Identifying factors that influence adoption of electric vehicle bikes in Goa, India

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by

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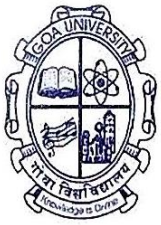

Goa University

Date: 27th April 2023

Examined by:

Seal of the School

DECLARATION BY STUDENT

I hereby declare that the data presented in this Internship report entitled, "Identifying factors that influence adoption of electric vehicle bike in Goa, India" is based on the results of investigations carried out by me in the Management Studies at the Goa Business School, Goa University under the Supervision/Mentorship of Dr. Priyanka U. Naik and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities will be not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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Place: Goa University

COMPLETION CERTIFICATE

This is to certify that the dissertation / internship report **"Identifying factors that influence adoption of electric vehicle bike in Goa, India"** is a bonafide work carried out by **Mr Tejas Vijaykumar Surlakar** under my supervision / mentorship in partial fulfilment of the requirements for the award of the degree of **Master of Business Administration** in the Discipline of Management Studies at the Goa Business School, Goa University.

Dr. Priyanka U. Naik
Management Studies

Date: 27/04/2023

Goa Business School ★ Goa University ★

School Stamp

Prof. Jyoti D. Pawar
Dean,
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Date: 27/04/2023
Place: Goa University

Atharv EV
a unit of Atharv Creations
Shop No 7, Samruddhi Lifestyle,
B B Borkar Road, Penha De France
Porvorim, Bardez, Goa 403501
GSTIN: 30AHRPT5934E1Z5

Date: 26th April 2023

TO WHOMSOEVER IT MAY CONCERN

INTERNSHIP CERTIFICATE

This is to certify that ***Mr. Tejas Vijaykumar Surlakar***, Student of the Goa Business School, Goa University, undergoing Master of Business Administration has successfully completed Internship from 1st March 2023 to 26th April 2023 at our organisation. He actively participated in the activities during the period of internship and learned the skills needed for various activities such as market survey, analysis of the survey result, content creation for marketing activities.

This certificate is issued at his own request for academic fulfilment. We wish him good luck for his future endeavours

For **Atharv EV**
(A unit of Atharv Creations)

For Atharv Creations
Authorised Signatory

(Reema Parag Velusker)

Phone: +91 9284 381 977 / +91 9823 781 710 Email: atharvcreationsgoa@gmail.com

Acknowledgement

I would like to express my gratitude to all the individuals who have helped and supported me throughout this project.

I also take this opportunity to thank management and staff of AtharvEV, a unit of Atharv Creations and Mr. Parag Velusker for allowing me to do internship in the organisation.

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I would also personally like to thank our mentor, Dr. Priyanka U. Naik for her guidance throughout and completion of this project.

I extend my gratitude to Goa Business School for giving me this opportunity.

Thank you

Tejas Vijaykumar Surlakar

Table of contents

IDENTIFYING FACTORS THAT INFLUENCE THE ADOPTION OF ELECTRIC VEHICLE BIKES IN GOA, INDIA

1. Profile of the company

Atharv EV

Atharv EV is a unit of Atharv Creations. The dealership is situated at Shop No.7 Samruddhi Lifestyle, B.B. Borkar Road, Porvorim, Bardez - Goa. It was founded on 2nd October 2022. The founder of the firm is Mr. Parag Velusker. The firm aims to be an electric mobility solution provider. The brands offered by the dealership are 2 wheeler EV (electric vehicle) bikes and 3 wheeler electric rickshaws, loaders from E-Ashwa Automotive, EV bicycle from Svitch and Portable charging station from Bijlify.

E-Ashwa Automotive

E-Ashwa Automotive is one of the top manufacturers of battery-powered, environmentally friendly automobiles. It was established in 2017 & incorporated on 4th May 2021, headquartered at Ghaziabad, Uttar Pradesh. Mr. Vikas Gupta is the founder of the firm. The business specialises in the sale of electric rickshaws, loaders and scooters. The company's goal is to provide customers with high-quality electric rickshaws, electric loaders, and electric scooters that are equipped with the newest technology. So that every product that leaves the factory provides the maximum level of safety, comfort, and utility to the driver and the passengers, which is then translated into "Value for Money." Their Main Hub, Head Office & Showroom in Goa is situated at Old Goa: E-Ashwa Automotive Pvt Ltd, Shop no 1& 2, Gera's Imperium Premio, Kadamba Plateau highway, Old Goa, Tiswadi, Goa. +91 9356064213

Their dealerships in Goa are:
Nuvem: DSA Motoplex, 4/A/1, Goulloy, Nuvem Salcete-Goa + 91 45343795/ 7218699886
Curtorim: Symphony E-Bikes .Bhatti Curtorim,Curtorim - +91 9822381173
Colva: Trinity Enterprise, Seraulim, Colva Road, Colva. +91 9923559277
Porvorim: Atharv EV, Shop no 7, Samruddhi Life Style, B.B.Borkar Road, Penha De França, Bardez Goa. +91 9284381977

2. Introduction

The Indian market for electric vehicles is expanding. The national and state governments have started programs and incentives to encourage the use of electric vehicles, and there are also rules and standards in place. Even though the country stands to gain significantly from converting its transportation from internal combustion engines to electric motors, there are obstacles to overcome. E-commerce businesses, automakers, app-based transportation network firms, and mobility solution providers have entered the market and are gradually increasing the capacity and visibility of electric vehicle.

In order to increase national fuel security through the promotion of hybrid and electric vehicles, the Government of India introduced the National Electric Mobility Mission Plan, 2020 in 2012. The GDP of manufacturing is 22% accounted for by the auto sector. By 2022, manufacturing will contribute 25% more to the total economy thanks to the new manufacturing policy. In India, 30% EV penetration is the goal of the National Electric Mobility Mission Plan for the year 2030.

The Faster Adoption and Manufacture of Hybrid and Electric Vehicles (FAME) scheme was launched by the government and offers financial incentives for buying electric automobiles. The plan's Phase I ran from 2015 to 2019, while Phase II started in 2019 and is expected to end in 2022. To improve the nation's charging infrastructure, the government is issuing bids. For scooters, motorbikes, and automobiles, the scheme gives incentives ranging from Rs.1,800 to Rs.29,000 for electric and hybrid vehicles. FAME is a component of the Indian government's National Electric Mobility Mission Plan. From this study, we try understand the current and future status of Electric Vehicle market and uptake in the country.

To promote the use of electric mobility cars and to assure energy security in the nation, the government started the Go Electric campaign at the beginning of 2021. Go Electric is a future for India, according to Road Transport and Highways Minister Nitin Gadkari, who introduced the initiative by claiming it will support inexpensive, ecologically friendly, and domestic electrical items. He voiced worry over the high cost of importing fossil fuels and noted a significant issue is the CO2 emissions from transportation vehicles. India's electric vehicle industry is dominated by two-wheel vehicles rather than four-wheel passenger automobiles, in contrast to the US and China.

However, the Indian government has plans to enhance EV adoption in the next ten years, concentrating on increasing purchases of two-wheel cars. EVs now account for just

approximately 2% of all automotive sales in India. According to predictions from Bain & Co., sales in India are anticipated to increase by 40% to 45% by 2030, when 13 million new automobiles would be sold yearly.

3. Literature review

Researchers from all around the world have worked hard to determine the obstacles to EV adoption in the automobile industry. The influences might be social, political, economic, technical, or even environmental. While the social components have been investigated in-depth in order to achieve a competitive edge in the global market, the technological, economic, and environmental issues have been explored in the past.

The study respondents who believe that the vehicle performance elements are the most important have a more passive mind-set towards the adoption of EVs, even if the financial and infrastructure considerations have a favourable influence on the rate of adoption of EVs in India (Digalwar & Rastogi, 2022).

The top three BEV (battery electric vehicle) concerns were safety, reliability, and range, indicating that the general public is dissatisfied with present vehicle performance. Also, those who were more worried about the environment were more inclined to use BEVs and were more concerned about the pollution that would result from the battery. This tells decision-makers that spreading the word about the benefits BEVs have on the environment may encourage adoption. Standardizing battery recovery processes might further dispel public cynicism about BEVs, especially among more environmentally conscious buyers (She et al., 2017).

The expansion of the infrastructure for charging battery electric vehicles is crucial for their users, especially if they want to use them for long-distance travel. To prevent current BEV users from switching back when they discover that their mobility needs cannot be satisfactorily met by a BEV, especially when it is the only vehicle in the household, it seems important to increase the number of chargers along the motorway network and provide simple and compatible payment solutions across Europe. An essential behavioural change to undertake is finding a strategy to manage or be willing to engage in lengthier BEV trips. In order to reduce the requirement for behavioural adaptation, people should be assisted in this process not just by pertinent information but also by upgrades and extensions to the charging infrastructure (Haustein & Jensen, 2018).

Six factors: financial, vehicle performance, lack of infrastructure for charging, environmental concern, societal influence, and knowledge of electric vehicles were determined based on the components gathered. The biggest challenges to the adoption of EVs in the Indian context are determined to be financial constraints, performance limitations of the vehicles, and a lack of infrastructural facilities for charging. (Michael et al., 2022).

In terms of sex, age, and education, EV behaviour, comprehension, and viewpoints vary. Additionally, research demonstrates that although EVs have an impact on sustainability and the environment, their costs and efficiency lag behind those of conventional vehicles. The findings from the survey indicate that there is moderate to significant interest in EVs notwithstanding the different misgivings that have been stated in respect to them. The majority of EV-based views were neither wholly positive nor wholly negative, but even the small number of wholly negative EV-based attitudes should not be disregarded (Shetty et al., 2020).

Consumer attitudes about EV are greatly influenced by environmental concerns. The results of this study also showed that customer attitudes regarding EVs are strongly and favourably influenced by product knowledge. Hence, utilising marketing communication techniques, EV producers and government organisations must raise the awareness and product understanding of their target consumers. Another outcome of this study is that an individual's subjective norms had a favourable impact on the creation of a consumer's attitude in the context of EV (Dash, 2021).

Consumers' perceived usefulness, perceived ease of use, reported enjoyment of using EVs, and consumers' desire to adopt EVs are all positively and substantially correlated with consumer technological expertise. However, the technical knowledge portion of the study revealed no association between perceived joy to use and readiness to embrace EVs (Huang et al., 2021).

Environmentally friendly information, performance information, and attribute information are all favourably correlated with perceived value and perceived trust when it comes to EVs. Moreover, the quality of the information affects the favourable relationships between environmentally friendly information and performance, attribute, perceived value, and perceived trust. The relationships between environmentally friendly information, performance information, attribute information, perceived value information, and perceived trust information are strengthened by information quality. Moreover, perceived value and perceived trust are positively correlated with customers' inclinations to embrace EVs (Zhang et al., 2022)

It is clear that Danish EV customers' decision-making and preferred charging methods are heavily influenced by cost and convenience. Generally, the EV owners who were surveyed say that the reason they opted for EVs was to have cheaper operating expenses. Yet, the outcomes of the quantitative models indicate that consumers are prepared to pay more for the ease of reduced (per kWh) prices for routine charging. The findings also demonstrate that consumers favour the ease of interoperability amongst charge providers. Lastly, they are prepared to take alternate routes to reach fast-charging stations with additional facilities and chargers (Visaria et al., 2022).

Instead of having a direct impact on EV adoption, financial incentives have an indirect impact through mind-set and behaviour. So, in contrast to other research, the results of the current study present the advantages and consequences of financial incentives from a new angle. It emphasises how government financial incentives might aid in enhancing public perception and behaviour towards EVs, which in turn could have a long-term effect on the adoption of EVs in large numbers and their future in India. Consequently, even though EVs now have a small market share in India despite financial incentives, the study's findings support the premise of offering financial incentives in the Indian context and imply that government financial incentives for EVs should continue. (Ansab & Kumar, 2022)

On these basis on this, Distance Range, Environment, Safety, Government Subsidy, Performance, Knowledge, Price Range were identified as rational factors and Waiting Period, Engine Sound and Appearance were added as emotional factors determining EV adoption. For conducting this study, research papers from online database of Science Direct, Emerald, Taylor and Francis were examined.

4. Research Gaps and Questions

Few research have examined how to investigate the impacts of consumer technology knowledge regarding EVs on their adoption intention, and prior studies lack a technological knowledge-based perspective. This study closes the technology gap.

Hence, this study focuses on the effect of customer’s knowledge of the technology determine adoption of electric vehicle bikes.

5. Project Objectives

The objective of study is to determine the factors which makes customers adopt & shift from oil fueled vehicle to electric vehicle bikes. This includes understanding the Behavioral and Technological factors as well, such as emotions and knowledge respectively. Also considers other factors such as government subsidies, initiative etc.

As such the themes will include distance range, impact on environment, price range, safety, govt. subsidy, charging facility, performance, and knowledge of the technology as well as waiting period, engine sound and appearance.

5.1 Need for the study

It is important to conduct this because despite of many efforts by the Government of India, the rate of adoption of EVs in India has not been up to the mark.

To bridge this gap, (Digalwar & Rastogi, 2022) study understands the social acceptability and sustainability of EVs and identifies the social factors, builds inferences from the results obtained and helps in orienting the manufacturers and decision makers towards faster adoption of the EVs.

Hence research and development in this space is mandatory For India to get ahead in the electric vehicle adoption.

5.2 Benefits of the study

Due to the increasing demand towards EVs by consumers, the data of this research will help firms in the industry.

Therefore in future, this project has the potential to be beneficial to EVs showrooms and their sales team by using the data in marketing their vehicles. Overall this study is important because the value it can obtain to understand and navigate the emerging EV market space in India.

5.3 Usefulness to company

This study will help in increasing the awareness of the brand and their products. Data and analysis of this study will help in getting to know their target market in depth and understand the preferences and use of consumers in the EV bike space in Goa. The data will also help the firm in setting up a new showroom and creating marketing campaigns in a different locality.

6. Project Methodology

This research study seeks to identify the factors which influence the adoption of electric vehicle bikes in Goa, India. The study was conducted on a small population from various parts of the state.

6.1 Sampling and data collection

Initially, a pilot study was conducted with 20 responses for the feasibility of my research process. The results of which implied the time & cost in collection of large number of samples. For this research a sample size of 100 respondents was considered. The questionnaire was circulated through online Google form and offline method. Data collected from offline and Google form responses will be recorded in spreadsheet file for the smooth flow of data collection. The responses collected through online survey & also offline data that is input into the form will be measured in real-time in the summary tab section. Socio-demographic factors like age, gender, occupation, annual income and number of vehicles owned were considered for the survey.

6.2 Questionnaire Design

To conduct this study, the research instrument used was online questionnaire – Google form and offline survey. The questionnaire is designed based on past literature and it was titled “Determinants of Electric Vehicle Bike Adoption”. The questionnaire was divided into 4 sections:

Section I: Demographics (Questions 1 – 7)

In the first section demographic information of the respondents like gender, resident, age, qualification, occupation, number of family members, annual family income was taken.

Section II: Ownership. (Questions 8 – 15)

The second section included questions pertaining to ownership of fueled bikes EV bikes number of vehicles, purpose of vehicle etc. was asked

Section III: Perception (Questions 16 – 23)

The third section included questions pertaining to perceptions of EV.

This was the perception view of the respondent. Followed by 5 point likert scale of importance, agreement, likelihood and satisfaction. At the end of the section a question was asked if their next purchase is an EV.

Section IV: Purchase Decision of EV (Question 24 Rankings)

The fourth and last section is purchase decision of EV. The respondent had to rate the factors for considering or not considering an EV' followed by 5 point likert scale of satisfaction. The factors were distance range, impact on environment, price range, safety, govt. subsidy, charging facility, performance, waiting period, engine sound and appearance. This was the expectations view of the respondent.

6.3 Research Instrument

For the prepared questionnaire, 5- point likert scale was used.

Scale	Agreement	Importance	Satisfaction	Likelihood
1	Strongly Disagree	Very unimportant	Very dissatisfied	Extremely unlikely
2	Disagree	Unimportant	Dissatisfied	Unlikely

3	Neither Agree nor Disagree	Neutral	Neutral	Neutral
4	Agree	Important	Satisfied	Likely
5	Strongly Agree	Very important	Very Satisfied	Extremely likely

6.4 Data analysis

The survey was be linked to Google sheets and all the responses were recorded in the file. The collected data will be converted into numerical form.

The converted data will be further analyzed using Reliability, Validity, Frequency Distribution, Chi Square and Correlation. After analyzing, the data would be formulated to derive findings and conclusion.

6.4.1 Reliability Test

The extent to which a scale produces consistent results if repeated measurements are made refers to reliability. The average of all possible split-half coefficients resulting from different ways of splitting the scale items is known as the coefficient alpha, or Cronbach's alpha. A value greater than 0.6 is considered to be good for internal consistency (Table 1). By using reliability analysis, you can identify the degree to which the items in your questionnaire are related to one another, as well as problematic items that ought to be removed from the scale you can also obtain a general index of the repeatability or internal consistency of the scale as a whole.

6.4.2 Validity Test

Validity test measures the degree of validity or the validity of a research instrument. An instrument is said to be valid if it is able to measure the value that is to be measured or desired. An instrument is deemed valid if the significance of variables under investigation is less 0.5. One instrument that is frequently used in quantitative research is a questionnaire. To determine true the questionnaire compiled it valid or not it is necessary to test validity. (Refer to table 2. in annexure)

$H_{0:}$ Null Hypothesis: There is no correlation in the data.

$H_{1:}$ Alternate Hypothesis: There is correlation in the data.

6.4.3 Frequency Distribution

The distribution of observations based on a variable's possible values is displayed in a frequency table. To understand which alternatives appear more or less frequently in the dataset, frequency tables are useful. This is useful for better understanding each variable and determining whether or not variables need to be recoded.

6.4.4 Chi Square

With chi-square and Cramer's V, we compare the observed frequencies in the cells of a contingency table with what we would expect to see if the two variables are independent. Chi-square is a measure of statistical significance. It answers the question, "Is there a relationship between our dependent variable and our independent variable?" Cramer's V is a measure of substantive significance. It answers the question, "How strong does the relationship appear to be?" The statistic used to test the statistical significance of the observed association in a cross-tabulation. It assists us in determining whether a systematic association exists between the two variables.

$H_{0:}$ Null Hypothesis: There is no association between annual family income and next purchase as EV

$H_{1:}$ Alternate Hypothesis: There is no association between annual family income and next purchase as EV

Pearson Chi-Square (table 6) tells us if there is association and the value should be greater than 0.05. Cramer's V (table 5) tells us how strong or weak the association is and it should be more than 0.5 to interpret that there is a strong association. If it's below 0.5 it a weak association.

If there is strong association, we must go ahead and compare cells in table 4, if the count is greater than expected count to find the highest difference between the counts and conclude about the location of association.

6.4.5 Correlation

A correlation reflects the strength and/or direction of the relationship between two (or more) variables. The direction of a correlation can be either positive or negative. Correlation coefficients provide a numerical summary of the direction and strength of the linear relationship between two variables. First we should check significance value which should be less than 0.5. Then check for direction of relationship and at the end, strength of relationship.

$H_{0:}$ Null Hypothesis: There is no correlation between the knowledge of EV and likeliness of next purchase as EV

$H_{1:}$ Alternate Hypothesis: There is correlation between the knowledge of EV and likeliness of next purchase as EV

7. Data analysis and discussion

7.1 Reliability Test Results

Table 1. Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.676	34

A Cronbach's alpha of the value 0.676 is obtained from the study result which suggests a moderate consistency level and acceptable for the selected 34 items for a sample size of 100. Therefore we accept the null hypothesis that the data is reliable.

7.2 Validity Test Results (Refer annexure no. 2)

Since significance in majority of items are below 0.05 that is 25 out of 34 items, therefore we reject the null hypothesis and accept alternate hypothesis that there is correlation in the data and it is valid.

7.3 Frequency Distribution Results

Table 2. Frequency Distribution					
	Frequency	Percent		Frequency	Percent
1. Gender			**12. If yes, then how many?**		
Male	72	72	0	17	17
Female	28	28	1	51	51
2. Resident of			2	15	15
North Goa	81	81.0	3	8	8
South Goa	19	19.0	4	5	5
3. Taluka			5	1	1
Bicholim	20	20	6	1	1
Pernem	1	1	7	1	1
Sattari	3	3	10	1	1
Tiswadi	32	32	**13. Do you own an Electric Bike?**		
Ponda	6	6	Yes	16	16
Mormugao	4	4	No	84	84
Salcette	8	8	**14. If yes, then how many?**		
Quepem	2	2	0	84	84
4. Age			1	16	16
18 – 28	58	58	**15. Would you consider EV as your primary bike?**		
29 – 39	21	21	Yes	64	64
40 – 50	7	7	No	36	36
51 – 61	11	11	**16. How likely is your next bike as EV?**		
62 & above	3	3	Extremely unlikely	8	8
5. Qualification			Unlikely	8	8
SSC	5	5	Neutral	14	14
HSSC	6	6	Likely	48	48
Graduate	41	41	Extremely likely	22	22
Postgraduate	46	46	**17. What is your overall knowledge of an EV?**		
PhD	2	2	Very Poor	1	1
6. Occupation			Poor	9	9
Student	41	41	Average	36	36
Unemployed	3	3	Good	43	43
Private service	21	21	Excellent	11	11
Govt. Service	12	12	**18. Can EVs be used for long distance travel?**		
Self Employed	11	11	Extremely unlikely	8	8
Professional	12	12	Unlikely	37	37
7. Family Members			Neutral	22	22
1	1	1	Likely	28	28

2	2	2	Extremely likely	5	5
3	29	29	**19. EV is good for the environment as compared with fuel ones?**		
4	38	38	Strongly Disagree	2	2
5	18	18	Disagree	4	4
6	6	6	Neither Agree nor Disagree	14	14
7	2	2	Agree	57	57
8	2	2	Strongly Agree	23	23
9	1	1	**20. Are EVs less vulnerable to catch fire on its own?**		
10	1	1	Extremely unlikely	4	4
8. Annual Family Income			Unlikely	13	13
Less than 5 Lakhs	37	37	Neutral	44	44
5 – 10 Lakhs	40	40	Likely	31	31
11 – 16 Lakhs	14	14	Extremely likely	8	8
16 Lakhs & above	9	9	**21. Are you satisfied with the current options in EV available in the market?**		
9. Do you own a fuel bike?			Very dissatisfied	4	4
Yes	91	91	Dissatisfied	19	19
No	9	9	Neutral	34	34
10. If yes, then how many?			Satisfied	39	39
0	9	9	Very Satisfied	4	4
1	26	26	**22. Price Range for buying EV bike**		
2	44	44	60K-75K	27	27
3	13	13	75K-90K	29	29
4	3	3	90K-1.20L	27	27
5	2	2	1.20L-1.50L	13	13
6	2	2	1.50L & Above	4	4
10	1	1	**23. Your Daily Travelling Distance Range**		
11. Do you own a fuel car?			0-40KM	40	40
Yes	82	82	40-60KM	27	27
No	18	18	60-80M	15	15
			80-120KM	15	15
			120-150KM	2	2
			150KM & above	1	1
			24. Is your next purchase an EV?		
			Yes	66	66
			No	34	34

Table 3. Purchase Decision Perception - Frequency Distribution			
Factors	**Frequency**		**Percentage**
Distance Range	Positive	31	31%
	Neutral	36	36%
	Negative	33	33%
Waiting Period	Positive	35	35%
	Neutral	48	48%
	Negative	17	17%
Impact on Environment	Positive	69	69%
	Neutral	24	24%
	Negative	7	7%
Price Range	Positive	30	30%
	Neutral	34	34%
	Negative	36	36%
Safety	Positive	36	36%
	Neutral	39	39%
	Negative	23	23%
Engine sound	Positive	65	65%
	Neutral	25	25%
	Negative	10	10%
Govt. subsidy	Positive	39	39%
	Neutral	35	35%
	Negative	26	26%
Appearance	Positive	61	61%
	Neutral	30	30%
	Negative	9	9%
Charging facility	Positive	23	23%
	Neutral	41	41%
	Negative	36	36%

Performance	Positive	55	55%
	Neutral	38	38%
	Negative	7	7%

The demographics of respondents were: Male (72%) Female (28%), Age 18–28 (58%) 29–39 (21%) 40–50 (7%) 51–61 (11%) 62 & above (3%), Qualification SSC (5%) HSSC (6%) Graduate (41%) Postgraduate (46%) & PhD (2%), Occupation Student (41%) Unemployed (3%) Private Service (21%) Govt. Service (12%) Self Employed (11%) and Professional (12%). 38% have 4 family members. 40% have annual family income of 5-10 Lakhs.

The ownership of respondents were 91% Own a fuel bike, 44% own 2 bikes, 82% own a fuel car, 51% own 1 car, 16% own an electric bike, 64% would consider EV as their primary bike and 70% have the likeliness of next bike as EV.

The perception of respondents were overall knowledge 43% Good 11% Excellent 36% Average, 44% neutral for EVs less vulnerable to catch fire on its own, 39% satisfied with the current options in EV available in the market, 29% considers 75K-90K price for buying EV bike. 40% daily travelling distance range is 0-40 KM.

The factors which received the most positive are: Impact on Environment 69%, Engine sound 65%, Appearance 61%, Performance 55% were the top five. This was followed by Govt. Subsidy 39%, Safety 36%, Waiting Period 35%, Distance Range 31%, Price Range 30% and Charging Facility 23%.

The factors which received the most neutral are: Waiting Period 48%, Charging Facility 41%, Safety 39%, Price Range 38%, Distance Range 36% were the top five. This was followed by Govt. Subsidy 35%, Price Range 34%, Appearance 30%, Engine sound 25% and Impact on Environment 24%.

The factors which received the most negative are: Price Range and Charging Facility at 36%, Distance Range 33%, Govt. Subsidy 26%, and Safety 23% were the top five. This was followed by, Waiting Period 17%, Engine sound 10%, Appearance 9%, Impact on Environment and Performance 7%.

7.4 Chi Square Results

Table 4. Annual family income * Is your next purchase an EV? Crosstabulation

			Is your next purchase an EV?		Total
			Yes	No	
Annual family income	Less than 5 Lakhs	Count	21	16	37
		Expected Count	24.4	12.6	37.0
	5 – 10 Lakhs	Count	31	9	40
		Expected Count	26.4	13.6	40.0
	11 – 16 Lakhs	Count	12	2	14
		Expected Count	9.2	4.8	14.0
	16 Lakhs & above	Count	2	7	9
		Expected Count	5.9	3.1	9.0
Total		Count	66	34	100
		Expected Count	66.0	34.0	100.0

Table 5. Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.373	.003
	Cramer's V	.373	.003
N of Valid Cases		100	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Table 6. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.877[a]	3	.003
Likelihood Ratio	13.921	3	.003
Linear-by-Linear Association	.147	1	.701
N of Valid Cases	100		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.06.			

From analysing the data we found Pearson Chi-Square is .003, which is less than 0.05, therefore there is significance.

Cramer's V is .373 which is less than 0.5, which means there is a weak association. Therefore we reject the null hypothesis and accept the alternate hypothesis, there is association between annual family income and next purchase as EV.

7.5 Correlation Results

Table 7. Correlations

		How likely is your next bike as EV?	What is your overall knowledge of a EV? (Eg. Charging, Battery Replacement, Servicing etc.)
How likely is your next bike as EV?	Pearson Correlation	1	.264**
	Sig. (2-tailed)		.008
	N	100	100
What is your overall knowledge of EV? (Eg. Charging, Battery Replacement, Servicing etc.)	Pearson Correlation	.264**	1
	Sig. (2-tailed)	.008	
	N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).			

For correlation between likelihood of next bike as EV and respondent's knowledge about EV, Pearson Correlation is 0.264 with significance value of 0.008. There correlation is significant at 0.01 level.

The Pearson Correlation or Correlation Coefficient is a positive correlation as both variables change in the same direction and size of the correlation is large at 0.264

Therefore we reject the null hypothesis and accept the alternate hypothesis, that there is positive correlation between knowledge of EV and likeliness of next purchase as EV.

8. Project findings and conclusion

8.1 Project findings

From the data analysis, for reliability test it was found the data is reliable. And for validity test there is correlation in the data and it was valid.

It was found that for frequency distribution (Table 3 & 4), 64% of the respondents considers EV as their primary bike. 66% next purchase as EV. 75K-90K is the most looked after price range budget for buying EV bike. 43% are satisfied with the current options in EV available in the market while 23% are not. Majority of the customers considers EV as their primary bike and their next purchase also they are willing to increase their budget to get the best in class features in the segment.

Impact on Environment 69%, Engine sound 65%, Appearance 61%, Performance 55%, Govt. Subsidy 39% received the most positive response. Price Range and Charging Facility at 36%, Distance Range 33%, Govt. Subsidy 26%, Safety 23%, received the most negative response.

Customers prefers EV because they are satisfied with the positive impact it has on the environment, low to zero engine sound, appearance and performance such as economy, hill climb, pickup etc., although government subsidy was discontinued, people who received the benefit are satisfied with it and others wishes it to resume again. Customers were disappointed and not satisfied with price range as they tend to be on the expensive side to get the premium features, the development of charging facility infrastructure such as having charging point stations throughout the state and charging time taken for the bike to operate again, the ability of the vehicle to commute to work and travel distances without worrying about the range was also not satisfied with, customers were disappointed with discontinuing of government subsidy and hopes it will resume again, earlier there were lot of news about EV bikes catching fire although there has not been such as cases recently, safety is still a concern for customers.

In Chi-square test (Table 4, 5 & 6), it was found that annual family income has a significant weak association with the respondents' next purchase of as EV. We can say that retail price of EV vehicle has the same impression on all consumers and income will have a slight impact. And purchase decision of customers will based on other variables such features etc. At the time of writing, centre and state government subsidy is currently not available in Goa.

It was found there is a correlation (Table 7) between respondents' knowledge of EV and likelihood of next bike as EV. The correlation coefficient was a positive and large between respondents' knowledge of EV and likelihood of next bike as EV. It can be said that consumers with higher knowledge of EV space are more likely to consider and go ahead with the purchase decision of the vehicle since they have more clarity about the features, specifications, range etc. and are less confused. Firms should focus on advertising and campaigns on increase customers' knowledge on EV to increase adoption.

8.2 Conclusion

The research study aims to identify the factors which influence the adoption of electric vehicle bikes in Goa India. The study was conducted on a small population in the state of Goa, India. There are several obstacles to overcome while switching from internal combustion engines to electric motors in transportation. Distance Range, Waiting Period, Impact on Environment, Price Range, Engine Sound, Safety, Government Subsidy, Performance, Knowledge, Charging facility and Appearance were considered as potential factors determining EV bike adoption in Goa.

From the findings of the research, Impact on Environment of the vehicle was found to be most the sought after factor in EV bike followed by Engine sound, Appearance & Performance.

Knowledge about EV plays a big role in the adoption of electric bike as they have less confusion to navigate the market. Firms should increase the knowledge by advertisement and campaigns. Majority of the customers are willing to consider primary bike and next purchase as EV irrespective of their income, also they are willing to increase their budget to get the best in class features in the segment.

EV manufactures should take in the account the factors which were ranked poorly by the consumers and work on improving factors which were not met with their expectations such as Price Range, Charging Facility, Distance Range & Safety to increase the adoption of electric vehicles bikes. Government subsidy had also played a major role for early adopter of EV and it should be reintroduction to accelerate adoption in the state of Goa.

9. Recommendations to the company

- I would recommend the firm to increase the awareness of current showroom by setting up signs and prompts directing towards the location, as it is a bit away from major roads and highways.
- And also for upcoming showrooms preferably location should be near prominent roads, so that potential customer are attracted and that they don't have trouble finding the showroom.
- Increase walk-ins by showing how simple and easy it is to get a test drive thus increasing walk-ins and this will push the bikes out of the showroom and onto the roads which will generate public impressions.
- The firms has the potential to do very well in comparison to its competitors by offering budget friendly plans and options.
- Do more interactive roadshows and green initiatives to build awareness about the brand through these campaigns.
- Promoting the vehicle as a rent-a-bike will increase the sales volume.
- Making customers aware on technical aspects as ease of having full battery charge at the starting of the day, how ease is to charge and carry the charger with the bike, maintenance to increase adoption
- And financial savings per month for using an EV vehicle in comparison to fuel bike.

10. Work done & Learnings derived

- Customer interactions

During my internship I learned how the sales team should interact with clients and what the approach should be. From greeting the customers to understanding their needs and curating the best option, plan for their budget and commute. From learning, assisting the team and communicating features of the bikes towards customers.

Different people have different needs, which applies here as well, though it seems the products are similar, their utility depends from user to user. Attracting new customers and retaining current ones is an important process as it builds trust and expands the growth of the organization.

- Market Research Study

I had created questionnaire for the market research as a part of my internship report for which feedback and suggestion for framing the survey was also taken from the firm as they wanted to know more about use and preferences of the respondents & data analysis which will be beneficial to them.

As the firm were planning to open a new showroom, I travelled to Bicholim, Salcette, Ponda and Mormugao taluka to conduct the survey and gather responses as suggested. I would approach people on the street, bus passengers etc. and most of them were cooperative and helped me by giving their responses.

- Sales promotion

While I was doing my survey, I also gave paper pamphlets (designed by me) to people. The paper pamphlet also contained QR code of the exact coordinates of the location which would be open on Google maps and QR for contacting via WhatsApp. No extra paper was used to print the pamphlet as it was printed with the questionnaire paper's extra space which could tore off and given to the respondents.

- Content creation

During my internship I also created promotional images and videos for the firm highlighting key features of the vehicle and promoting the showroom overall. The content circulated both online and offline mediums.

The work was submitted to the team and it was used by the organization. Features such as remote plus key on and off, anti-theft system etc. were promoted as they are the firm's unique selling point.

- Dealership Business

I learned about the dealership in respect to how many vehicles they have to sell to be at the break even, earn profits, and what their sales projection for the financial year. And how collaborations between dealerships and manufacturer is important for synergy.

11. References

Ansab, K. V., & Kumar, S. P. (2022). Influence of government financial incentives on electric car adoption: empirical evidence from India. *South Asian Journal of Business Studies*. https://doi.org/10.1108/SAJBS-03-2021-0088

Dash, A. (2021). Determinants of EVs adoption: a study on green behavior of consumers. *Smart and Sustainable Built Environment*, *10*(1), 125–137. https://doi.org/10.1108/SASBE-02-2019-0015

Digalwar, A. K., & Rastogi, A. (2022). Assessments of social factors responsible for adoption of electric vehicles in India: a case study. *International Journal of Energy Sector Management*. https://doi.org/10.1108/IJESM-06-2021-0009

Haustein, S., & Jensen, A. F. (2018). Factors of electric vehicle adoption: A comparison of conventional and electric car users based on an extended theory of planned behavior. *International Journal of Sustainable Transportation*, *12*(7), 484–496. https://doi.org/10.1080/15568318.2017.1398790

Huang, X., Lin, Y., Lim, M. K., Tseng, M. L., & Zhou, F. (2021). The influence of knowledge management on adoption intention of electric vehicles: perspective on technological knowledge. *Industrial Management and Data Systems*, *121*(7), 1481–1495. https://doi.org/10.1108/IMDS-07-2020-0411

Michael, L. K., K V, S., Hungund, S. S., & Fernandes, M. (2022). Factors influencing adoption of electric vehicles–A case in India. *Cogent Engineering*, *9*(1). https://doi.org/10.1080/23311916.2022.2085375

She, Z. Y., Qing Sun, Ma, J. J., & Xie, B. C. (2017). What are the barriers to widespread adoption of battery electric vehicles? A survey of public perception in Tianjin, China. *Transport Policy*, *56*, 29–40. https://doi.org/10.1016/j.tranpol.2017.03.001

Shetty, D. K., Shetty, S., Raj Rodrigues, L., Naik, N., Maddodi, C. B., Malarout, N., & Sooriyaperakasam, N. (2020). Barriers to widespread adoption of plug-in electric vehicles in emerging Asian markets: An analysis of consumer behavioral attitudes and perceptions. *Cogent Engineering*, *7*(1). https://doi.org/10.1080/23311916.2020.1796198

Visaria, A. A., Jensen, A. F., Thorhauge, M., & Mabit, S. E. (2022). User preferences for EV charging, pricing schemes, and charging infrastructure. *Transportation Research Part A:*

Policy and Practice, *165*, 120–143. https://doi.org/10.1016/j.tra.2022.08.013

Zhang, W., Wang, S., Wan, L., Zhang, Z., & Zhao, D. (2022). Information perspective for understanding consumers' perceptions of electric vehicles and adoption intentions. *Transportation Research Part D: Transport and Environment*, *102*. https://doi.org/10.1016/j.trd.2021.103157

12. Annexure

Annexure 1. Questionnaire

EV Bike Adoption Survey

Greetings, I am a student of MBA Part II, Goa Business School, Goa University. And as a part of **Final** Internship I am doing a Market Research Study on **Electric Vehicle Bike Adoption in Goa.** Please spare few minutes of your time to fill my questionnaire. It will be a great help to my project. Thank you.

1. Gender ☐Male ☐Female ☐Others
2. Resident of: District_____ Taluka _____ Village/City _____
3. Age ☐18 – 28 ☐29 – 39 ☐40 – 50 ☐51 – 61 ☐62 & above
4. Qualification ☐SSC ☐HSSC ☐Undergraduate ☐Postgraduate ☐ PhD
5. Occupation ☐Student ☐Unemployed ☐Private service ☐Govt. Service ☐Self Employed ☐Professional
6. Family members _____
7. Annual Family income ☐ Less than 5 Lakhs ☐5 – 10 Lakhs ☐11 – 16 Lakhs ☐16 Lakhs & above
8. Do you own a Fuel Car? ☐Yes ☐No
9. If yes, then how many? _____
10. Do you own a Fuel Bike? ☐Yes ☐No
11. If yes, then how many?_____
12. Do you own a Electric Bike? ☐Yes ☐No
13. If yes, then how many? _____
14. Would you consider EV as your primary bike? ☐Yes ☐No
15. How likely is your next bike as EV?
    ☐Extremely unlikely ☐Unlikely ☐Neutral ☐Likely ☐Extremely likely
16. What is your overall knowledge of an EV? (Eg. Charging, Battery Replacement, Servicing etc.)
    ☐Very Poor ☐Poor ☐Average ☐Good ☐ Excellent

17. Can EVs be used for long distance travel?
    ☐Extremely unlikely ☐Unlikely ☐Neutral ☐Likely ☐Extremely likely

18. EV is good for the environment as compared with fueled ones?
    ☐Strongly Disagree ☐Disagree ☐Neither Agree nor Disagree ☐Agree ☐Strongly Agree

19. Are EVs less vulnerable to catch fire on its own?
☐Extremely unlikely ☐Unlikely ☐Neutral ☐Likely ☐Extremely likely

20. Are you satisfied with the current options in EV available in the market?
☐Very dissatisfied ☐Dissatisfied ☐Neutral ☐Satisfied ☐Very Satisfied

21. Price Range for buying EV bike
☐ 60-75K ☐ 75K -90K ☐ 90K – 1.20L ☐ 1.20L -1.50L ☐ 1.50L & Above

22. Your Daily Travelling Distance Range
☐ 0-40KM ☐ 40-60KM ☐ 60-80KM ☐ 80-120KM ☐ 120-150KM ☐ 150KM & above

23. Is your next purchase an EV? ☐Yes ☐No

24. Rate the following factors for considering / not considering an EV.

Factors	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Distance Range					
Waiting Period					
Impact on Environment					
Price Range					
Safety					
Engine sound					
Govt. subsidy					
Appearance					
Charging facility					
Performance					

Email*_____ Phone no._____

Annexure 2. Correlations

		Total			Total
Gender	Pearson Correlation	.022	Can EVs be used for long distance travel?	Pearson Correlation	.493**
	Sig. (2-tailed)	.829		Sig. (2-tailed)	.000
Resident of	Pearson Correlation	.229*	EV is good for the environment as compared with fueled ones?	Pearson Correlation	.296**
	Sig. (2-tailed)	.022		Sig. (2-tailed)	.003
Select Taluka	Pearson Correlation	.274**	Are EVs less vulnerable to catch fire on its own?	Pearson Correlation	.231*
	Sig. (2-tailed)	.006		Sig. (2-tailed)	.021
Age	Pearson Correlation	.166	Are you satisfied with	Pearson Correlation	.544**

	Sig. (2-tailed)	.098	the current options in EV available in the market?	Sig. (2-tailed)	.000
Qualification	Pearson Correlation	.020	Price Range for buying EV bike	Pearson Correlation	.290**
	Sig. (2-tailed)	.840		Sig. (2-tailed)	.003
Occupation	Pearson Correlation	.075	Your Daily Travelling Distance Range	Pearson Correlation	.130
	Sig. (2-tailed)	.456		Sig. (2-tailed)	.199
No. of Family members	Pearson Correlation	.447**	Is your next purchase an EV?	Pearson Correlation	-.454**
	Sig. (2-tailed)	.000		Sig. (2-tailed)	.000
Annual family income	Pearson Correlation	.060	Rate Distance Range	Pearson Correlation	.676**
	Sig. (2-tailed)	.551		Sig. (2-tailed)	.000
Do you own an fuel bike?	Pearson Correlation	.092	Rate Waiting Period	Pearson Correlation	.567**
	Sig. (2-tailed)	.360		Sig. (2-tailed)	.000
If yes, then how many?	Pearson Correlation	.046	Rate Impact on Environment	Pearson Correlation	.527**
	Sig. (2-tailed)	.647		Sig. (2-tailed)	.000
Do you own an fueled car?	Pearson Correlation	-.054	Rate Price Range	Pearson Correlation	.521**
	Sig. (2-tailed)	.590		Sig. (2-tailed)	.000
If yes, then how many?	Pearson Correlation	.220*	Rate Safety	Pearson Correlation	.585**
	Sig. (2-tailed)	.028		Sig. (2-tailed)	.000
Do you own an Electric Bike?	Pearson Correlation	-.294**	Rate Engine sound	Pearson Correlation	.571**
	Sig. (2-tailed)	.003		Sig. (2-tailed)	.000
If yes, then how many? (Select 0 for none)	Pearson Correlation	.294**	Rate Govt. subsidy	Pearson Correlation	.507**
	Sig. (2-tailed)	.003		Sig. (2-tailed)	.000
Would you consider EV as your primary bike?	Pearson Correlation	-.292**	Rate Appearance	Pearson Correlation	.528**
	Sig. (2-tailed)	.003		Sig. (2-tailed)	.000
How likely is your next bike as EV?	Pearson Correlation	.585**	Rate Charging facility	Pearson Correlation	.654**
	Sig. (2-tailed)	.000		Sig. (2-tailed)	.000
What is your overall knowledge of a EV? (Eg. Charging, Battery Replacement, Servicing etc.)	Pearson Correlation	.384**	Rate Performance	Pearson Correlation	.656**
	Sig. (2-tailed)	.000		Sig. (2-tailed)	.000
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					