

Key Factors Influencing Consumer Purchase Intention of Electric Cars in Sri Lanka

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INTRODUCTION

Mainly due to environmental pollution and rising oil prices, many countries of the world are encouraging an increase in the share of Electric Vehicles (EVs) in their transport sector. In 2020, 6.8 million battery electric vehicles were in operation around the world (Mathilde, 2021). In terms of energy efficiency, an Internal Combustion (IC) engine is estimated to transfer around 50 percent of the input energy, and an EV is estimated to transfer over 90 percent of the input energy to the driven wheels (IEA, 2017). This is a significant difference in efficiency and the use of EVs can bring immediate carbon savings. With the global trend, and due to many other technological advances over ICs, EVs will take over the market in the future and most manufacturers are converting the process of manufacturing to EVs. “If a vehicle purchase intention is made solely from a cost perspective since the prices are comparatively high in EVs in an international context, and Sri Lanka it is low, by then making respective penetration compositions, it can be considered as a relatively simple optimization problem” (Yavuz et al., 2015).

Table 01: Demand Comparison of Electric cars

Demand for ECs	2015	2016	2017	2018
Global Demand	1,180,000	1,200,000	1,900,000	3,100,000
Demand from Sri Lankan Market	3238	3153	2495	1819

Source: Mathilde, 2021 and Jayasinghe et al, 2018.

The strategic plan presented in 2019 by the former Minister of Finance proposed all vehicles in Sri Lanka be powered by non-fossil fuel sources by 2040. The number of EVs in the country is slowly declining from 2016 onwards even being granted favorable tax concession. Based on the last four years' figures 0.011 percent of EVs is represented compared to fuel vehicles which are significantly low and it is estimated that they may reach 2-3 percent of the vehicle population by 2030. Thereby it is very important to identify the barriers and drivers of this segment to formulate long-term policy decisions.

A key objective of this study is to identify the determinants of purchasing intention and key influencing factors of consumer adaptation in the Sri Lankan electric car market and this research is attempted to achieve the following specific objectives.

- To identify the impact of consumer behavior dynamics (KPD's) over buying intention of the electric car market in Sri Lanka.
- To study the viewpoints of prospective electric vehicle buyers.
- To make relevant recommendations for relevant authorities based on the research findings on the electric automotive industry.

THEORETICAL BACKGROUND

Consumers enter the process of thoroughly evaluating cars for purchase when they experience a strong desire or need for a car (Dholakia, 2001; Frey and Jegen, 2001; Villacorta et al., 2003). In complex purchasing situations, consumers tend to assess perceived risk and therefore commit to a higher level of engagement (Schiffman and Kanuk, 2010). In the context of automobiles, consumers examine cost, performance, the 'lifestyle-image' associated with some models, social influence, and the car's environmental credentials like fuel economy/emissions (Griskevicius et al., 2010). Literature on consumer EV adoption has analyzed several factors which affect the adoption of EVs by using hybrid models. Researchers are attempting to determine the key drivers of the electric car market in Sri Lanka which are mainly taken into consideration that can affect the purchasing decision of a buyer. These factors can be intrinsic directly related to the product, or external independent of the product attributes.

During the process of researching the factors affecting consumers' purchase intention towards EVs, both intrinsic and extrinsic factors have their own importance, and researchers have not yet come across

any clear evidence of these factors having more significance than other factors. Few studies suggest that extrinsic factors are more important than intrinsic factors when studying consumers' purchase intention (Richardson, 1997). Whereas a more recent study suggests that intrinsic factors play a more important role in driving consumers' purchase intention (Kumar, 2012). Hence intrinsic and extrinsic factors both are taken into consideration for this study to examine the purchase intention of Electric Cars (ECs) in the Sri Lankan market.

METHODOLOGY

The study was carried out through a deductive quantitative approach. Due to the above assertion, primary data was collected using a self-structured questionnaire using a Likert scale. In this research, all the car owners or those prospective car buyers who plan to purchase in the near future were considered as the study population. A sample of 150 respondents was selected using the contact list of email directory of the researchers. Respondents were selected using the purposive sampling technique. The primary respondent recruitment criterion was set such as vehicle ownership or prospective car buyers those who are having a driving license, and monthly income over LKR 75,000. Descriptive and inferential statistical techniques were deployed to analyze raw data, employing SPSS software. The data collection was conducted maintaining ethical consideration to ensure the anonymity of all participants/respondents and gaining informed consent from all participants (Saunders & Townsend., 2016). Based on the model, the following dimensions were explored.

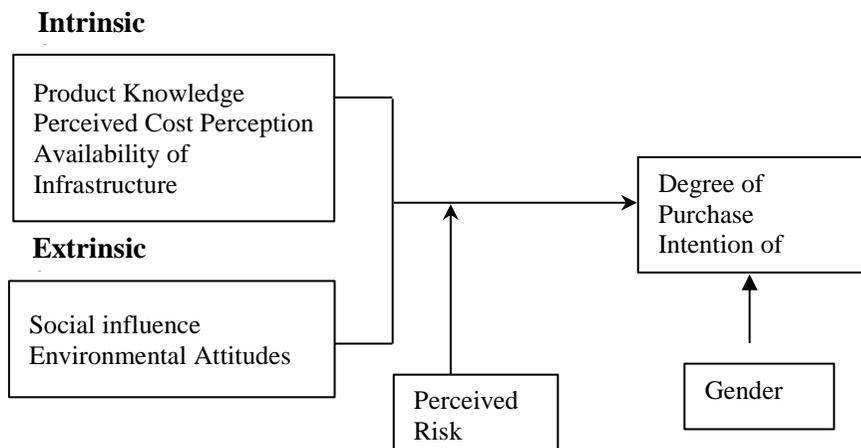


Figure 01: Conceptual Model

FINDINGS AND DISCUSSION

Table 02: Reliability Test

Constructs	Cronbach's Alpha
Overall	0.718
Product Knowledge	0.735
Social influence	0.772
Perceived cost Perception	0.694
Environmental Attitudes	0.710
Perceived Risk	0.654
Availability of Infrastructure	0.727
Degree of Purchase intention of Electric cars	0.777

Source: Compiled by the author based on the survey

The reliability of a measure indicates to which extent measures are free from random error and the results showed that the scores of the Cronbach's alpha for all the constructs used in this research exceeded the preferable scores and they indicated that the measurements scales (72%) of the constructs were stable and internally consistent. Tests of normality were carried out and outliers were not detected.

Analysis of the model relationship

Table 03: Examinability of the model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.344 ^a	0.718	0.087	0.942	
2	0.346 ^b	0.779	0.082	0.945	1.210
a. Predictors: (Constant), Availability of Infrastructure, social influence, Perceived cost Perception, Environmental Attitudes, Product Knowledge					
b. Predictors: (Constant), Availability of Infrastructure, social influence, Perceived cost Perception, Environmental Attitudes, Product Knowledge, Perceived Risk					
c. Dependent Variable: Degree of Purchase intention of Electric cars					

Source: Compiled by the author based on the survey

It shows that there is no problem of autocorrelation based on the Durbin-Watson value. In order to evaluate the proposed model, the R square was tested which indicates the proportion of variance in the overall model. In the first model without moderating effect overall model is explained by 72% and 78% once the perceived risk effect is

included. This measure indicates that the model does fit the data very well and 78% of the variance of consumer purchase intention of ECs is explained by intrinsic and extrinsic factors.

Table 04: Relationship between consumer behavior dynamics and purchase intention of ECs

ANOVA^c

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.124	5	3.425	3.855	0.003 ^a
	Residual	127.916	144	0.888		
	Total	145.040	149			
2	Regression	17.322	6	2.887	3.233	0.005 ^b
	Residual	127.718	143	0.893		
	Total	145.040	149			

a. Predictors: (Constant), Availability of Infrastructure, social influence, Perceived cost Perception, Environmental Attitudes, Product Knowledge

b. Predictors: (Constant), Availability of Infrastructure, social influence, Perceived cost Perception, Environmental Attitudes, Product Knowledge, Perceived Risk

c. Dependent Variable: Degree of Purchase intention of Electric cars

Source: Compiled by the author based on the survey

The proposed model is considered to be a good fit. Hence the model can be used to draw the conclusion which arises from the findings of the survey with regards to the electric automotive industry.

Table 05: Overall Model Significance by Variables

Determinant	B	P	Tolerance	VIF
1 (Constant)	1.372	.104		
Product Knowledge	-.101	.213	.653	1.532
social influence	.184	.278	.952	1.051
Perceived cost Perception	.193	.020	.736	1.359
Environmental Attitudes	.033	.790	.678	1.474
Availability of Infrastructure	.322	.013	.729	1.371
2 (Constant)	1.247	.160		
Product Knowledge	-.094	.254	.633	1.580
social influence	.208	.242	.876	1.142
Perceived cost Perception	-.225	.037	.435	2.297
Environmental Attitudes	.055	.676	.588	1.700
Availability of Infrastructure	.340	.012	.673	1.487
Perceived Risk	-.072	.638	.277	3.605
3 Gender	-.024	.880	.982	1.018

Source: Compiled by the author based on the survey

Basic thumb rules were tested and it was identified that the VIF value is less than four and the Tolerance value is less than two for all variables considered. The results (Table 5) clearly show that perceived cost perception (energy cost per unit & battery/panel replacement) and availability of infrastructure (rechargeable points & service stations) are the key determinants that Sri Lankan consumers highly consider in making a purchase decision which was confirmed by (Singh, Singh, & Vaibhav 2020) as well. It is evident that moderating effects of gender and perceived risk of EVs have no association with purchase intention. It is a well-known fact that the cost per energy unit is comparatively higher in developed countries.

Y: Electric cars purchase intention

X1: Product Knowledge

X2: Social influence

X3: Perceived cost Perception

X4: Environmental Attitudes

X5: Perceived Risk

X6: Availability of Infrastructure

$$Y = 1.247 - .094X_1 + .208X_2 - .225X_3 + .055X_4 - .072X_5 + .340X_6 \quad (1)$$

When energy cost per unit goes down by 0.225 units purchase intention will increase by 1-unit standard deviation.

Assimilation of Hypothesis

Based on the results of Table 4, perceived cost perception and availability of infrastructure have a significant impact on buying intention of electric cars.

CONCLUSIONS

The study reveals that consumers' perception of perceived cost which covered high cost of electricity per unit, perception toward the high cost of battery replacement are prominent factors that most consumers consider before purchasing EVs. Moreover, the non-availability of the infrastructure of the country is the other important key barrier for customer adaptation in this market. Hence research recommends relevant authorities to pay high consideration to renewable energy sources which are naturally replenished throughout the year on a human timescale, such as sunlight, wind, rainfall, tides, and waves to achieve the sustainable goal and gain energy self-sufficiency in the long run when energy cost reaches to an affordable level, and infrastructure (rechargeable stations and service stations) is adequately supported, both vehicle electrification and customer adoption will no longer be an issue of concern.

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