

# Potential Of E-Bikes In Indian Markets

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## Abstract

The study is to determine the potential of e-bikes in campuses which are spread over a large area like educational institutions and corporate offices in Hyderabad, India. Primary data will be collected to know the level of awareness and the willingness of employees and students to use these bikes in their campuses. Depending on the data collected and analysed, the company will look forward to tie up with those campuses and provide their e-bikes. The main motive behind this is that the students or employees can use these e-bikes to move from one place to other inside the campus that is spread over a large area and also for their personal use. The e-bikes will be provided on a monthly subscription basis with different plans. These bikes are eco-friendly and run completely with the help of electricity with zero to minimal running costs.

**Keywords:** E-Bikes, Eco-Friendly, Intent to Subscribe , Perceived Advantages.

## Introduction

In developing countries like India, there is a huge scope for electric vehicles which are eco-friendly and run purely with the help of electricity. As these e-bikes do not need any fuel to run them, the carbon and nitrogen emissions can be eliminated.

The major reasons for selecting students and employees as the target audience are:

- Their awareness about the need for pollution control and also about saving the most precious non-renewable resources.
- To serve their underlying and unidentified mobility needs.

The e-bikes can be charged using both AC and DC currents. Installation of DC current charging stations is slowly increasing across Hyderabad and also across India as the government and private bodies are coming forward to increase the usage of green transportation. Also, these bikes can be charged normally with the help of regular household power sockets. The time taken for charging the battery and the maximum distance covered depends on the type of the model selected. The increasing fuel rates will also be a major

concern for the target market for considering an electric bike over a regular conventional bike. The government of India is also promoting and encouraging the use of electric vehicles and trying to change the future transportation in the coming years.

## Literature Review

E-bikes were originated in Japan in early 1980's but the technological and cost limitations reduced the market attractiveness until early 2000's. Later, the improved battery and motor technologies have proved that E-bikes can travel for a longer distance, with faster speeds and are affordable too. The E-bike market has been growing rapidly since the past decade in various countries with a good market penetration. But the knowledge about E-bikes among the citizens is not up to the mark, so government agencies have to come forward to spread awareness that how these bikes may have an impact on health, emissions and safety.[ Fishman & Christopher, 2016]

The present scenario of electric vehicles shows that financial incentives to EV buyers and investments to improve infrastructure can help increase the share of EVs in India in the short to medium term by 2030. This would also be an opportunity for India to develop domestic EV

industry and create a charging infrastructure, which can increase EVs. The policies to shift to electric vehicles will result in decreasing pollution rapidly in the growing cities in India. As public transport is widely used in a country like India, a higher share of investments can be used for purchasing electric buses. EVs market share in India is still small. The policies and incentives announced by the Government of India, can help EV 2-wheelers to be competitive by 2020; but for EV 4-wheelers, these may not be sufficient. The size of 2-wheeler market in the coming days is going to be much larger than the 10 Million two-wheelers sold in 2010. For EV 4-wheelers the incentives will help to bring the difference only by 2030, when there is a global decline in battery costs further, which brings down the costs. [Subash, Minal & Priyadarshi, 2017]

India has the capacity to emerge as the world leader in the electric mobility. Firstly, a comprehensive policy may help the global automotive manufacturers in decision making and also making them to invest. Not only the electric vehicle but a whole ecosystem and infrastructure has to be developed that can support the plan. Batteries are becoming the main building blocks in the transport and the energy sector. The industry will experience a significant growth and this is just the beginning. A regulatory push from the government and creating awareness among the consumers is very important for the market growth. Hence India needs to think out of the box, to welcome the trend of electric vehicles and adapt latest technologies. [Arora, 2018]

Developing countries need to introduce EVs which are appropriate to the electrical power structures in their countries. Innovating the necessary technology to reduce the cost of EV production and increasing the establishment of charging infrastructures are the two main methods that should be used to promote development of the EV industry in developing countries. Secondly, air pollutants should be strictly controlled during the power production process. Commercialization of the EV industry in developing countries is expected to directly

and increase the demand for power in the future and may also possibly result in substantially increased emission of air pollutants. Although CO<sub>2</sub> emission reduction in developing EV industries exerts a positive environmental effect, the emission of various other air pollutants has a negative effect on the environment. Therefore, the total environmental benefits are likely to be negative. Therefore, the developing countries have to pay more attention to the control of pollutant emission in power generation in the short term so as to expand the EV industry in the future. [Ya Wu & Zhang, 2017]

In the coming future, as the battery technology becomes cheaper, fossil fuels becomes costlier, electric vehicle technology becomes cost effective, and the government will come forward to give subsidies and tax benefits for EVs. The charging stations will become widespread, and due to GHG emission law being more stringent, it is a natural expectation that the vehicle to home (V2H) methodology will become popular and economically viable. This can happen only by bridging the cost margin between the existing commercial vehicles, which are driven by fuel and the EVs. A very recent initiative by the Indian government under the Faster Adoption and Manufacturing of Hybrid and Electric Vehicle (FAME) scheme 2015, is to provide subsidies for electric vehicle purchase, due to this the cost difference between electric vehicle and conventional diesel vehicle is bridged to an extent. [Kumart, Anmol & Akhil, 2015]

## **Data Analysis and Interpretation**

### **Regression between perceived advantages and intent to subscribe an e-bike**

**Null Hypothesis ( $H_0$ ):** As the perceived advantages of e-bikes increase, the intent to subscribe an e-bike is not increasing.

**Alternate Hypothesis ( $H_1$ ):** As the perceived advantages of e-bikes increase, the intent to subscribe an e-bike is increasing.

## **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.507 <sup>a</sup>	.257	.252	1.094

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.774	.623		-4.454	.000
	Perceived Advantages	1.219	.170	.507	7.162	.000

**Interpretation**

From the above table, we can formulate the regression equation  $Y = a + bX$  as follows

$$Y = -2.774 + 1.219X$$

Hence, we can say that advantages influence subscription behaviour by 1.21%

Also, from R square value, which is 0.257, we can say that the relation between advantages

and subscription behaviour is explained 25% accurately.

From the table, we can analyse that the P value is less than the level of significance, therefore, we have to reject the null hypothesis and accept alternative hypothesis. It means that we have to accept the hypothesis that, as the perceived advantages of e-bikes increase, the intent to subscribe an e-bike is increasing.

**Correlation between preference of attributes and intent to subscribe an e-bike**

		Speed	Mileage	Appearance	Brand name
Intent to Subscribe	Pearson Correlation	.547**	.625**	.095	.088
	Sig. (2-tailed)	.000	.000	.246	.285
	N	150	150	150	150

		Price	Resale value	Body type	Availability of spare parts
Intent to Subscribe	Pearson Correlation	.577**	.293**	.101	.119
	Sig. (2-tailed)	.000	.000	.217	.149
	N	150	150	150	150

**Interpretation**

From the above tables, we can analyse that mileage, speed and price are having a strong positive correlation with the subscription behaviour. Hence, we can say that majority of the people who have an intent to subscribe an e-bike would prefer mileage, speeds and price with top priority.

**Regression for preference of attributes and the subscription behaviour****Model Summary**

**Null Hypothesis ( $H_0$ ):** Majority of the people who have an intent to subscribe an e-bike don't prefer mileage, speeds and price with top priority.

**Alternate Hypothesis ( $H_1$ ):** Majority of the people who have an intent to subscribe an e-bike prefer mileage, speeds and price with top priority.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.746 <sup>a</sup>	.557	.548	.851

#### Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-2.076	.302		-6.864	.000
1 Speed	.282	.078	.234	3.617	.000
Mileage	.529	.088	.386	5.991	.000
Price	.294	.056	.326	5.207	.000

#### Interpretation

From the above table, we can formulate the regression equation  $Y = a + bX$  for speed, mileage and price respectively as follows:

$$Y = -2.076 + 0.282X_1 + 0.529X_2 + 0.294X_3$$

Here, we can say that speed, mileage and price influence subscription behaviour by 0.28%, 0.59% and 0.29% respectively.

Also, from R square value, which is 0.557, we can say that the relation between the listed attributes of electric bikes and subscription behaviour is explained 55% accurately.

From the table, we can analyse that the P value is less than the level of significance, therefore, we have to reject the null hypothesis and accept alternative hypothesis. It means that we have to accept the hypothesis that, majority of the people who have an intent to subscribe an e-bike prefer mileage, speeds and price with top priority.

#### Findings

- From the study it is clearly visible that females are more interested in using electric bikes when compared to males.
- It is found that, students are more enthusiastic to use electric bikes when compared to that of the corporate employees. This might be because of the reason that employees are already provided free transportation from the company side. Also, many of the students stay in a certain geographical location for a specific period of time, they might feel more flexibility in opting for an electric bike on subscription basis.

- It is found that, majority of the respondents who have undergone the survey fall under the income level of 0-2.5 lakhs, this is because of the fact that half of the respondents were college students who don't have any source of income.
- It is found that, though the awareness about e-bikes among the customers is very high, their willingness to use these bikes is less.
- It is found that, the respondents have firmly accepted that electric bikes are eco-friendly, light in weight and have low running costs.
- Out of the given list of attributes, we found that speed, mileage and price are the top three attributes the consumers prefer while opting for an electric bike.
- From the study, it is clearly understood that as the perceived advantages of electric bikes increase, the intent to subscribe an e-bike will increase.
- It is found that, majority of the people opting for an electric bike subscription prefer mileage, speeds and price with top priority.

#### Recommendations

- From the study we found that mileage is one of the main concerns to choose an electric bike over a normal bike, so the company shall think about partnering with other companies to setup fast charging stations at different geographic areas.
- Negative perception towards e-bikes over normal bikes among people might

be a drawback for opting an e-bike, which can be eliminated by following promotional strategies that highlights the advantages of these bikes and explains the immediate need of adopting electric bikes over conventional bikes to reduce the growing pollution rates.

- Corporate employees are found to be less interested to use electric bikes. Hence, eternal green can think about providing extra corporate offers to attract this segment.
- The company is currently planning to launch three variants. Increasing the number of variants might grab the attention of a larger chunk of customers.
- The company can also think about selling electric bikes rather than only providing them on monthly subscriptions.
- Few respondents expressed an opinion that the monthly subscription rates are higher, so the company should think about revising them.

## Conclusion

The frequency distribution of respondents showed that most of the respondents in the survey are men. Majority of the respondents who are interested to opt for e-bike subscription fall under the age group of 16-25 years and an income level of 0-2.5 lakhs per annum. The awareness of electric bikes among the respondents is high, very few respondents were unaware about these bikes. Though the awareness is high, most of the respondents said that they have never used electric bikes. Responses about perceived advantages and preference of various attributes of e-bikes were collected through a 5-point Likert Scale and an in-depth analysis was performed using statistical techniques like correlation and regression.

Females are more interested in using electric bikes than that of males, so the company can introduce variants which attract males. The company should focus on developing advertising campaigns which will communicate the need and importance of using electric bikes. Increasing pollution rates and fluctuating fuel prices stand as the top concerns which

strengthens the need for immediate adaption of e-bikes. The latest plans and schemes by the government of India brings in a lot of scope for e-bike subscriptions and sales in the coming few years.

## References

- Ankit Kumar, S. K. (2018). COMMERCIAL VIABILITY OF ELECTRIC VEHICLES IN INDIA. International Journal of Mechanical Engineering and Technology (IJMET), 730-745.
- Anu G. Kumart, A. M. (2015). A Strategy to Enhance Electric Vehicle Penetration Level in India. ELSEVIER, 552-559.
- Ashok Jhunjhunwala, P. K. (2018). Electric Vehicles in India: A Novel Approach to Scale Electrification. IEEE Electrification Magazine, 40-47.
- Cherry, E. F. (2016). E-bikes in the mainstream: Reviewing a decade of research. Transport reviews, 72-91.
- Dash, P. K. (2013). Potential Need for Electric Vehicles, Charging Station Infrastructure and its Challenges for the Indian Market. Research India, 471-476.
- Faisal, F. (2017). An analysis of electric vehicle trends in developed nations - A sustainable solution for India. The journal of undergraduate research at the university of illinois at chicago.
- Furkan Ahmad, M. S. (2018). Optimal placement of electric, hybrid and plug-in hybrid electric vehicles (xEVs) in Indian power market. IEEE.
- Gill, S. (2015). Facts, Myths about Electric Two-Wheelers. Auto Tech Review, 12-13.
- Girish Ghatikar, R. K. (2016). Electric transportation action plan for India. IEEE.
- Kotak, P. m. (2017). Electric Vehicles: Status and Road Map for India. ELSEVIER, 387-414.
- Lieven, N. R. (2018). A Comparison of Policy Measures Promoting Electric Vehicles in 20 Countries. Springer, 125-145.

- Nitish, A. (2018). Making resource efficient batteries for electric vehicles. *Journal of resources*, 83-94.
- Pallavi Rodge, K. J. (2018). Electric vehicles in India: Current status, future trend and environmental impact. *IEEE Xplore*.
- Pritam K. Gujarathi, V. A. (2018). Electric Vehicles in India: Market analysis with consumer perspective, policies and issues. *Journal of Green Engineering*, 17-36.
- Ramachandran Alamelu, C. S. (2015). Preference of e-bike by women in India - A niche market for auto manufactures. *Business theory and practice*, 25-30.
- Samveg Saxena, A. G. (2014). Electrical consumption of two-, three- and four-wheel light-duty electric vehicles in India. *ELSEVIER*, 582-590.
- Sanchari Deb, K. T. (2018). Review of recent trends in charging infrastructure planning for electric vehicles. *Wiley online library*.
- Shrivastava, R. V. (2018). A Review of Electric Vehicle Lifecycle Emissions and Policy Recommendations to Increase EV Penetration in India. *Energies*, 483-498.
- Subash Dhar, M. P. (2017). Electric vehicles and India's low carbon passenger transport: A long term co benefits assessment. *ELSEVIER*, 139-148.
- Ya Wu, L. Z. (2017). Can the development of electric vehicles reduce the emission of air pollutants and greenhouse gases in developing countries? *ELSEVIER*, 129-145.
- Yadav, K. S. (2018). Promoting e-mobility in India: challenges, framework and future roadmap. *Springer*, 2587-2607.
- Zeeshan Ahmad Khan, M. S. (2017). A Review of the Electric Vehicle Charging Techniques, Standards, Progression and Evolution of EV Technologies in Germany. *Smart Science*, 36-53.
- (n.d.). Retrieved from DATAWISE: <http://mydatawise.com>
- (n.d.). Retrieved from ETERNAL GREEN: <http://www.eternal.green>
- (n.d.). Retrieved from <http://www.pureenergy.co.in>
- (n.d.). Retrieved from <https://www.techsciresearch.com/report/india-electric-two-wheeler-market/1668.html>
- (n.d.). Retrieved from <https://economictimes.indiatimes.com/industry/auto/auto-news/focus-indias-electric-vehicle-goals-being-realised-on-two-wheels-not-four/articleshow/67522910.cms>
- (n.d.). Retrieved from <https://auto.economictimes.indiatimes.com/news/industry/how-will-indian-two-wheeler-market-pan-out-with-electrification-of-upto-150cc/69832001>
- (n.d.). Retrieved from <https://auto.economictimes.indiatimes.com/news/two-wheelers/scooters-mopeds/indias-electric-vehicle-goals-being-realised-on-two-wheels-not-four/67527981>
- Kothari, C. R. (n.d.). Research methodology methods and techniques.
- Philip Kotler, G. A. (n.d.). Principles of marketing.

## Online References