Consumers' Awareness On Government Incentives Towards Electric Vehicles

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Abstract

The goal of this study is to find out how much consumers are aware of the Government Incentives for Electric Vehicles. For this purpose, primary data has been collected through the interview methods. Simple random sampling method has been used for collection of the data. Sample size for the present study is 157. The present study reported that there is a significant level of consumers' awareness about the government incentives toward electric vehicle. It is found that males are more aware than females about Government providing income tax deduction on purchase of EVs. It is concluded that males agree more than females on no requirement of licence for youth (16-18 yrs.) to drive an EV (two wheeler). It can be concluded that males are found more aware than females about the subsidy provided by the government on the purchase of an EV. It can be concluded that males are found more aware than females regarding EVs getting a concessional treatment at toll gates. Males are slightly highly aware about green number plates, EVs preferred parking and free admission in crowded zones. Respondents having bachelor degree are slightly more aware about government incentives toward electric vehicle. Semi-urban residents are slightly more aware about government incentives towards electric vehicle.

Keywords: Consumer, Awareness, Electric Vehicles, government Incentives and Tax Deduction.

Introduction

As a result of recent improvements in technolgy and reductions in cost, the focus of much of thescholarly community has shifted away from the purely technical and economic aspects of electric vehicles (EVs), and instead has shifted to questions regarding policies, policy mechanisms, and policy mixes. For instance, the political variables like local, state, and national regulations for electric vehicles may have a role in influencing the pace at which EVs are adopted and spread across society. When considering electric vehicles (EVs) for use in urban freight transportation, Mirhedayatian and Yan (2018) illustrated, via the use of modelling, how critically important policies are. In a similar view, Ji and Huang pointed out the need of having policies that are robust, consistent, and steady in order for China to successfully promote EVs (2018). Because of this, talks concerning the broad adoption of electric vehicles (EVs) have shifted their focus to centre on the development, implementation, scope, and interplay of EV policy. For a variety of different reasons, the Nordic area presents a particularly strong argument for testing both the substance of policies as well as the expert judgements on the success of such policies. This testing may be done in a number of different ways. It is well known that the five Nordic nations of Iceland, Finland, Denmark, Sweden, and Norway work closely together and integrate their economies on a variety of issues, including climate change, the generation of power, and transportation. They all have the highest levels of renewable energy production in the world, along with highly strict environmental restrictions, substantial public tax burdens, and other features. Electric cars are recognised as a significant instrument for reducing carbon emissions from transportation in the Nordic countries. These vehicles also provide various co-benefits, including as stabilising power networks, reducing reliance on oil, and lowering levels of noise pollution. At the same time, they are up against a variety of obstacles, some of which are inherent to electric vehicles (EVs), such as price and range; others are political interests and current business cases; and still others are a low awareness of consumer and actual driving experience. This ultimately results in demands for assistance from the general people. In recent times, there has been an rise in the number of publications that have been published to investigate the policy processes that have been established as a reaction. A handful of these examine the differences and similarities across various policies, while others concentrate on certain

measurements or programmes operating throughout the whole nation.

Review of literature

There is a positive relationship between a country's market share for electric cars and factors like financial incentives, charging infrastructure, and the presence of manufacturing plants. The results showed that charging infrastructure was the single most correlated variable in the spread of EVs. Researchers found that high rates of electric vehicle adoption were not guaranteed by the presence of either financial incentives or a widespread charging infrastructure (Sierzchula et al, 2014). As stated by Jin and Slowik (2017), many consumers are unfamiliar with electric car technology, are uninformed of available incentives, and fail to fully appreciate the various benefits that these cars provide. In the future, consumers who are aware of and acquainted with the technology are more likely to consider buying or leasing an electric vehicle. Electric vehicle markets with high growth and penetration have been shown to have more sophisticated marketing and promotion. Finally, we stress the long-term indirect environmental benefits of EVs and urge the government to implement effective regulatory measures for automakers to further reduce EV prices. Inaccuracies about the cost of a battery electric vehicle (BEV) and the amount of money you'll save on gas and repairs are equally common, however their impacts will be different depending on the kind of vehicle you get (PHEV). Possible next steps toward widespread deployment include improving consumer education regarding present government incentives and the advantages of existing PEV technology (Krause et al, 2013). Studies conducted in Ireland by Rogan et al. (2011) suggest that ownership tax differentials and incentives may encourage people to choose alternatively fuelled vehicles. Both in Canada (Chandra et al., 2010) and Switzerland, where hybrids have seen rapid market expansion, government incentives have risen in response to this trend (De Haan et al., 2007). A vehicle excise fee has been found to have a significant impact on lowering carbon emissions, and this has led to the rapid introduction of more energy-efficient vehicles (Borup, 2007).

In light of recent evidence from the United States, it seems that fee-rebate schemes may assist speed up the adoption of hybrid vehicle technology (Gallagher and Muehlegger, 2011). Purchase

decisions, vehicle ownership rates, and mileage driven will all be influenced by the high price and high taxes attached to these automobiles (Brand et al., 2013). A study among Malaysian consumers found that government involvement was a significant predictor of environmentally conscious purchasing decisions (Sinnappan and Rahman, 2011). Consumers' interest in EVs might be boosted by government interventions like price subsidies. Coworkers led by Coffman (2016) Although the aetiology of the correlation between public charging facilities and EV adoption has been established, it is still unclear which comes first. There is no guidance on how the government should go about ensuring the availability of public charging facilities, which might reduce range anxiety, particularly for battery electric vehicles. Xue et al. (2021) found that lowered taxes, higher incomes, and higher charger densities all contributed positively to EV adoption. Therefore, it suggested that the government keep tax incentives in place while prioritising the installation of charging infrastructure. Adoption rates of electric vehicles (EVs) are also influenced by other socioeconomic factors, such as the average income of households. Tax exemptions, charging infrastructure for public and apartment use, consumer awareness, especially via information campaigns, specific policy measures like procurement programmes and environmental zones, and more general policy concepts were all endorsed by Kester et al. (2018). A adequate recharger network seems to be a prominent barrier for EV adoption due to customer concerns and vehicle constraints, as stated by Broadbent et al. (2017). Implementing appropriate laws, building and maintaining an adequate public recharger network, government procurement activities, and investing in communication campaigns are all examples of best practise methods for hastening the transition to EV adoption. Incentives for car ownership have been shown effective in limiting car ownership rates (Jansen and Denis, 1999). The United States (US) government has suggested a diversified subsidy structure to increase the market share of electric vehicles (Skerlos and Winebrake, 2010). Consumers in Canada will be incentivized to buy more environmentally friendly vehicles through cheaper prices, "tax-free purchases," and lower emission rates (Potoglou and Kanaroglou, 2007). When it comes to persuading people to buy low-emission vehicles, subsidies are a crucial economic instrument (Santos et al., 2010).

Research Methodology

Exploratory cum descriptive research is used for present research. Self-structured questionnaire is used to measure the consumers' awareness regarding government incentives regarding electric vehicles. Primary data has been collected through the interview methods. Simple random sampling methods has been used for collection of the data. Sample size for the present study is 157.

Table 1. Demographics of respondents

Variables	Group	Frequency	Percentage
Age	**16-30**	**147**	**93.6**
	31-40	**8**	**5.1**
	51-60	**2**	**1.3**
Place	**Rural**	**71**	**45.2**
	Semi Urban	**10**	**6.4**
	Urban	**76**	**48.4**
Gender	**Male**	**18**	**11.5**
	Female	**139**	**88.5**
Education level	**Below Bachelor**	**64**	**40.8**
	Bachelor Degree	**34**	**21.7**
	Masters or Higher	**59**	**37.6**
Awareness about Availability	**No**	**15**	**9.6**
	Yes	**142**	**90.4**

Source: - Primary Data

Table 1 shows the demographics of the respondents. Out of total 157 respondents, 147 (93.6%) participants are from the age group of 16-30 years. It can be concluded majority of the participants are youth. About 5% (8) respondents belong to age group of 31-40 years. Only 2 (1.3%) are from the age group of 51-60 years. In case of place of residence more than 45%(71) respondents belong to rural area. Only 10 (6.4%) belong to the semi-urban area and more than 48% per cent respondents belong to the urban area. In case of gender, majority 88.5% (139) of the respondents are female and only 11.5% (18) are male. For the education level, more than 40%(64) respondents are below bachelor degree , 21.7% (34) are having bachelor degree and 37.6% are having master degree or higher. Majority (90.4%) of the respondents are aware about the availability of electric vehicles.

Consumers' Awareness of Government Incentives Regarding Electric Vehicles

Table 2. Frequency and percentage

Sr. N.	**Government Incentives**	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Government provides income tax deduction on purchase of EVs .	19(12%)	11(7%)	50(31.8%)	35(22.3%)	42(26.8%)
2.	The subsidy provided by the government on the purchase of an EV.	17(10.8%)	12(7.6%)	57(36.3%)	29(18.5%)	42(26.8%)
3.	Green number plates provide EVs preferred parking and free admission in crowded zones.	20(12.7%)	17(10.8%)	56(35.7%)	33(21%)	36(22.9%)
4.	EVs get a concessional treatment at toll gates .	20(12.7%)	18(11.5%)	58(36.9%)	29(18.5%)	32(20.4%)
5.	No licence is required for youth (16-18 yrs.) to drive an EV (two wheeler).	36(22.9%)	17(10.8%)	52(33.1%)	19(12.1%)	33(21%)

Source: - Primary Data

Table 2 demonstrates the awareness level of consumers' awareness on government incentives regarding electric vehicles. Nearly 50 per cent respondents are aware (agreed) about government providing income tax deduction on purchase of EVs. Only 19 per cent respondents disagreed and more that 30 per cent are neutral about government incentives on tax deduction on purchase of EVs. More than 45 per cent respondents are aware about the subsidy provided by the government on the purchase of an EV, 18.4 per cent are not aware and 36.3 per cent reported neutral about subsidy provided by the government on the purchase of an EV. Nearly 23 per cent respondents agreed on that green number plates provide EVs preferred parking and free admission in crowded zone, more than 23 per cent disagreed and more than 35 per cent reported as neutral regarding Green number plates provide EVs preferred parking and free admission in crowded zones. Neary 40 per cent respondents agreed on EVs getting a concessional treatment at toll gates, more than 33 Per

cent disagreed and 36.9 per cent are neutral about a concessional treatment at toll gates. Only 33 per cent respondents are aware about no requirement of licence for youth (16-18 yrs) to drive an EV (two wheeler).

Table 3. Descriptive statistics

Sr. N.	Items	N	Mean	SD	Skewness	Kurtosis	Cronbach Alpha
1.	Government provides income tax deduction on purchase of EVs .	157	3.446	1.2880	-.462	-.690	.775
2.	The subsidy provided by the government on the purchase of an EV.	157	3.427	1.2619	-.366	-.690	
3.	Green number plates provide EVs preferred parking and free admission in crowded zones.	157	3.369	1.2210	-.291	-.681	
4.	EVs get a concessional treatment at toll gates .	157	3.223	1.2588	-.196	-.781	
5.	No licence is required for youth (16-18 yrs.) to drive an EV (two wheeler).	157	2.975	1.4140	.004	-1.160	

Source: - Primary Data

Table 3 shows the normality and reliability of the data. Skewness and kurtosis are measures of the data set's normality. Skewness and Kurtosis should be between -2 and +2 for data normalcy (Ghasemi & Zahediasl, 2012). Cronbach alpha is used to assess the reliability; Cronbach alpha should be more than .70 for better reliability. Statistics shows that data is normal and scale is reliable.

Table 4. T-Test Across the Gender

Sr. N.	Items	Gender	N	Mean	SD	t-value	p-value
1.	Government provides income tax deduction on purchase of EVs.	Male	18	4.333	1.1376	3.471	.002
		Female	139	3.331	1.2648		
2.	The subsidy provided by the government on the purchase of an EV.	Male	18	4.111	1.2314	2.503	.020
		Female	139	3.338	1.2427		
		Male	18	3.444	1.4642	.236	.816

3.	Green number plates provide EVs preferred parking and free admission in crowded zones.	Female	139	3.360	1.1918		
4.	EVs get a concessional treatment at toll gates .	Male	18	2.500	1.4653	-2.267	.035
		Female	139	3.317	1.2041		
5.	No licence is required for youth (16-18 yrs.) to drive an EV (two wheeler).	Male	18	2.167	1.2948	-2.787	.011
		Female	139	3.079	1.3991		

Source: - Primary Data

The table 4 shows the results of t-test regarding consumers' awareness of government incentives toward electric vehicle. For the item, Government provides income tax deduction on purchase of EVs, t-value is 3.471 which found to be significant(p>.05, p=.002) at 5 per cent of significance level which indicated that there is significant difference found between male and female regarding Government providing income tax deduction on purchase of EVs. From the mean value, it can be concluded that males are found more aware than females about the Government providing income tax deduction on purchase of EVs. For the item, the subsidy provided by the government on the purchase of an EV, t-value is 2.503 which is found to be significant(p>.05, p=.020) at 5 per cent of significance level. There is significant difference found between male and female regarding the subsidy provided by the government on the purchase of an EV. From the mean value, it can be concluded that males are found more aware than females about the subsidy provided by the government on the purchase of an EV.For the item, EVs get a concessional treatment at toll gates, t-value is -2.267 which found to be significant(p>.05, p=.035) at 5 per cent of significance level. There is significant difference found between male and female. EVs get a concessional treatment at toll gates. From the mean value, it can be concluded that males are found more aware than females EVs get a concessional treatment at toll gates.For the item, no licence is required for youth (16-18 yrs.) to drive an EV (two wheeler), t-value is -2.787 which is found to be significant(p>.05, p=.011) at 5 per cent of significance level which indicated that there is significant difference found between male and female regarding no licence is required for youth (16-18 yrs.) to drive an EV (two wheeler). From the mean value, it can be concluded that males are found

more agreed than females on that no licence is required for youth (16-18 yrs.) to drive an EV (two wheeler).

But for the item, Green number plates provide EVs preferred parking and free admission in crowded zones t-value is .236 which not found significant (p=.816) which indicated that there is no significant difference found between male and females regarding green number plates provide EVs preferred parking and free admission in crowded zones.

Table 5. ANOVA Test Across Place of Residence

Sr. N.	Items	Area	N	Mean	SD	F-value	p-value
1.	Government provides income tax deduction on purchase of EVs .	Rural	71	3.380	1.2463	.116	.847
		Semi Urban	10	3.500	1.2693		
		Urban	76	3.500	1.3416		
		Total	157	3.446	1.2880		
2.	The subsidy provided by the government on the purchase of an EV.	Rural	71	3.254	1.2389	1.286	.279
		Semi Urban	10	3.700	1.2517		
		Urban	76	3.553	1.2795		
		Total	157	3.427	1.2619		
3.	Green number plates provide EVs preferred parking and free admission in crowded zones.	Rural	71	3.352	1.2773	.390	.678
		Semi Urban	10	3.700	1.2517		
		Urban	76	3.342	1.1725		
		Total	157	3.369	1.2210		
4.	EVs get a concessional treatment at toll gates .	Rural	71	3.282	1.2782	.247	.781
		Semi Urban	10	3.000	1.2472		
		Urban	76	3.197	1.2545		
		Total	157	3.223	1.2588		
5.	No licence is required for youth (16-18 yrs.) to drive an EV (two wheeler).	Rural	71	3.042	1.4583	.239	.787
		Semi Urban	10	3.100	1.6633		
		Urban	76	2.895	1.3523		
		Total	157	2.975	1.4140		

Source: - Primary Data

Table 5 show the results of ANOVA test regarding consumers' awareness of government incentives towards electric vehicle across the place of residence. F-values are not found significant for the all items. It can be concluded that there is no significant difference between rural, semi-urban and urban residents regarding all items of consumers' awareness of government

incentives toward electric vehicle. From the mean values it can be concluded that semi-urban residents are slightly more aware about government incentives toward electric vehicles.

Table 6 ANOVA Test Across the Education Level

Sr. N.	Items	Education level	N	Mean	SD	F-value	p-value
1.	Government provides income tax deduction on purchase of EVs .	Below Bachelor	34	3.176	1.2178	1.169	.314
		Bachelor Degree	64	3.594	1.2436		
		Masters or Higher	59	3.441	1.3680		
		Total	157	3.446	1.2880		
2.	The subsidy provided by the government on the purchase of an EV.	Below Bachelor	34	3.265	1.2138	.504	.605
		Bachelor Degree	64	3.531	1.1948		
		Masters or Higher	59	3.407	1.3661		
		Total	157	3.427	1.2619		
3.	Green number plates provide EVs preferred parking and free admission in crowded zones.	Below Bachelor	34	3.471	1.1609	2.065	.130
		Bachelor Degree	64	3.547	1.1809		
		Masters or Higher	59	3.119	1.2742		
		Total	157	3.369	1.2210		
4.	EVs get a concessional treatment at toll gates .	Below Bachelor	34	3.382	1.2064	1.502	.226
		Bachelor Degree	64	3.344	1.2875		
		Masters or Higher	59	3.000	1.2457		
		Total	157	3.223	1.2588		
5.	No licence is required for youth (16-18 yrs.) to drive an EV (two wheeler).	Below Bachelor	34	3.235	1.4577	2.200	.114
		Bachelor Degree	64	3.109	1.3466		
		Masters or Higher	59	2.678	1.4317		
		Total	157	2.975	1.4140		

Source: - Primary Data

Table 6 show the results of ANOVA test regarding consumers' awareness of government incentives toward electric vehicle across the education level. F-values are not found significant for the all items. It can be concluded that there is no significant difference between different education levels regarding all items of consumers' awareness on government incentives towards electric vehicles. From the mean values it can be concluded that respondents having bachelor degree are slightly more aware about government incentives toward electric vehicles.

Conclusion

Government provides various incentives to consumers who purchase electric vehicles. It can be concluded that there is significant level of consumers' awareness of government incentives toward electric vehicles. It is found that males are more aware than females about the Government providing income tax deduction on purchase of EVs. It is concluded that males are found more agreed than females on no requirement of licence for youth (16-18 yrs.) to drive an EV (two wheeler). It can be concluded that males are found more aware than females about the subsidy provided by the government on the purchase of an EV. It can be concluded that males are found more aware than females regarding EVs getting a concessional treatment at toll gates. Male are slightly highly aware about green number plates providing EVs preferred parking and free admission in crowded zones. Respondents having bachelor degree are slightly more aware about government incentives toward electric vehicle. Semi-urban residents are slightly more aware about government incentives toward electric vehicles.

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