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Does Consumer Preferences Leads to Adoption Intention For Electric Vehicles? A Literature Review on Indian Studies.

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Abstract

The present study is a literature review on Consumer Preferences for Electric Vehicles in India. The article examines various factors affecting the adoption intention towards Electric Vehicles. Many studies revealed that EVs is environmentally sound and addresses environmental issues such as air pollution, global warming and vehicle emissions, in contrast to the conventional fuel vehicles. As a result, global concern is moving towards eco-friendly options such as electric vehicles. At present, the EV adoption is still nascent in India, in spite of understanding various factors influencing Customer Preference towards EV's. This study focuses on reviewing the Indian Consumer Preferences and adoption perception of EVs. The review analysis helped to understand the scenarios and future of EVs in India. There is an immediate need to shift from Customer Preferences to addressing the intentions which can bring a Behavioural Intention and Adopt the EV's. Firstly, this article brings out the summary of choice and selection perception of Consumers towards EVs. Secondly, to understand consumer preferences, the study has considered the systematic literature review of 21 articles using comparative analysis. The findings suggests that other than government tax relief and subsidies, better ground work, strong customer support system, after sales service are the factors contributing towards deriving interest in EVs that can lead to adoption intention. Finally, several strategies and under discovered factors are recommended to improve EV consumer preference.

Keywords: Electric Vehicles, EV, Customer Preferences, Behavioural Intention, EV Strategies

1. INTRODUCTION

According to FADA (Federation of Automobile Dealers Associations), EV retail sales increased by more than thrice in the previous fiscal year. In FY2021-22, a total of 4,29,217 electric vehicles were sold in the country, compared to 1,34,821 in FY2020-21.

The electric 2W segment has emerged as the unchallenged leader. E2W vehicles currently account for more than half of all electric car sales in the country, much outnumbering. The two-wheeler was the most popular mode and booming sector of transportation in the industry.

EV adoption is still in evolving stage in India (Sarod and Sarode, 2020). The answer to the global concern towards environment is the development and adoption of electric vehicles which are eco- friendly (Sharma and Maheshwari, 2014)

According to Bhalla et al., 2018, there are a number of reasons why Indian customers are resisting the adoption of the new mode of transportation. It's tough to predict how the current electric mode of transportation will affect consumers. To generalize the acceptance of electric vehicles, a thorough examination of user reactions is likely to be required.. NITI Aayog – Indian Government focusing on such technology and elements which can have an impact on the control of Vehicular emissions.

2.1 : REVIEW OF LITERATURE

The Approach: The search was made only from major databases like *Ebsco, Science Direct, Emerald, Jstor, Sage, Springer*. Sampling is done using inclusion and exclusion criteria method (Table 1) Systematic Literature Review is considered and lastly, 21 articles are reviewed and analysed (Table 2).

The Systematic Literature Review technique gathers data after thoroughly identifying and evaluating relevant research (Liberati et al., 2009).

Table 1. Inclusion and Exclusion Criteria.

Criteria	Description	Articles
Inclusion	*Period: 2020 to 2022* *Keywords: 'Electric Vehicles In India' 'Customer Preference towards EV's in India' 'Literature Review On Electric Vehicles in India'* *Articles from selected databases*	3500 1200
Exclusion	*Book Chapters, Conference Proceedings, Non-peer reviewed journals,* *Articles Prior to 2020.* *Abstract reading and Content Analysis Structured- Identification of relevant articles*	2300 150 21

To begin with, many governments and automakers want to encourage EV adoption by enhancing the qualities of EVs or the accompanying service infrastructure, as well as assessing the potential efficacy of policies or strategies. Secondly, the research on understanding the Consumer Choice is undertaken into different areas like, psychological studies, Consumer retention models, service evaluation, perceived consumer value (Liao et al., 2017)

Psychological studies only give a fragment of an idea (if any) of how changes in Electric Vehicle adoption parameters can affect Electric Vehicle preferences. (Fanchao Liao et al., 2017). EV firms has a major critical research on Consumer retention in understanding deeper and long term relationship tie-ups with the firm (Khajehzadeh, 2016, Lee et al., 2020). High service evaluation suggests that the firm can have better retention (Parasuraman et al., 1988). The individual perception of choosing EV drives from demographic factors, grants, rewards and technical, social characteristics (Krishnan & Koshy, 2021) . Major firms and government policies are all focusing only on giving subsidies and tax relief which are not the major adopter's intention of EVs.

The advancements in technology pushing the desire of changing the transportation mode (Rezvani et al., 2015) More than the environmental issues or values, the EV owners has much interest into functional issues such as performance, features, convenience (Nayum et al., 2016)

2.2 : OVERVIEW OF STUDIES

This section brings out the summary of choice and selection perception of Consumers towards EV's

Table 2.

Source	**Focus**	**Findings**	**Methodology**
Ali and Naushad, (2022)	Primary factors that influence the adoption of EVs	The key predictor of EV adoption is price.	Questionnaire method, structural equation modelling, confirmatory factor analysis
Khalid et al, (2022)	Case study on India – As an upcoming EV hotspot in the globe, with a goal of having 30% EVs on the road by 2030.	Cost, charging infrastructure, battery technology and it's availability and sound ecosystem elements driving customer adoption of electric vehicles.	Literature Review

Kore & Koul, (2022)	Critical challenges for EV charging infrastructure	Need for EV charging infrastructure and development	SLR literature review, comparative Analysis
Tyagi et al., (2022)	Role of technology in economic and social development	Infrastructure development and government policy communication are prioritised, with incentives for awareness and end-user acceptability..	Literature Review
Gupta S et al., (2021)	The government's role in creating clean fuels, decarbonizing the transportation sector, and maximising renewable energy sources	Adoption of biofuel policies encourages indigenous biofuel generation in order to increase affordability and accessibility by 2050.	Literature Review

Kumar et al., (2021)	Factors affecting the adoption of a consumer EV	Various consumer related factors affect the use of EV	Literature Review
Krishna (2021)	Consumer perception and barriers to adoption of EV amongst consumers.	Reveals the relationship between the hurdles that has a negative cascading effect on overall adoption.	Thematic Analysis
Bera and Maitra (2022)	Commuters' willingness to pay [WTP] for the attributes of EVs	Purchase price, WTP, battery charging time and tail pipe emission are the major determinants influencing EV adoption	Survey method and Econometric models
Bhat et al., (2021)	Intention to adopt electric vehicles as well as the elements that impact their decision.	Adoption intentions are positively connected to environmental passion, technical enthusiasm, social image, social influence, anticipated benefits, and performance expectancy.	Structural equation modelling and questionnaire method
Serohi, (2021)	In terms of infrastructure and downstream operations, EV adoption in underdeveloped countries appears to be a long way off.	Range anxiety is the most common fear among potential electric vehicle mass customers in India.	Case study
Jaiswal et al, (2021)	Intention to adopt electric vehicles	The predictor variables of attitude, perceived usefulness, perceived ease of use, and perceived risk, along with the moderation of financial incentives policies, influence adoption intention for EV both directly and indirectly.	Structural equation modelling and questionnaire method

Ray and Sahney (2021)	Personal cultural orientation has an impact on potential buyers' intentions to buy electric vehicles.	Collectivism, LTO, and masculinity appear to be important cultural factors that influence Indian consumers' willingness to buy electric vehicles.	Questionnaire method
Jaiswal and Deepak (2021)	Role of EV knowledge in predicting consumer adoption intention directly and indirectly in the backdrop of an emerging market	Consumer adoption is significantly driven by EV knowledge, perceived usefulness, perceived ease of use and perceived risk	Questionnaire method and Literature review
Kumar et al., (2021)	Challenges for EV adoption by 2030	The sharing economy perspective, among other things, presents different chances for the government to manage resources wisely.	Survey method
Dr. Anoop Pandey et al., (2020)	Switching to EVs reduce pollution and dependence on expensive fuels	Need of different strategies to promote and launch EVs	Extensive method and sequential survey method
Verma et al., (2020)	Factors affecting the Purchase decision of Electric vehicles	Perceived Environmental benefits and financial incentives are discovered to be the most important motivators	Questionnaire method
Das (2020)	Customer perception and awareness towards environmental friendly E-2 wheeler	EV adoption is environment friendly	Survey method and Interview method
Bhattacharyya and Thakre (2020)	EVs ecosystem	11 key factors influencing the adoption of EV	Empirical investigation, Literature review, semi-structured open-ended questionnaire, thematic content Analysis
Dash (2020)	Factors affecting adoption of eco-friendly EVS	Environmental concern, product knowledge, subject norms has a significant impact on customer perceptions about EVs	Explorative and questionnaire method
Shalender and Sharma (2020)	Adoption intentions of customers towards purchase of EVs	The TPB Model is effective in predicting customer adoption intentions for electric vehicles.	Questionnaire method

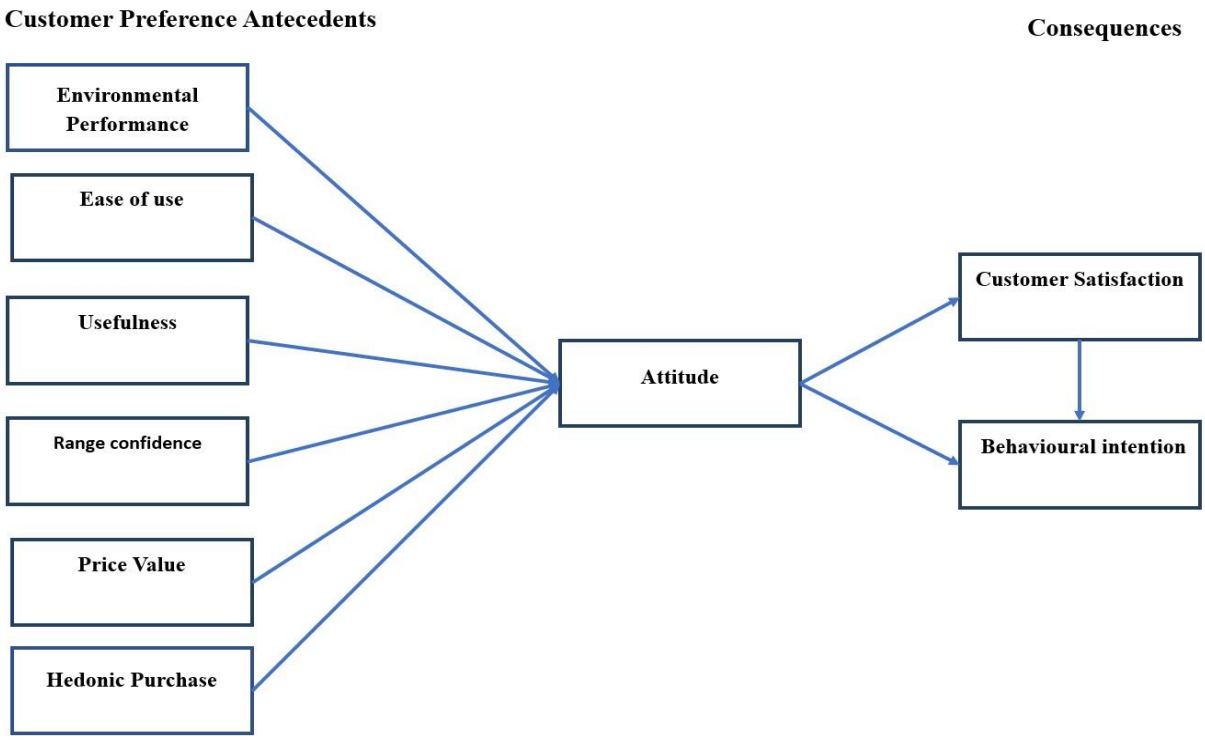
Sankar et al., (2020)	Consumer perception towards Electric two wheelers and for improving B2B sales of E2W and consumer awareness level towards electric vehicles.	People's perception about the product is negative. Lack of awareness, regulatory authority, quality issues are some of the biggest challenges	Explorative Research and questionnaire method

3. DISCUSSIONS AND FINDINGS

The study focusses on reviewing the Indian Consumer Preferences and adoption perception of EVs. The review analysis helped to understand the scenarios and future of EVs in India. The article has presented each study's objective, methodology and critical findings which is describing the covered areas and uncovered areas to be focused for the development of EVs industry in India. There is immediate need and shift in development of confidence and understanding the perception of Consumers from the psychological to Consumer Value Benefit. Lot of studies have taken responses from general consumers who are non-users of EVs. The future research should be focussed on analysing the adoption perception of existing users of EVs. The Government tax relief and subsidies are not the major motivating factors. Instead, better infrastructure development, technological improvement, and strong customer support system, after sales service are the factors contributing towards deriving interest in EVs.

Charging Policies are still inadequate in India and requires improvement (Ahmad et al., 2020; Ghosh, 2020). Scarcity of Land and high rent is becoming barrier into improvement of EV infrastructure (Dua et al., 2021) which should be addressed from the government policies or firms' strategies. Studies suggest that emphasising on social, economic and infrastructure development will lead to end user acceptance (Tyagi et al., 2022)

Fig. 1. Customer Preference Antecedents and Consequences



Source: Authors Conceptual model.

4. CONCLUSION

The previous studies have revealed that major customer preference for adoption of electric vehicles are related to Environmental issue, Financial Incentives, Economic perspective, EV knowledge, Perceived usefulness, Perceived ease of use, Perceived risk, Range anxiety, Technical enthusiasm, Social image, Social influence, Anticipated benefits, Performance expectancy and so on. There is a lag in understanding whether these Customer Preference antecedents impacts on the selection of EV's. Looking at the present issue in EV industry like Burning of EV, Battery Explosion, Gaps in company claims versus true range and efficiency. There is a need to address these elements on all these aspects and bring confidence in the minds of customers. The impact of Customer Preference factors on Customer satisfaction and Behavioral Intention are very less explored in the previous research. Several factors are still under discovered like Ease of use (Davis, F.D. 1989), Usefulness (Davis, F.D. 1989), Range confidence (Garbarino and Johnson, 1999), Price Value (Venkatesh et al. 2012), Hedonic Purchase (Babin, B.J, 1994). (Fig.1)

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