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Factors influencing the purchase intention toward electric vehicles; a nonuser perspective

Dinesh Samarasinghe and Gayithri Niluka Kuruppu
Department of Industrial Management, University of Moratuwa, Moratuwa, Sri Lanka, and
Tharanga Dissanayake
Department of Management of Technology, University of Moratuwa, Moratuwa, Sri Lanka

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Abstract

Purpose – The demand for electric vehicles (EVs) has significantly increased in recent years, though some countries like Sri Lanka have reported the opposite direction compared to the global trend. Hence, this study focused on identifying factors affecting EV purchase intention and barriers to the widespread adoption of EVs in a developing country context. Also, this study presents an overview of the theoretical perspectives utilized for understanding consumer intentions and adoption behavior toward alternative fuel vehicles (AFVs).

Design/methodology/approach – The questionnaire method was employed, and 394 individuals who lived in Colombo City, Sri Lanka, with valid driving licenses and a hybrid or conventional vehicle were the study sample. The partial least squares structural equation modeling (PLS-SEM) was used to test the research hypothesis.

Findings – The findings confirmed that the three relationships between the unified theory of acceptance and use of technology (UTAUT) variables and EV purchase intention are significant, and there is no significant moderator effect from the consumer's perceived risk.

Originality/value – These results offer useful information for governments and EV companies to better understand consumer behavior toward purchasing EVs.

Keywords Electric vehicles, Technology acceptance models (TAM), UTAUT, EVs, Perceived risk, EV acceptance

Paper type Research paper

1. Introduction

The diffusion of electric vehicles can mitigate most environmental problems, including air pollution, oil dependency, greenhouse gas emissions and global warming. Therefore, most countries have taken action to provide policy incentives with the target of encouraging consumers to purchase electric vehicles (EVs) (Zimm, 2021). However, there are barriers to the widespread adoption of EVs. For example, experts believe that people shift gradually without much effort if EVs are equal to or better performing than traditional cars and when EVs become cost-effective. Researchers have identified that EVs must be like the traditional car in terms of size, driving experience, driving range and price to achieve a mass switch from fossil fuel cars to EVs (Agassi, 2009).

The demand for EVs has surged in recent years, transforming the landscape of road transport. In 2021, global electric car sales hit 6.6 m, with a total of 16.5 m electric cars on the

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road (IEA, 2022). Notably, leading countries like China, Germany, France, Sweden, Denmark, the UK and the Netherlands have declared plans to ban fossil-fueled vehicles by 2040 (Petroff, 2017). Nevertheless, electric vehicles have yet to become a ubiquitous global phenomenon.

Sales in developing and emerging countries like Sri Lanka have been slow (IEA, 2022). According to Figure 1, newly registered electric cars accounted for less than 2% of newly registered motor cars from 2017 to 2020, increasing to 7.81% in 2021 (Ministry of Transport and Highways, 2023). These figures indicate a continued preference for petrol and diesel cars over EVs among Sri Lankan consumers. However, there has been a significant change in this trend in 2022, with a notable increase in the proportion of EVs among newly registered cars. Nonetheless, the reasons behind this sudden change remain unidentified, highlighting a research gap in understanding the factors influencing this shift.

Ensuring the successful adoption of new technology like pure EVs hinges on understanding customer perceptions and adoption barriers. Tesla's marketing strategy emphasizes innovation, technology, and sustainability, presenting their EVs as cutting-edge machines promoting environmental friendliness. Elon Musk's public image and Tesla's adept use of social media play central roles in creating an aspirational identity appealing to those valuing innovation and eco-friendly initiatives. This approach resonates with consumer aspirations, fostering a sense of involvement in a cleaner, smarter future and ultimately, boosting sales. However, it's crucial to contextualize these strategies within Sri Lanka's socio-cultural and economic landscape.

This study employs the UTAUT model within its framework, integrating environmental concerns as a key independent variable and perceived risk as a moderating variable. Unlike prior studies focused primarily on psychological determinants (Jain *et al.*, 2022), this model expands its scope to include various factors influencing EV purchase intention. By incorporating environmental concerns and perceived risk into the conceptual model, the study addresses a theoretical gap by elucidating how these factors interact with EV acceptance and adoption. Notably, while existing studies have focused on established EV markets (Jain *et al.*, 2022), this research uniquely explores an emerging market context, specifically Sri Lanka. This distinction underscores the novelty of investigating EV adoption factors in smaller, developing markets, offering insights that may diverge significantly from those in more mature markets.

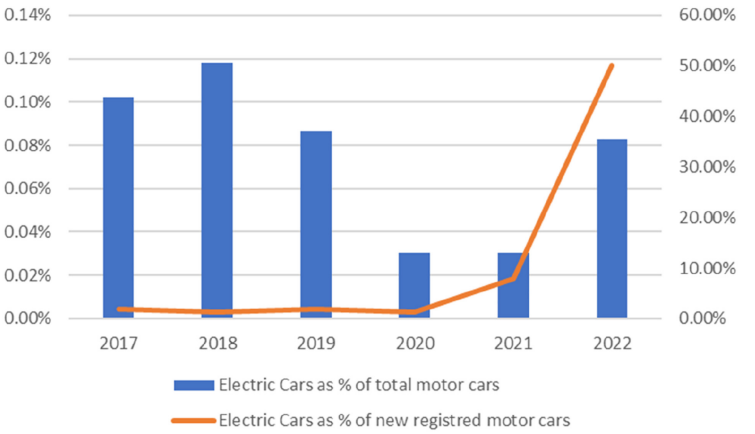


Figure 1.
Electric car registration

Source(s): Ministry of transport and highways (2023)

This paper has four main objectives: firstly, to examine current consumer perceptions of EVs in the local context; secondly, to elucidate the relationships between factors affecting purchase intention for EVs; thirdly, to determine the moderating effect of perceived risk on the relationship between these factors and EV purchase intention and finally, to propose a policy framework to promote EVs in Sri Lanka, focusing solely on passenger vehicles. The remainder of this article is organized as follows: Section 2 outlines the literature, Section 3 presents the conceptual framework and Section 4 details the research methodology. The results are discussed in Section 5, while Section 6 covers conclusions, implications, limitations and suggestions for future research.

2. Literature review, research hypotheses and conceptual framework

This section presents the literature, hypotheses and conceptual framework of the present studies.

2.1 Measuring the acceptance of EVs

The unified theory of acceptance and use of technology (UTAUT) model delineates factors influencing technology adoption. Anchored in performance expectancy, effort expectancy, social influence and facilitating conditions, UTAUT probes individuals' tendencies toward new technologies. While prior studies focused on psychological traits in mature EV markets (Jain *et al.*, 2022), this study employs UTAUT to explore additional factors. UTAUT's versatility demonstrated across various contexts like mobile devices and healthcare systems (Raj *et al.*, 2023), facilitates a comprehensive understanding and predictive modeling of technology adoption patterns.

2.2 Hypotheses

The following hypotheses were used in relation to the literature:

Empirical studies generally confirm a positive relationship between performance expectancy and EV purchase intention. For example, Emsenhuber and Zielke (2012) found variables that perceived usefulness and relative advantage have a significant positive relationship. Similarly, it has been found that drivers confident in the performance of electric vehicles show a higher level of purchase intention and recommend EVs to others (Jabeen, 2016). Hence, the first hypothesis of the study is:

H1. Performance expectancy has a significant impact on the buying intention of EVs.

Effort expectancy means the degree of ease associated with using an EV. The construction of effort expectancy is made up of three combined variables from different models, and those are namely perceived ease of use, complexity and ease of use (Venkatesh *et al.*, 2003). As per Emsenhuber and Zielke (2012), perceived ease of use positively affects EV purchase intention. Similarly, Mashayekhi (2012) revealed that when more people perceive the use of a battery-electric vehicle as difficult, the less they adopt that battery-electric vehicle. Hence, the second hypothesis of the study is:

H2. Effort expectancy has a significant impact on the buying intention of EVs.

Social influence refers to the importance consumers attach to others believing they should use EVs. It comprises subjective norms, social factors and image (Wu *et al.*, 2007). Family members' influence, friends' influence and the beliefs of important people are commonly used indicators for social influence in EV acceptance studies (Riga, 2015). Similarly, Karunanayake and Wanninayake's (2015) study in Sri Lanka revealed a positive relationship between social

influence and hybrid vehicle purchase intention. Thus, the third hypothesis posits this relationship.

H3. Social influence has a significant impact on the buying intention of EVs.

Facilitating conditions means the consumers' perceptions of the resources and support available to use EVs, such as infrastructure, availability of necessary resources and policies (Jayawardena *et al.*, 2022). Hung *et al.* (2003) found that facilitating conditions affect the acceptance of a new system. Similarly, a study conducted by Karunanayake (2017) in Sri Lanka found that the facilitating conditions construct has a positive relationship with the purchase intention of alternative fuel vehicles. Hence, the fourth hypothesis of the study is:

H4. Facilitating conditions have a significant impact on the buying intention of EVs.

Environmental concern includes understanding, efforts to find solutions and a willingness to contribute to environmental causes (Dunlap and Jones, 2003). Mashayekhi's (2012) study found a significant link between environmental concern and purchase intention (Ziegler, 2012). However, Lee (2009) and Karunanayake and Wanninayake (2015) discovered that environmental concerns may not affect young respondents' purchasing behavior significantly. Hence, the study's fifth hypothesis explores this further.

H5. Environmental concerns have a significant impact on the buying intention of EVs.

Perceived risk encompasses various dimensions, including social, financial, functional, privacy, physical, time and psychological risks (Sunitha *et al.*, 2012). Mashayekhi (2012) highlighted functional risk, linked to usability challenges, as a critical barrier to widespread electric vehicle adoption in urban areas. Karunanayake and Wanninayake (2015) demonstrated that perceived risk significantly impacts the purchase intention of hybrid vehicles, while Karunanayake (2017) found a similar effect on alternative fuel vehicle purchase intention. Consequently, the sixth hypothesis of this study investigates:

H6. Perceived risk moderates the relationship between independent variables and EV purchase intention.

The following sub-hypotheses were used to measure the effectiveness of the moderator variable on the above relationships.

H6a. Perceived risk moderates the relationship between performance expectancy and EV purchase intention.

H6b. Perceived risk moderates the relationship between effort expectancy and EV purchase intention.

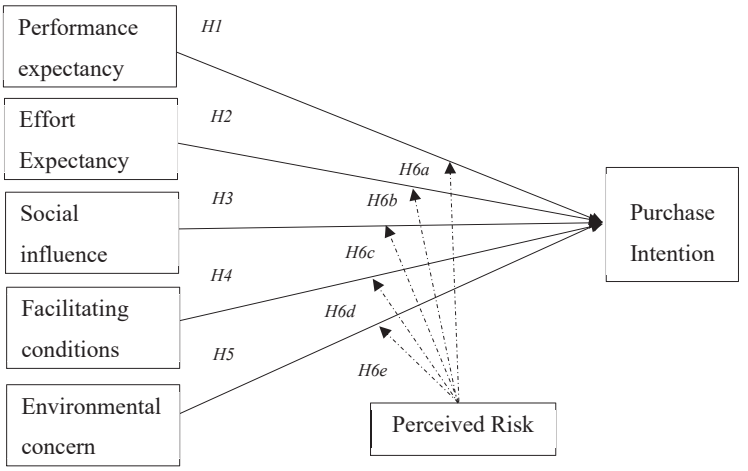
H6c. Perceived risk moderates the relationship between social influence and EV purchase intention.

H6d. Perceived risk moderates the relationship between facilitating conditions and EV purchase intention.

H6e. Perceived risk moderates the relationship between environmental concern and EV purchase intention.

2.3 Conceptual framework

Figure 2, the conceptual framework utilized in this study is developed based on the UTAUT model, alongside other constructs identified in the literature regarding EV adoption. Aligned with the UTAUT model, key independent variables – performance expectancy, effort expectancy, social influence and facilitating conditions – are utilized to gauge purchase



Source(s): Developed by authors based on the literature review

Figure 2.
Conceptual model

intention (Bhatnagr and Rajesh, 2023; Venkatesh *et al.*, 2003). Additionally, acknowledging the significance of environmental concerns in influencing consumer behavior toward EV adoption, environmental concern is also integrated as an independent variable (Noel and Sovacool, 2016), complementing the UTAUT model variables. The focal dependent variable is the intention to purchase an EV (Lai *et al.*, 2015). Moreover, beyond examining these direct relationships, the study posits that consumer-perceived risk moderates the associations between the independent variables and EV purchase intention.

2.4 Operationalization

The first independent construct, performance expectancy, is measured through perceived usefulness, outcome expectations and relative advantage (Emsenhuber and Zielke, 2012). The second construct, effort expectancy, is measured through perceived ease of use, complexity, and ease of use (Venkatesh *et al.*, 2003). Additionally, social influence (Venkatesh *et al.*, 2012), facilitating conditions (Brown and Venkatesh, 2005) and environmental concerns are each measured through three indicators. The moderating construct, perceived risk, is measured through four indicators: economic risk, functional risk, physical risk and social risk (Sunitha *et al.*, 2012). Each indicator is further divided into three sub-indicators. The dependent variable, purchase intention, is measured through three indicators: speaking favorably, recommending buying and expecting to buy (Ling *et al.*, 2010).

3. Research methodology

3.1 Data collection and sample size

The study targeted nonusers of electric vehicles, including owners of hybrid and conventional fossil fuel vehicles and prospective car buyers seeking information about purchasing a motor vehicle. A sample of 500 participants was meticulously chosen using judgmental sampling techniques, excluding current electric car users. This sample size meets Samarasinghe and Samarasinghe's (2013) and Roscoe's (1975) recommended minimum sample size guidelines, despite the study's inclusion of 16 variables.

Both primary and secondary data were utilized in this study. Primary data were collected through a questionnaire, following methodologies employed by other scholars

(Karunanayake and Wanninayake, 2015), to explore consumers' perceptions of electric cars. The study encompassed 14 variables, with a structured questionnaire comprising questions and statements adapted from prior research. A five-point Likert scale was employed for all indicator questions, while demographic information was collected in the final section.

Before distribution, the questionnaire underwent rigorous validation by two academics to ensure measurement accuracy. A pilot study with ten car owners refined its readability and comprehensibility, guiding improvements for clarity. The finalized questionnaire was distributed to 500 nonusers of electric vehicles, yielding 400 completed responses. After scrutiny for missing data, six questionnaires were excluded, leaving 394 for subsequent analysis, with an approximate 79% response rate.

3.2 Data analysis

Data analysis occurred in two stages. Initially, descriptive statistical techniques were used to understand the dataset. Additionally, exploratory factor analysis was performed by using SPSS software and SMART PLS 3 software to assess the construct validity and reliability. Subsequently, inferential statistical analysis techniques, particularly structural equation modeling (SEM), were employed to validate the conceptual model and the hypothesized relationships.

4. Data analysis and discussion

4.1 Reliability and validity of the constructs

All constructs exhibited a Cronbach's alpha value exceeding 0.6 and a composite reliability of 0.7 or higher, meeting the reliability criteria (Nunnally, 1978). Factor analysis revealed factor loadings exceeding 0.5 for all elements, while average variance extracted (AVE) values surpassed 0.5, establishing convergent validity (Churchil, 1979). Additionally, all variables demonstrated face and content validity, having been adapted from established measures in the literature (Sekaran and Bougie, 2009). HTMT correlations were below 0.9, indicating acceptable discriminant validity for all constructs.

4.2 Test of linearity and normality of the data

According to the results of the SPSS data analysis, the data were non-normal and hence, the partial least squares (PLS) method was used (Fornell and Bookstein, 1982).

4.3 Composition of the sample

The demographic profile of the respondents summarized according to the respondent characteristics is shown in Table 1.

In the sample, 88% of respondents were male, while 12% were female. The majority (48%) fell into the 26–30 age category, with 11% in the 31–35 age range. Regarding education, 52% were graduates, while only 1.3% had completed up to the advanced level. A significant portion (90%) held at least a university degree. Occupation-wise, 11.7% were managers, 8.9% were executive-level employees, 4.5% were academics and 3.5% were businessmen. Additionally, 3.2% were government employees, with 16.5% representing various other occupations. In terms of income, 32.4% reported earnings between 100,000 and 150,000 LKR, while 13.4% earned below 50,000 LKR and 14.7% earned above 200,000 LKR.

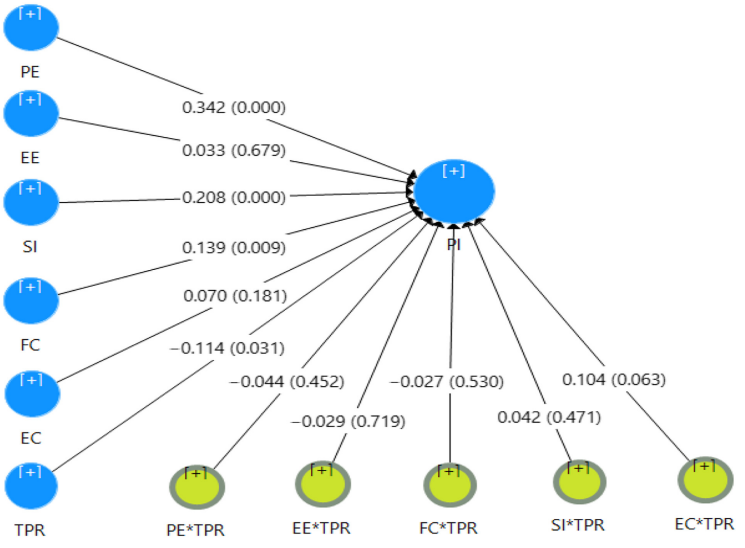
4.4 Results of the structural model

The initial measurement model was constructed based on existing literature, conceptualization and theory. Each linked path between the constructs represents an explicit research hypothesis to be tested. In this study, six hypotheses were assessed. Figure 3

Respondent characteristics		Number	Percentage
Gender	Female	47	11.9
	Male	347	88.1
Age	18–25	24	6.1
	26–30	190	48.2
	31–35	45	11.4
	36–40	34	8.6
	41–45	36	9.1
	46–50	12	3.0
	51–55	24	6.1
	56–60	11	2.8
	Over 60 years	18	4.6
Education	Up to advanced level	5	1.3
	Diploma level or similar	29	7.4
	University degree or similar	206	52.3
	Master's degree or similar	135	34.3
	Ph.D. or similar	19	4.8
Occupation	Engineering professional	203	51.5
	Academic/Lecturer	18	4.6
	Manager	46	11.7
	Executive level	35	8.9
	Businessmen	14	3.6
	Government staff	13	3.3
	Other	65	16.5
Income	Below 50,000 LKR	53	13.5
	50,000 LKR–99,999 LKR	117	29.7
	100,000 LKR–149,999 LKR	128	32.5
	150,000 LKR–199,999 LKR	38	9.6
	Above 200,000 LKR	58	14.7

Source(s): Table by authors

Table 1.
Composition of the sample



Source(s): Developed by authors

Figure 3.
Inner model

and Table 2 illustrate the initial PLS structural model, providing calculated p-values, path coefficients and variance explained (R^2) for each dependent variable construct.

The results indicate that the model accounts for 47.8% of variability, reflecting its goodness of fit to the population, considering the sample size and the number of variables and items utilized (Hair *et al.*, 2011).

4.4.1 The relationship between independent and dependent variables – hypotheses 1–5. The path coefficients and p-values were derived from bootstrap resampling, a technique used to estimate standard errors and confidence intervals for various statistical measures. Table 3 presents a summary of the path coefficients alongside the corresponding p-values obtained through bootstrap resampling. Notably, bootstrapping is independent of sample normality or size, making it a robust method for statistical inference (Efron and Gong, 1983).

The two path coefficients were not significant, as per the result of the bootstrapping indicated. The PE → PI, SI → PI and FC → PI paths were the significant paths ($p < 0.05$). Hence, hypotheses 1, 3 and 4 were accepted and Hypotheses 2 and 5 were rejected. The relationship between perceived risk and purchase intention (TPR → PI) was significant and therefore considered the effect of TPR on the above-measured relationships.

4.4.2 Moderation effect – hypotheses 6a–6e. According to Table 4, the relationship between perceived risk exhibits a significant negative impact on consumer purchase intention. However, bootstrapping results revealed that none of the path coefficients for moderator effects were significant. Consequently, hypotheses 6a–6e were rejected, suggesting no moderating effect of perceived risk on the relationships influencing EV purchase intention. Following Fornell and Larcker's (1981) suggestion, various alternative models fitting the data and theory were explored, leading to a respecification of the structural model to enhance parsimony and model fit.

Table 2.
R-square value of the inner model

Construct	R^2	R^2 adjusted
Purchase intention	0.478	0.463

Source(s): Table by authors

Table 3.
Inner model path coefficients and significance level

	Path coefficient	T-statistics	p-values
PE → PI	0.342	5.842	0.000
EE → PI	0.033	0.414	0.679
SI → PI	0.208	4.027	0.000
FC → PI	0.139	2.685	0.007
EC → PI	0.070	1.325	0.185

Source(s): Table by authors

Table 4.
Inner model path coefficients and significance level – effect of TPR

	Path coefficient	T-statistics	p-values
TPR → PI	−0.114	2.183	0.031
PE*TPR → PI	−0.044	0.717	0.473
EE*TPR → PI	−0.029	0.345	0.731
SI*TPR → PI	0.042	0.698	0.485
FC*TPR → PI	−0.027	0.610	0.542
EC*TPR → PI	0.104	1.805	0.071

Source(s): Table by authors

4.5 Moderator effect analysis for independent variables

The authors decided to perform a separate moderator effect analysis for all independent variables, considering only one independent variable at a time.

The authors created separate models in SmartPLS and examined the moderator effect on each independent variable individually. The path coefficients and calculated *p*-values from the bootstrap resampling procedure are summarized in Tables 5 and 6.

The relationship of the PE → PI is the most significant in this model. SI → PI and FC → PI path coefficients are also significant, indicating that social influence and facilitating conditions do positively influence EV purchase intention (PI); hence, we accept hypotheses 1, 3 and 4.

According to Gopal *et al.* (1992), in a multiple regression model, path coefficients are interpreted as standardized beta weights. Lin and Hsieh (2010) suggested that standardized path coefficients between 0.20 and 0.30 are meaningful. Conversely, Gonzalez and Griffin (2001) proposed guidelines for studies with limited theoretical or empirical foundations: path coefficients greater than 0.50 are considered "large" effects, around 0.30 are "medium" effects and less than 0.10 indicate "small" effects.

The results of this structural model analysis summarized in Table 7 indicate that performance expectancy (PE) has a significant effect on EV purchase intention, the path coefficient is 0.422 and ($p < 0.05$), social influence (SI) has a meaningful significant effect on

Table 5. Path coefficients and significance level – moderator effect on PE construct

	Path coefficient	*T*-statistics	*p*-values
PE → PI	0.489	12.650	0.000
TPR → PI	−0.243	5.242	0.000
PE*TPR → PI	−0.023	0.608	0.543

Source(s): Table by authors

Table 6. Path coefficients and significance level – moderator effect analysis

	Path coefficient	*T*-statistics	*p*-values
Moderator effect on effort expectancy construct			
EE → PI	0.468	8.968	0.000
TPR → PI	−0.172	3.036	0.003
EE*TPR → PI	−0.018	0.452	0.651
Moderator effect on social influence variable			
SI → PI	0.360	7.469	0.000
TPR → PI	−0.333	6.776	0.000
SI*TPR → PI	0.026	0.526	0.599
Moderator effect on facilitating conditions variable			
FC → PI	0.262	4.618	0.000
TPR → PI	−0.343	6.469	0.000
FC*TPR → PI	−0.008	0.219	0.827
Moderator effect on environmental concern variable			
EC → PI	0.268	6.064	0.000
TPR → PI	−0.365	8.115	0.000
EC*TPR → PI	0.029	0.618	0.537

Source(s): Table by authors

purchase intention (PI) and path coefficient is 0.233 and ($p < 0.05$). However, the influence of these three factors, performance expectancy, social influence, and facilitating conditions, does not moderate perceived risk. The moderator variable was tested with (Baron and Kenny, 1986) procedures for moderation hypotheses.

4.6 Model fit

According to Baron and Kenny (1986), model fit is evaluated using variance explained (R^2) and blindfolding techniques for determining predictive relevance (Q^2). To assess the fit of the model, R^2 is used for dependent constructs and Stone–Geisser Q^2 is used for predictive relevance. Table 8 reports the explanatory power of the model. The R^2 value is described by its relationship with the variables believed to affect it. According to Sontag and Pedhazur (1972), there are no firm criteria to evaluate R^2 and the meaning of the R^2 value can be changed significantly between researchers and research study areas. Anyhow, it is suggested that it be above 0.1 to be meaningful.

R^2 of the analysis showed 47.8% purchase intention, which indicates that the model explains 47.8% of all the variability of the response data around its mean.

This Q^2 is an indicator that measures how well the observed values are reproduced by the model and parameter estimates. Q^2 can be calculated using blindfolding testing in SmartPLS, which attempts to estimate the omitted dataset using the estimated parameters (Fornell and Bookstein, 1982; Chin *et al.*, 2003).

There are two types of predictive relevance (Q^2) estimates, where omitted data points can be predicted using underlying latent variables to produce cross-validated communality Q^2. Additionally, redundancy Q^2 tests how well antecedent constructs predict omitted data. Positive Q^2 results, as shown in Table 9, and reported values closer across omission distances indicate predictive relevance and stable model estimates, consistent with Fornell and Bookstein (1982).

Table 7. Revised structural (inner) model results

	Path coefficient	*T*-statistics	*p*-values
PE → PI	0.422	9.891	0.000
SI → PI	0.233	4.988	0.000
FC → PI	0.202	4.913	0.000

Source(s): Table by authors

Table 8. *R*-square value of the inner mode

Construct	R^2	R^2 adjusted
Purchase intention	0.478	0.463

Source(s): Table by authors

Table 9. Omission distance value

Construct	Omission distance 7 Redundancy Q^2	Omission distance 15 Redundancy Q^2
Purchase intention	0.416	0.403

Source(s): Table by authors

4.7 Total effects

In the original model, the hypothesized paths, PE → PI, SI → PI and FC → PI, are significant at the 99.9% CI level. The respecified model demonstrates that PE significantly and positively influences PI, and social influence and facilitating conditions influence EV purchase intention. These findings are consistent with the underlying theory and conceptualization of the original model. The perceived risk of consumers also provided a minor, significant and negative influence on EV purchase intention, suggesting a negative effect on EV uptake.

4.8 Discussion

The study confirms that EVs meet consumer expectations regarding performance and effort expectancy, but facilitating conditions fall short. Current hybrid and conventional vehicle owners show minimal purchase intention toward EVs. While people speak positively about EVs, they do not actively recommend them to others, potentially hindering their uptake. Overall, the majority remain undecided about purchasing an EV as their next vehicle, reflecting current consumer perceptions and fulfilling the first research objective.

In examining factors influencing EV purchase intention, the study identified significant relationships with consumer behavior. Sri Lankan consumers' performance expectancy regarding electric vehicles aligns with Jain *et al.*'s (2022) findings, suggesting that improving EV performance could enhance uptake. Social influence also emerges as a significant predictor, alongside the crucial relationship between facilitating conditions and EV purchase intention. The absence of factors like charging station availability and technical support significantly affects EV uptake, with "Driving Range" and "Charging Infrastructure" cited as primary concerns.

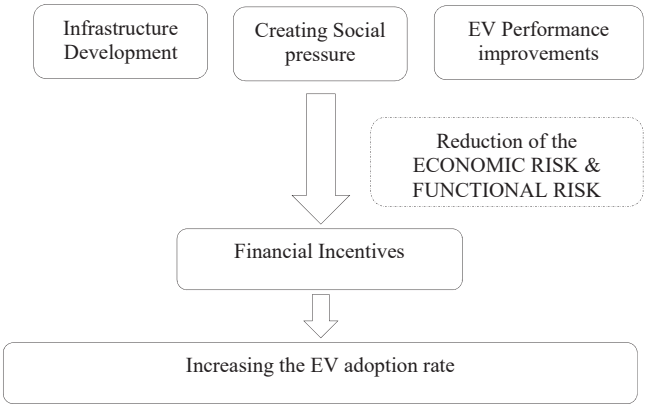
In addition, the most important finding of the study is that there is no significant relationship between the environmental concern of consumers and their purchase intention for EVs, similar to the findings of Karunanayake and Wanninayake (2015). Further, it was found that there were no effects of perceived risk on the relationships between independent variables and dependent variables. Consumers have a greater level of perceived risk produced from functional and economic risks regarding the EV purchase intention.

Descriptive data analysis highlights substantial perceived risk among both vehicle owners and potential EV buyers. Unlike prior studies by Karunanayake and Wanninayake (2015) and Karunanayake (2017), which found a significant relationship between perceived risk and purchase intention, this study underscores the dominance of factors like performance expectancy, social influence, facilitating conditions, effort expectancy and environmental concerns over perceived risk among nonusers of EVs in Sri Lanka. Thus, the direct link between independent constructs and purchase intention remains unaltered by moderation.

4.9 Policy framework to promote EVs in Sri Lanka

In this section, the authors proposes a framework for the diffusion of EVs in the Colombo metropolitan area and recommends a set of policies for increasing the rate of adoption of EVs in Colombo.

Although perceived risk does not moderate the relationship between independent variables and purchase intention, notable economic and functional risks persist in Sri Lanka's EV market. Concerns regarding vehicle resale and repair costs heighten economic risk, while inadequate infrastructure contributes to functional risk, directly influencing EV purchase intention. To promote EV adoption, Sri Lanka must prioritize enhancing performance expectancy, social influence and facilitating conditions while alleviating perceived consumer risk. Addressing economic risk is critical given Sri Lankan buyers' emphasis on resale values, while tackling functional risk is essential for market development, as depicted in Figure 4, outlining policy directives for the industry.



Source(s): Developed by authors

Figure 4.
A proposed policy framework for promoting EVs

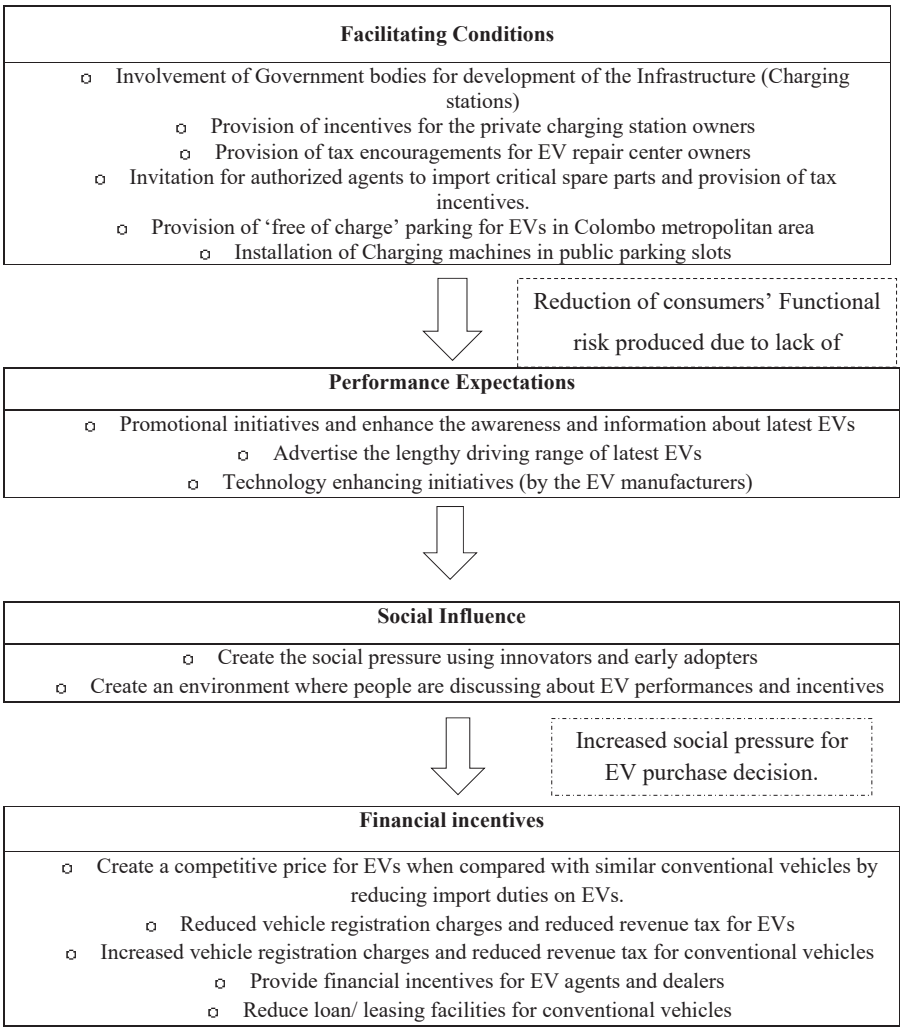
The authors consulted EV charging station professionals and EV owners club officials to identify new barriers to EV adoption in Sri Lanka, integrating them into Figure 5. Resistance from fuel station owners, motor vehicle agents and service center owners, as noted by Sovacool and Hirsh (2009), influences policymakers. Addressing barriers involves tackling value, cost, image and awareness dimensions, with the strategies proposed for each based on Mashayekhi's (2012) findings in Canada. The study's results inform the development of a framework emphasizing reducing functional and economic risk through enhancing facilitating conditions, EV performance expectations and social pressure.

5. Conclusions, implications and further research areas

This research was focused on finding the factors affecting the EV purchase decision and the relationships between those factors. The target was to fill this gap in the research. The findings came from six main hypotheses which are performance expectancy, social influence and facilitating conditions have a significant relationship with EV purchase intention, effort expectancy and environmental concern do not have a significant relationship with EV purchase intention and perceived risk does not moderate the relationship between those factors and EV purchase intention.

This study makes a significant contribution to academia and industry by integrating environmental concerns into the UTAUT framework using indicators from the New Environmental Paradigm (NEP). This innovative approach enhances understanding of factors influencing EV adoption, advancing comprehension of consumer behavior. Moreover, by incorporating perceived risk as a moderator, the framework gains conceptual robustness and practical utility. Empirical findings reveal significant impacts of UTAUT constructs on EV purchase intentions in Sri Lanka, highlighting the framework's adaptability. Additionally, identifying social pressure as a key driver underscores the importance of sustainable product adoption.

Significantly, while environmental concern plays a lesser role in local EV acceptance, performance expectancy emerges as crucial. Manufacturers must enhance the driving range and battery life to meet consumers' high-performance expectations. Marketing strategies should strategically highlight these factors, potentially outweighing environmental friendliness in promoting EVs. Additionally, government institutes can prioritize infrastructure development to further facilitate EV adoption.



Source(s): Developed by authors

Figure 5. Detailed policy framework for promoting EVs

Furthermore, the study highlights the limited moderating impact of perceived risks, particularly functional and economic, on the relationship between variables and purchase intention. This finding contributes uniquely to the local literature, indicating minimal social risk among consumers regarding EV adoption.

The proposed policy framework advocates for the Sri Lankan Government to spearhead EV adoption through the establishment of a dedicated organization for EV infrastructure and the cultivation of technical expertise. Integrated programs and incentives for vehicle stakeholders are deemed crucial, with a focus on facilitating conditions and performance expectations to drive EV purchase intentions. This highlights the necessity for concerted efforts to promote adoption in Sri Lanka.

Although this study provides valuable insights, it has limitations. The sample was restricted to Sri Lanka's Colombo district, primarily comprising educated individuals, especially graduate professionals under 30, which may bias the results. Future research should expand the geographic scope and sample demographics for greater generalizability. Moreover, incorporating a multi-dimensional stakeholder analysis involving authorized agents, EV importers, and charging station owners could enrich policy frameworks. Additionally, employing qualitative and mixed-method approaches to explore EV adoption factors is recommended.

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Corresponding author
Gayithri Niluka Kuruppu can be contacted at: gayithri@uom.lk