



sciendo

BALTIC JOURNAL OF LAW & POLITICS

A Journal of Vytutas Magnus University
VOLUME 15, NUMBER 4 (2022)
ISSN 2029-0454

Cite: *Baltic Journal of Law & Politics* 15:4 (2022): 808-819
DOI: 10.2478/bjlp-2022-004074

Public Opinion on E-Vehicles- Boon or Bane?

Jyotsna Roja

B.A., LLB. (Hons.) Saveetha School of Law Saveetha Institute of Medical and Technical Sciences (SIMATS)

Dr. Sreeya B

Associate Professor Department of Management Studies Saveetha School of Law Saveetha Institute of Medical and Technical Sciences (SIMATS)

Received: August 8, 2022; reviews: 2; accepted: November 29, 2022.

Abstract

The key to sustainable development is to ensure innovative development and reduce the exploitation of resources. Due to the uneven distribution of resources the high usage of non perennial resources fails to guarantee sustainable development, hence we have to plan to restrict usage of depletable resources. The automobiles used at present deplete the petroleum reserves. One such paradigm shift is immensely required in the automobile industry as the present usage of vehicles drains the resource which affects our future. Electric vehicles are the effective alternative to the traditional fuel automobile, which provides an advantage, which are efficient and reduce emissions. At the fundamental aspects e-vehicles draw dramatically feasible benefits. Assuredly e-vehicles encompass the need for the adaptation towards environmentally friendly and economically benefiting gamut. The aim of this paper is to analyze the scope of adopting e-vehicles by analyzing its benefits, negative aspects and its correlation relationship. A descriptive research was conducted. 218 samples were collected through a convenient sampling method. The sample frame includes the individuals from city, town and village. Age, gender, educational qualification, occupation, monthly income and domicile are the independent variables taken for analysis. The factors as to which acts as a benefit and negative aspects of e-vehicles are the dependent variables of the analyses. Complex charts and correlation analyses are used as statistical tools for the analyses in SPSS. The result observed in this study is that the lack of knowledge, awareness, skill and financial constraints are the cause for less adoption of e-vehicles. In order to bridge the existing gap, measures to educate, provide awareness and skill development has to be ensured along with financial support by providing incentives and subsidies to build infrastructure and other amenities. Thus, facilitating a sustainable future that transforms lifestyle through convenient innovative technology and enables us to live in a cleaner society.

Keywords

Sustainable innovation, transformation, alternative to traditional vehicles, environment friendly, awareness, skill development.

INTRODUCTION

Electric vehicles are ones that use one or more electric motors for propulsion unlike conventional petrol and diesel vehicles which use the internal combustion engine. The introduction of electric vehicles dates back to the nineteenth century. The need for a sustainable green planet goal and a robust push in cleaner mobility has welcomed and accepted electric vehicles.

The Government of India has launched National Electric Mobility Mission Plan (NEMMP) and Faster Adoption and Manufacturing of (Hybrid &) Electric vehicles in India (FAME India) for building a sustainable EV ecosystem, with a target of making up 30 % of sales of new cars and two-wheelers by 2030 from less than 1% at present. Various other departmental organizations such as the Bureau of Indian Standards (BIS), Department of Heavy Industry, Automotive Research Association of India are devising design and manufacturing standards of EVs, electric vehicle supply equipment and charging infrastructure to smoothen the advent of in-house production of EVs. (Ministry of Heavy Industries, 2022)

The lack of stable policies for electric vehicles production, technological challenges, lack of associated infrastructural support, lack of availability of materials for domestic production and lack of skilled workers are the major drawbacks in promoting e-vehicles.

India has initiated the National Mission on transformative mobility and battery storage with a motive for clean market, connected, shared, sustainable and holistic mobility initiatives. The five years valid phased manufacturing programme, which lasts till 2024 has been planned with an objective to support a few large-scale, export-competitive integrated batteries and cell-manufacturing Giga plants in India and also creation of PMP for localized production across the entire Electric Vehicles value chain.

Major developed and developing countries are rapidly adopting e-vehicles. In Norway, nearly 33.1% registered vehicles are plug-in electric; China and the US constitute more than half of electric cars in the world, where their automobile industry is rapidly turning all electric, moreover, UK and France are targeting 100% electric cars by 2040.

Objectives

- To know the benefits of e-vehicles.
- To know the negative aspects of e-vehicles.
- To analyse the correlation relationship among the benefits of e-vehicles.
- To analyse the correlation relationship among the negative aspects of e-vehicles.

Review of literature

Jan-Philipp Exner, 2020 through a structured approach examined the challenges experienced in adapting to electric vehicles. The author states that there's a lot of challenges with regard to traffic and infrastructure in different geographical areas. Efficient access to charging stations and other mechanisms and affordable price gives a wide scope in adapting to e-vehicle culture. The author observes that new data planners in hand with traffic flow patterns improves the efficiency of the market. **Peram Chandrashekar Reddy, 2020** scientifically analysed the ways to increase the distance that can be covered by the electric vehicles in one charge and the environmental benefits of the same. The author observes that the major drawback of such vehicles is that of the distance covered or the mileage in one charge as at present it is around 300-400 kms per charge which varies because of other factors such as quality of the battery, charging capacity, external factors, etc. The author recommends battery swapping technique to be adopted which will be feasible compared to setting up of charging stations. **Sita Mishra, et al., 2019** examined through an empirical research the consumption behaviour of Indian buyers and analysed different aspects pertaining to it. The environmental concern of Indian buyers due to increasing air pollution and other forms of pollution is the most important factor and recommends that the environmental benefits provided by the e-vehicles are to be highlighted.

Monika B Ashok, 2019 conducted an empirical research which analysed customers' perception in purchasing e-vehicles. The author observed that the Indian automobile industry has made a record sale of 24.6% in 2018, such an increase in automobile usage threatens the environment. The author recommends that implantation and providing awareness to promote e-vehicles shall act as a step towards reduced use of

resources. **Ralf Philipsen, 2019** through a descriptive research analysed the applications and challenges in smart vehicular traffic and recommends the means for efficiency, inclusivity and sustainability. The author observes that the challenges and drawbacks are mainly that of infrastructure and facilities than the other external factors. The author suggests that more adaptation and acceptance to transformation would increase the improvement in lacking aspects that affect improving smart vehicular traffic. **Ugo Fiore, 2019** conducted an empirical research by which the opinion and experience of the customers regarding the range stress of e-vehicles were analysed. The author observed that smart vehicular applications provide opportunities for welfare of the people and customers highly recommend the same but it does have challenges. The challenges include differences caused by scalable collection and processing of the hefty data volumes of sensors, et cetera.

METHODOLOGY

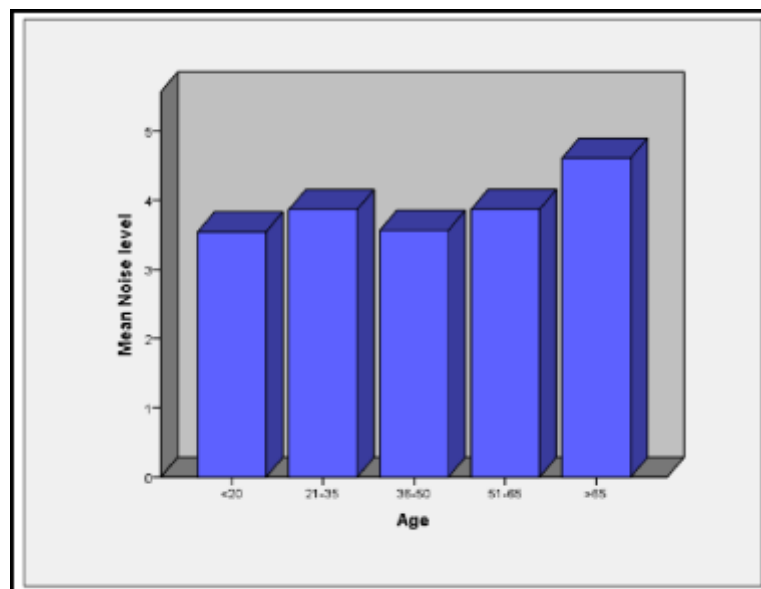
Descriptive research was conducted. 218 samples were collected through a convenient sampling method. The sample frame includes the individuals from city, town and village. Age, gender, educational qualification, occupation, monthly income and domicile are the independent variables taken for analyses in SPSS. The factors as to which acts as a benefit of e-vehicles, factors which act as a negative aspect of e-vehicles are the dependent variables of the analyses. Complex charts and correlation analyses are used as statistical tools for the analyses.

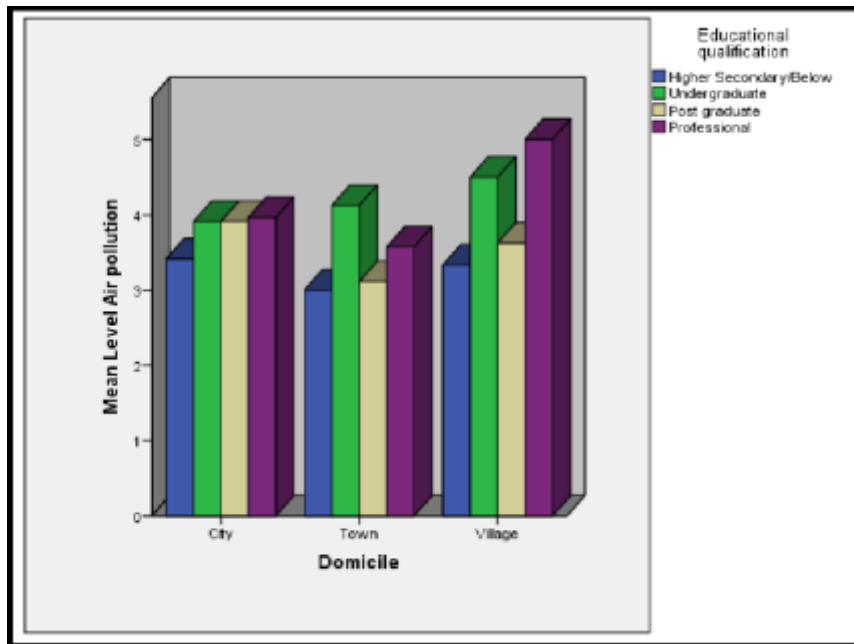
Analysis

- **Opinion on factors which acts as benefit of e-vehicles** **FIGURE 1**

Legend: Opinion of respondents on decreased noise level as the factor which acts as a benefit of e-vehicles compared to the age of the respondents.

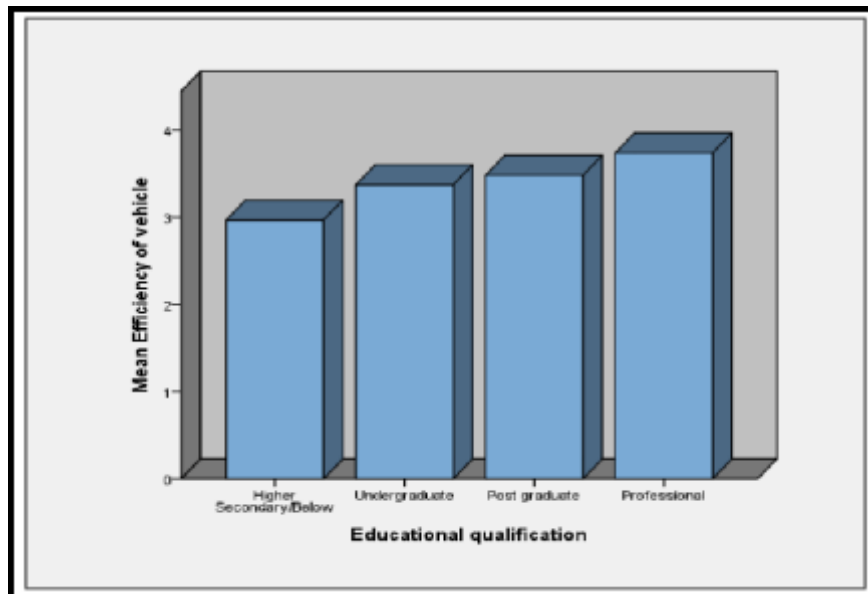
FIGURE 2





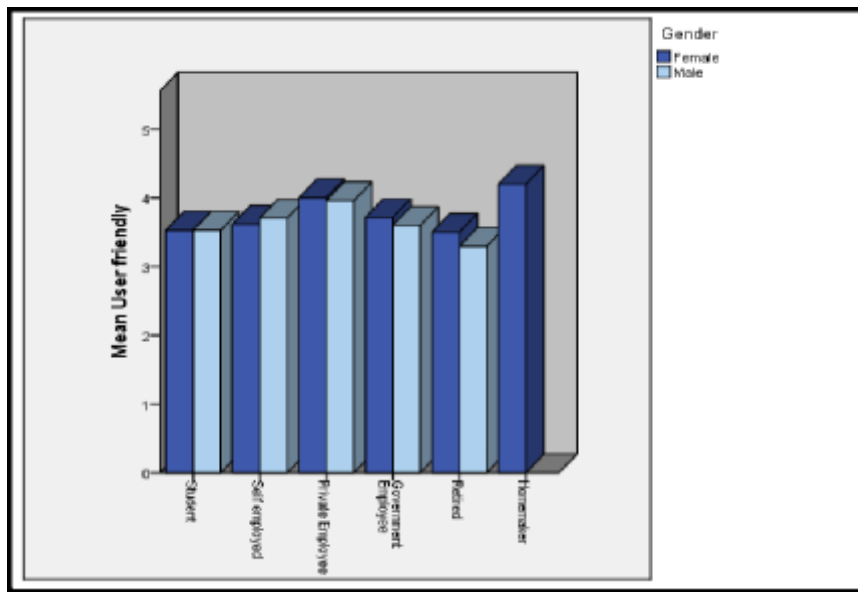
Legend: Opinion of respondents on level of air pollution as the factor which acts as a benefit of e-vehicles compared to the educational qualification and domicile of the respondents.

FIGURE 3



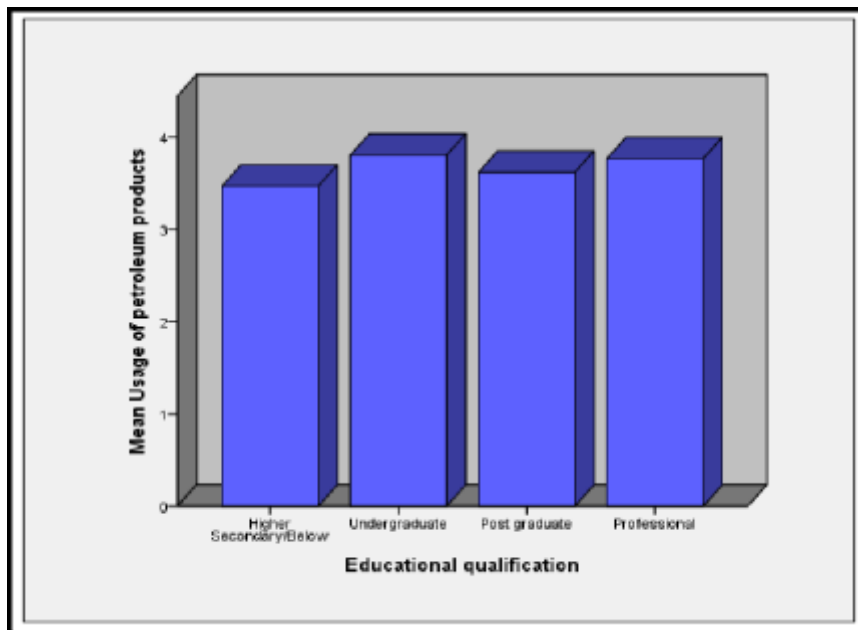
Legend: Opinion of respondents on efficiency of vehicles as the factor which act as the basis of benefit by e-vehicles compared to the educational qualification of the respondents.

FIGURE 4



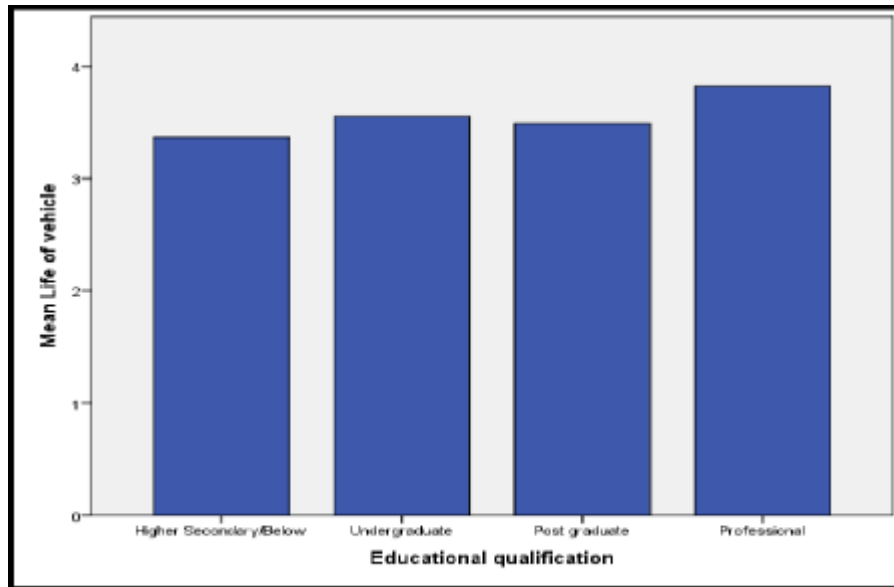
Legend: Opinion of respondents on e-vehicles being user friendly as the factor which acts as the basis of benefit by e-vehicles compared to the gender and occupation of the respondents.

FIGURE 5



Legend: Opinion of respondents on decreased usage of petroleum products as the factor which acts as the basis of benefit by e-vehicles compared to the educational qualification of the respondents.

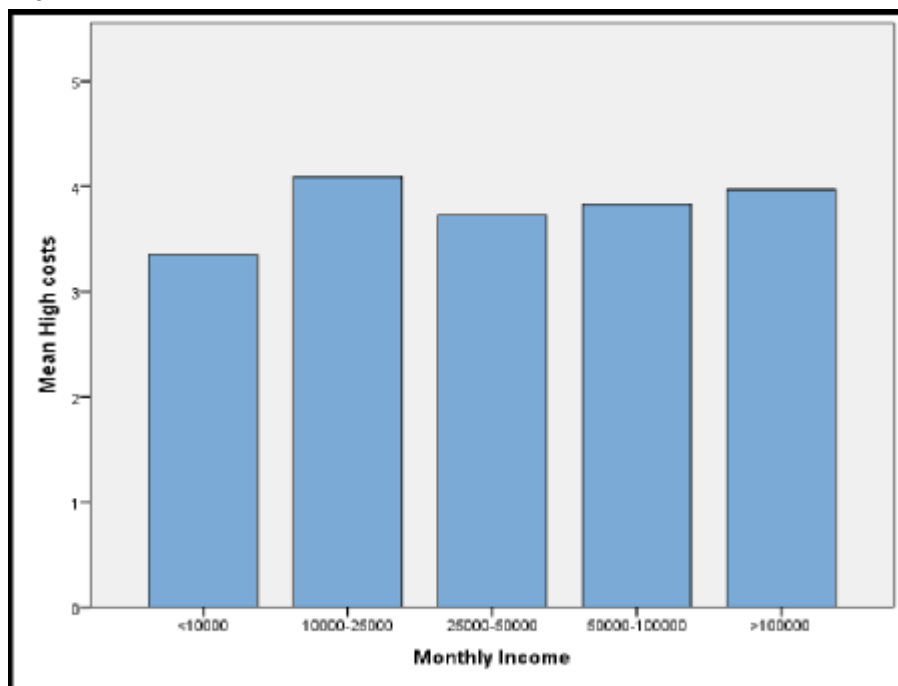
FIGURE 6



Legend: Opinion of respondents on the life of vehicles as the factor which acts as the basis of benefit by e-vehicles compared to the educational qualification of the respondents.

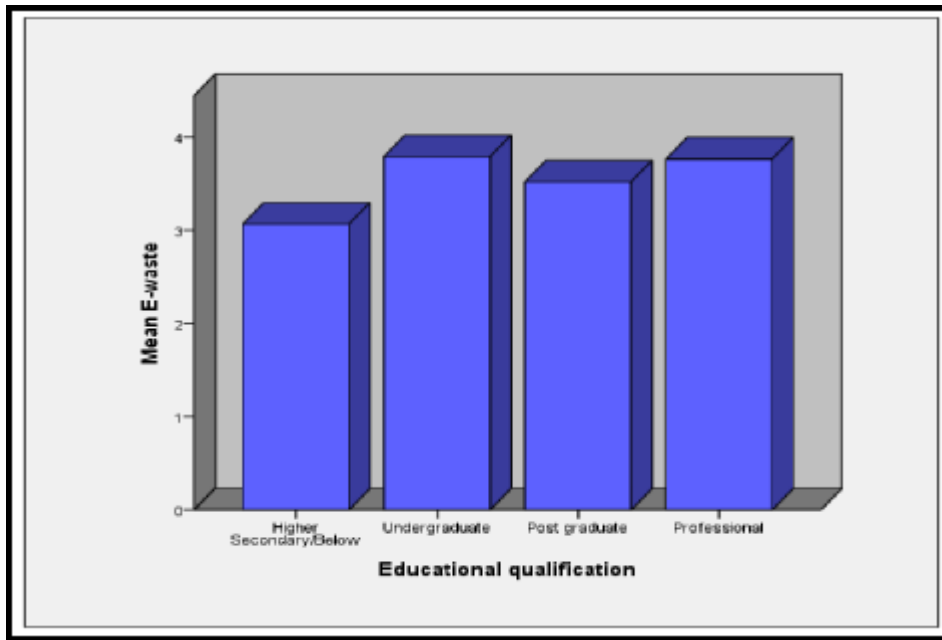
- **Opinion on factors on the basis of negative aspects of e-vehicles** **FIGURE**

FIGURE 6



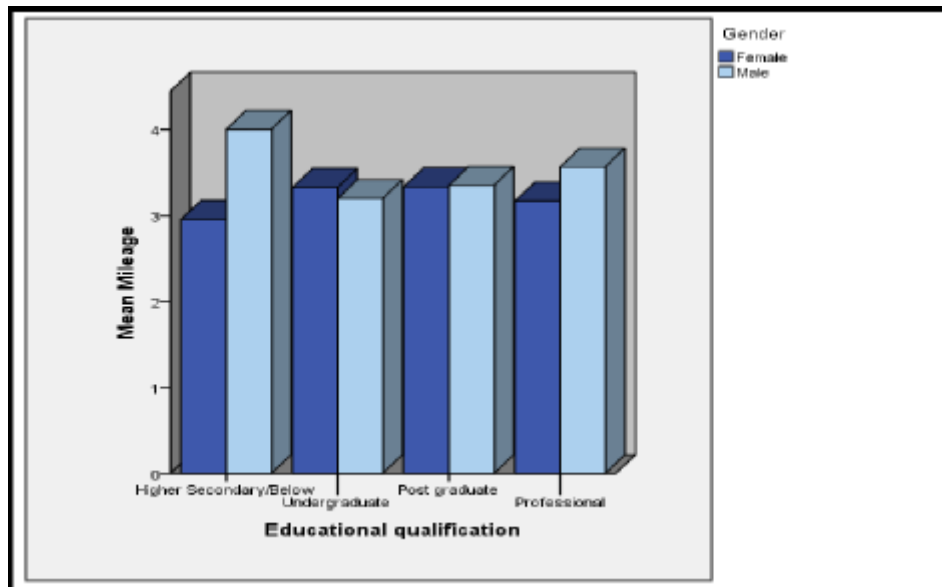
Legend: Opinion of respondents on high costs as the negative aspect of e-vehicles compared to the economic status of the respondents.

FIGURE 8



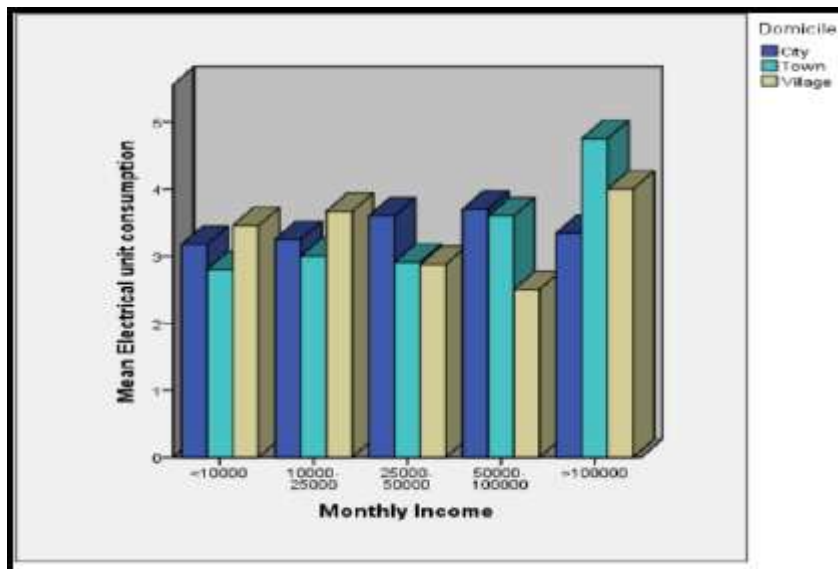
Legend: Opinion of respondents on e-wastes as the negative aspect of e-vehicles compared to the educational qualification of the respondents.

FIGURE 9



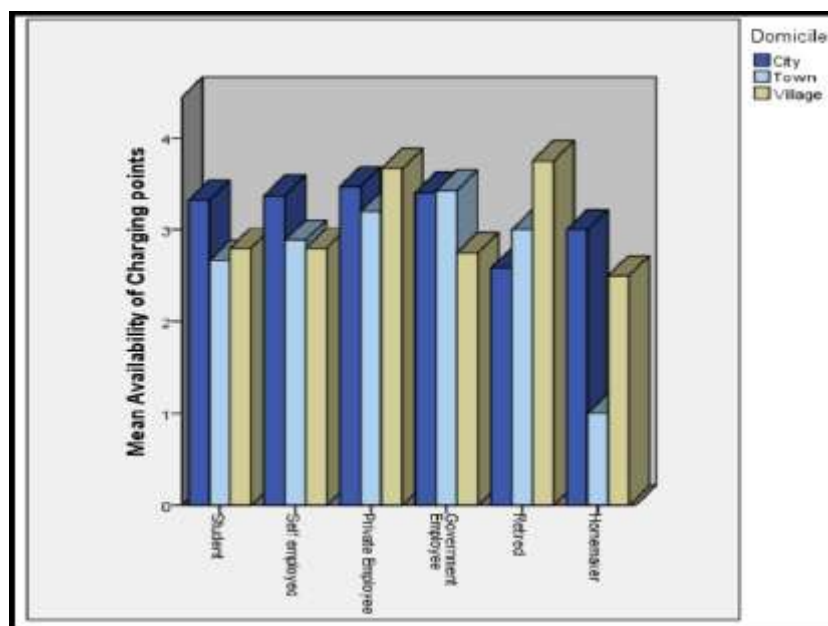
Legend: Opinion of respondents on mileage of e-vehicles as the negative aspect of e-vehicles compared to the economic status of the respondents.

FIGURE 10



Legend: Opinion of respondents on electrical unit consumption as the negative aspect of e-vehicles compared to the economic status of the respondents.

FIGURE 11



Legend: Opinion of respondents on less availability of charging points as the negative aspect of e-vehicles compared to the domicile and occupation of the respondents.

- Correlation relationship Table 1

Null hypothesis (H₀): There is no significant correlation relationship among the factors which act as a benefit of e-vehicles.

Alternative hypothesis (H₁): There is a significant correlation relationship among the factors which act as a benefit of e-vehicles.

			Noise level	Level Air pollution	Efficiency of vehicle
Spearman's rho	Noise level	Correlation Coefficient	1.000	.805**	.311**
		Sig. (2-tailed)	.	.000	.000
		N	218	218	218
	Level Air pollution	Correlation Coefficient	.805**	1.000	.285**
		Sig. (2-tailed)	.000	.	.000
		N	218	218	218
	Efficiency of vehicle	Correlation Coefficient	.311**	.285**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	218	218	218

** . Correlation is significant at the 0.01 level (2-tailed).

Legend: The correlation relationship among the factors which act as a benefit of e-vehicles are represented

Table 2

Null hypothesis (H₀): There is no significant correlation relationship among the factors which act as a benefit of e-vehicles.

Alternative hypothesis (H₁): There is a significant correlation relationship among the factors which act as a benefit of e-vehicles.

			User friendly	Usage of petroleum products	Life of vehicle
Spearman's rho	User friendly	Correlation Coefficient	1.000	.502**	.579**
		Sig. (2-tailed)	.	.000	.000
		N	218	218	218
	Usage of petroleum products	Correlation Coefficient	.502**	1.000	.455**
		Sig. (2-tailed)	.000	.	.000
		N	218	218	218
	Life of vehicle	Correlation Coefficient	.579**	.455**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	218	218	218

** . Correlation is significant at the 0.01 level (2-tailed).

Legend: The correlation relationship among the factors which act as a benefit of e-vehicles are represented.

Table 3

Null hypothesis (H₀): There is no significant correlation relationship among factors on the basis of negative aspects of e-vehicles.

Alternative hypothesis (H₁): There is a correlation relationship among factors on the basis of negative aspects of e-vehicles.

		High costs	E-waste	Mileage	Electrical unit consumption	Availability of Charging points
Spearman's rho	High costs	1.000	.759**	.359**	.529**	.483**
	Correlation Coefficient					
	Sig. (2-tailed)		.000	.000	.000	.000
	N	218	218	218	218	218
E-waste	E-waste	.759**	1.000	.466**	.564**	.467**
	Correlation Coefficient					
	Sig. (2-tailed)	.000		.000	.000	.000
	N	218	218	218	218	218
Mileage	Mileage	.359**	.466**	1.000	.607**	.567**
	Correlation Coefficient					
	Sig. (2-tailed)	.000	.000		.000	.000
	N	218	218	218	218	218
Electrical unit consumption	Electrical unit consumption	.529**	.564**	.607**	1.000	.551**
	Correlation Coefficient					
	Sig. (2-tailed)	.000	.000	.000		.000
	N	218	218	218	218	218
Availability of Charging points	Availability of Charging points	.483**	.467**	.567**	.551**	1.000
	Correlation Coefficient					
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	218	218	218	218	218

** . Correlation is significant at the 0.01 level (2-tailed).

Legend: The correlation relationship among factors on the basis of negative aspects of e-vehicles are represented.

RESULTS

- Opinion on factors which acts as benefit of e-vehicles**

All the respondents irrespective of their age agree that decreased noise level is a factor which acts as a benefit of e-vehicles. (Figure 1)

The respondents who are undergraduates, postgraduates and professionals living in Cities, Undergraduates living in towns and undergraduates and professionals living in villages agree that the decreased level of air pollution as the factor which acts as a benefit of e-vehicles. (Figure 2) The respondents who are professionals agree on the efficiency of vehicles as the factor which acts as the basis of benefit by e-vehicles. (Figure 3)

The private employees irrespective of their gender and homemakers agree on e-vehicles being user friendly as the factor which acts as the basis of benefit by e-vehicles. (Figure 4) the respondents who are undergraduates and professionals agree on decreased usage of petroleum products as the factor which acts as the basis of benefit by e-vehicles whereas others neither agree nor disagree. (Figure 5)

The respondents who are professionals agree on life of vehicles as the factor which acts as the basis of benefit by e-vehicles whereas others neither agree nor disagree. (Figure 6)

- Opinion on factors on the basis of negative aspects of e-vehicles**

The respondents who earn ₹10000- ₹25000 per month and above ₹100000 per month agree to high costs as the negative aspect of e-vehicles. (Figure 7)

Undergraduates and professionals agree on e-wastes as the negative aspect of e-vehicles whereas others neither agree nor disagree. (Figure 8)

Male respondents who have educational qualification of higher secondary or below agree on mileage of e-vehicles as the negative aspect of e-vehicles, whereas others neither agree nor disagree. (Figure 9)

Villagers who earn ₹10000- ₹25000 and above ₹100000, city dwellers who earn ₹25000- ₹100000 and town dwellers who earn ₹50000 and above agree that electrical unit consumption is a negative aspect on e-vehicles. (Figure 10)

None of the respondents irrespective of their domicile and occupation agree to less availability of charging points as the negative aspect of e-vehicles. (Figure 11)

- The correlation relationship among the benefits of e-vehicles**

Noise pollution is highly correlated with the level of air pollution and less correlated with

efficiency of e-vehicles. Efficiency of e-vehicles is less correlated with level of air pollution. The alternative hypothesis is accepted. (Table 1)

Usage of petroleum products is moderately correlated with both user friendly and life of vehicles. Life of vehicles and user friendliness are moderately correlated. The alternative hypothesis is accepted. (Table 2)

- **The correlation relationship among the negative aspects of e-vehicles**

High costs is highly correlated with E-wastes and moderately correlated with mileage, electric unit consumption and availability of charging points. E-waste is moderately correlated with mileage, electric unit consumption and availability of charging points. Mileage is moderately correlated with electric unit consumption and availability of charging points. Electric unit

Consumption is moderately correlated with availability of charging points. The alternative hypothesis is accepted. (Table 3)

DISCUSSION

Decrease in noise level, decrease in air pollution levels, decrease in usage of petroleum products, increase in life of vehicles, being user friendly and increase in efficiency of vehicles have been opined by professionals as the reasons for increase in utilisation of e-vehicles. Comparison of e-vehicles with that of other petroleum product utilised vehicles can be done only by a knowledgeable few, due to its lesser availability and awareness regarding technical aspects. Hence, the opinion of professionals will play a major role in the inference regarding the benefits of e-vehicles. (Figures 1-6)

Availability of charging points during on-road usage, cost of electrical consumption, less mileage per unit of consumption of electricity, disposal of e-wastes and high cost of vehicles act as deterrent factors for usage of e-vehicles by common man. Along with the availability of e-vehicles, organised disposal of e-wastes and more availability of charging points have to be planned to effectively utilise e-vehicles by our society to help decrease pollution levels due to the high utilisation of petroleum products and effective decrease in cost of vehicles is the need of the hour. (Figures 7-11)

The factors as to which are the factors that act as benefits of e-vehicles and the factors which act as the negative aspects of e-vehicles are positively correlated respectively. Since the alternative hypotheses are accepted the measures, techniques, policies, et cetera should focus on these aspects for improvement in efficiency and fast transformation. (Tables 1-3)

Limitation

The drawback of this research is that most of the respondents were from cities, hence there's a lack of opinion of people residing in the towns and villages and the number of female respondents are comparatively lesser than that of male respondents. The opinion of the less educated sector of people cannot be given preference as they are not much aware and lack knowledge about e-vehicles and its respective factors.

CONCLUSION

The electric vehicles though are new to the world, are aimed at sustainable transformation which is a need of the hour in the Indian market. Electric vehicles transform a society through innovative technology not just in heavy industries but environmentally, economically and socially as there exists crises in all these aspects in India. It is deduced from the study that the professionals or rather the well educated sect of respondents are more aware of the pros and cons of e-vehicles than that of less educated due to the lack of knowledge and awareness. It is also found that the lack of infrastructure and other facilities are withholding the adaptation to e-vehicles. There also exists a positive correlation relationship among the factors which act as benefits of e-vehicles and negative aspects of the same. In order to bridge the existing gap measures should be taken to educate, provide awareness and skill development in the electronic automobile sector to meet the requirements of different sectors, also policies

should be framed in order to increase and encourage investments on e-vehicles. Moreover by providing financial support for the development of infrastructure and other amenities such as providing incentives and subsidies on batteries, green photovoltaic panels and electric two wheelers to reduce the consumption of fuel and adapt to e-vehicles.

REFERENCES

- Jan-Philipp Exner, Sebastian Bauer, Kateryna Novikova, Jeffrey Ludwig, Dirk Werth (2020) 'Connected E-Mobility, IoT and its Emerging Requirements for Planning and Infrastructures', ISBN 978-3-9504173-8-8, *REAL CORP 2020 Proceedings/Tagungsband*, https://www.corp.at/archive/CORP2020_128.pdf
- Chandrashekhar Reddy , Esarapu Venkata Satya Prasad , Buragadda Sandeep , Eshwar Raja Sainath Babu, *Iconic Research And Engineering Journals*, April 2020, Volume 3, Issue 10 ISSN: 2456-8880, Pages: 188 - 192 <https://irejournals.com/formatedpaper/1702221.pdf>
- Sita Mishra and (2019) 'Is India Ready for e-Mobility? An Exploratory Study to Understand e-Vehicles Purchase Intention', *Theoretical Economics Letters*, DOI:10.4236/tel.2019.92027, pp. 376–391.
- Monika B Ashok, A Study on Customer Perception Towards E-Vehicles in Bangalore, *Journal of Emerging Technologies and Innovative Research*, ISSN-2349-5162 , January 2019, Volume 6, Issue 1, Pages: 579-588 https://www.researchgate.net/publication/333817235_A_Study_yon_Customer_Perception_Towards_E-Vehicles_Bangalore
- Ugo Fiore, A. F. A. G. P. L. (2019) 'An Interdisciplinary Review of Smart Vehicular Traffic and Its Applications and Challenges', *Journal of Actuator Networks, J. Sens. Actuator Netw.*, 8(13). doi: 10.3390/jsan8010013.
- Ralf Philipsen, Teresa Brell, Hannah Biermann and Martina Ziefle (2019) 'Under Pressure—Users' Perception of Range Stress in the Context of Charging and Traditional Refueling', *World Electric Vehicle Journal*. doi: 10.3390/wevj10030050.