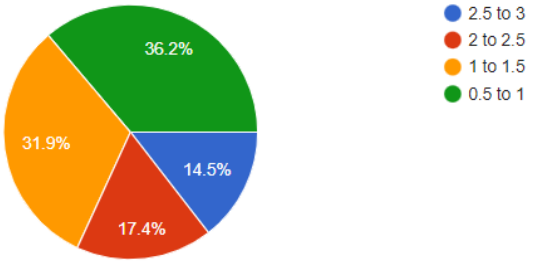
4. what price will you prefer for an electric two-wheeler?

207 responses



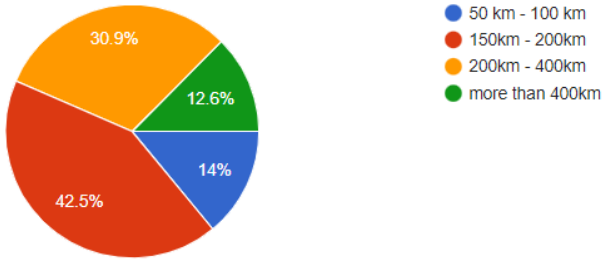
5. what charging time an electric vehicle should have in hours for full charge?

207 responses



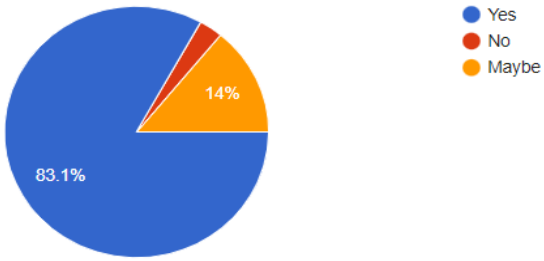
6. what distance an electric vehicle should cover in one charging?

207 responses



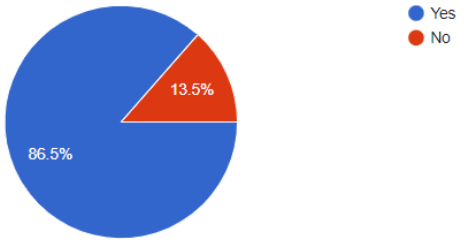
7. Is there any need of Improvement in EV Infrastructure?

207 responses



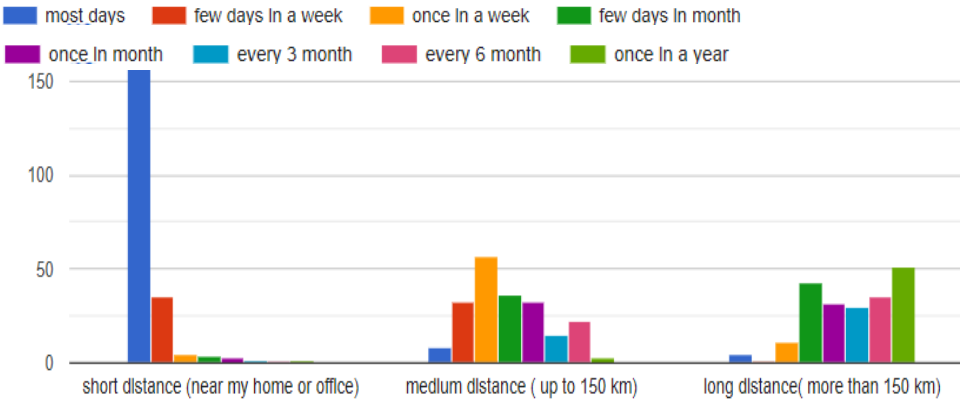
Is there any need for the advertising campaign to boost interest among people for Electric Vehicles?

207 responses



8.

Thinking about how far you drive or what types of trips you do. please give your response.



9.

Survey Questionnaire - https://docs.google.com/forms/d/e/1FAIpQLSc5Vy17NzMc2-1J--wOEyJmVOKeFXXx-2KZ_PBwIXWA8Ub_rQ/viewform?usp=sf_link

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4. GoI, 2012. National Electric Mobility Mission Plan. Government of India, New Delhi, India