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"Elektrinių Transporto Priemonių Suvokiamos Vertės Veiksnių Analizė Pakistane ir Lietuvoje."	*"Exploring Drivers of Electric Vehicle Perceived Value in Pakistan and Lithuania"*

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SUMMARY

Vilnius University Business School

Digital Marketing

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Exploring Drivers of Electric Vehicle Perceived Value in Pakistan and Lithuania

Supervisor – Prof. Oliver W. Olson, Vilnius in 2026

This thesis consists of 115 pages, 57 tables, 1 figure, and 107 references.

This thesis deals with the problem of slow electric vehicle (EV) adoption in Pakistan and Lithuania despite the environmental awareness and policy level support programmes. The reason is due to uncertainty in consumer perceived value, particularly about battery performance, recycling, driving range, and symbolic meaning. The objective of the study is to examine how these factors influence the consumer perceived value of EVs and then to compare their effects in Pakistan and Lithuania.

For this purpose, this research uses a quantitative research methodology through a cross-sectional survey design. Data were collected through a structured questionnaire. It was then analysed using Structural Equation Modelling to test relationships among value dimensions and to identify differences in both countries. The theoretical framework is based on the Theory of Consumption Values.

The results show that all analysed factors do shape perceived value, yet their importance varies by context. Battery life and range anxiety exert substantial influence in Pakistan due to infrastructure limitations and cost concerns. however, the battery recycling and symbolic value are more salient in Lithuania, which is due to higher environmental awareness and social norms. Further, the symbolic value emerges as the most effective predictor of perceived value overall. This shows that EVs are viewed not only as a transport solution but also as expressions of identity and modernism.

This study concludes that drivers of perceived value of EVs in Pakistan and Lithuania are multidimensional and they are context-dependent. It recommends to make improvements in transparent communication about battery performance, to strengthen recycling awareness, and to expand charging infrastructure, which should be tailored to national conditions. These least possible measures can enhance consumer confidence and eventually will support EV adoption in both markets of Pakistan and Lithuania.

SANTRAUKA

VU Verslo mokykla

Skaitmeninė rinkodara

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Elektrinių Transporto Priemonių Suvokiamos Vertės Veiksnių Analizė Pakistane ir Lietuvoje

Vadovas – Prof. Oliver W. Olson, Vilnius 2026 m.

Šį darbą sudaro 115 puslapiai, 57 lentelės, 1 paveikslas ir 107 literatūros šaltiniai.

Šiame magistro darbe nagrinėjama lėta elektromobilių (EV) plėtra Pakistane ir Lietuvoje, nepaisant augančio aplinkosauginio sąmoningumo ir politinio lygmens paramos programų. Pagrindinė šios problemos priežastis siejama su vartotojų suvokiamos vertės neapibrėžtumu, ypač baterijos veikimo, perdirbimo, nuvažiuojamo atstumo ir simbolinės reikšmės aspektais. Tyrimo tikslas – ištirti, kaip šie veiksniai veikia elektromobilių suvokiamą vertę, bei palyginti jų poveikį Pakistane ir Lietuvoje.

Šiam tikslui pasiekti tyrime taikyta kiekybinė tyrimo metodologija, naudojant skerspjūvio apklausos dizainą. Duomenys buvo surinkti naudojant struktūruotą klausimyną ir analizuoti taikant struktūrinių lygčių modeliavimą (SEM), siekiant patikrinti ryšius tarp vertės dimensijų ir nustatyti skirtumus tarp abiejų šalių. Teorinis tyrimo pagrindas remiasi Vartojimo vertės teorija.

Tyrimo rezultatai rodo, kad visi analizuoti veiksniai daro įtaką suvokiamai vertei, tačiau jų svarba skiriasi priklausomai nuo konteksto. Pakistane baterijos veikimo trukmė ir nuvažiuojamo atstumo nerimas turi didesnį poveikį dėl infrastruktūros apribojimų ir kainos jautrumo. Tuo tarpu Lietuvoje baterijų perdirbimo svarba ir simbolinė vertė yra ryškesnės, tai siejama su didesniu aplinkosauginiu sąmoningumu ir stipresnėmis socialinėmis tvarumo normomis. Be to, simbolinė vertė išryškėja kaip stipriausias suvokiamos vertės prognozuotojas apskritai, parodantis, kad elektromobiliai suvokiami ne tik kaip transporto priemonė, bet ir kaip tapatybės bei modernumo išraiška.

Tyrimas leidžia daryti išvadą, kad elektromobilių suvokiamos vertės veiksniai Pakistane ir Lietuvoje yra daugiadimensiai ir priklausomi nuo konteksto. Rekomenduojama gerinti skaidrią komunikaciją apie baterijų veikimą, stiprinti informuotumą apie baterijų perdirbimą ir plėsti įkrovimo infrastruktūrą, pritaikant šias priemones prie nacionalinių sąlygų. Šios palyginti nedidelės priemonės gali padidinti vartotojų pasitikėjimą ir ilgainiui paskatinti elektromobilių plėtrą tiek Pakistano, tiek Lietuvos rinkose.

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INTRODUCTION

Electric vehicles (EVs) are known as those vehicles who are providing chances to mitigate climate change through reduction of greenhouse gas emissions (GGE) and other pollutants which are normally associated with usual transports. This is how they are contributing in achieving the sustainability goals besides protecting the environment (Wolf & Kovács, 2024). Research shows that the transportation sector has played an important role in escalation of global warming. The substantial proportion of carbon dioxide (CO2)and other greenhouse gas emissions are one of the main results that this sector has caused in this world due to the maximum usage of fossil fuels (Wu et al., 2024).

On the other hand, research also shows that EV nowadays hold the chance to reduce these GGE. The reasons are that EVs works on the basis of electricity. This electricity can be sourced from renewable energy systems. In one study, authors found that on average, EVs in the United States generate 3,932 pounds of CO_2 annually. This number is much lower than the 11,435 pounds of CO_2 equivalent emissions which is linked with daily life gasoline-powered vehicles (Sun et al., 2024).

Since all EVs are powered through electricity and not dependent on fossil fuels, that is why they produce no direct tailpipe emissions during their operations and traveling. Additionally, the reason is that of this the exhaust gases, which also includes carbon monoxide, nitrogen oxides, not emitted by EVs. Therefore, EVs have considerable advantage on the normal routine life conventional vehicles internal combustion engines. As a result, the adoption of EVs has been considered as one of major way out to improve air quality; specifically, in the densely populated urban areas where traffic-related emissions have been considered as one of the leading source of health and environmental issues (Shakeel, 2022a).

This conversion toward EV now regarded as one of the major step in achievement of net-zero emission goals within the transport sector (Sun et al., 2024). Scholars argued that the this conversion to EVs are the most feasible and practical way forward to decarbonize available local passenger transportation (Wolf & Kovács, 2024). Therefore, policies are being designed to accelerate the adoption of EVs. For instance, in the California, USA, the mandate is to require 100% zero-emission vehicle sales by the year 2035. This is designed with an aim to give main environmental benesuits which includes 35% reduction in GGEs and an 80% decline in nitrogen oxide emissions. (Sun et al., 2024).

Furthermore, the functional and economic value also add value both in the practical utility and in the financial implications to own an EV. These values have been time and again discussed in the available research being one of the most influential factors which are shaping

consumer decision-making. These values directly deals with the routine life usage, cost savings, and also the long-term affordable considerations which affects the decision making of the buyers who carefully evaluate them before buying vehicles (Shakeel, 2022a). Moreover, nowadays, major proportion of consumers also gives value to the environmental advantages if associated with their vehicles. Such considerations are working as a main determinant factor of their perceived value. And in the EVs, their potential to reduce GGE, to lower air pollution, and their contribution in the achievement of broader sustainability goals, are one of the key motivational factors which do influence the adoption decisions of buyers (Yıldız et al., 2024).

There are numerous consumers, for whom the ownership of EVs extend beyond their functional benesuits; they sometimes perceived them as a symbolic act. They consider it as a represention to their environmental responsibility. And if it is aligned with technological progress, then it is far beneficial for them as they consider it as innovative traveling solutions (Sheykhfard et al., 2025). Moreover, the adoption of EVs for buyers and consumers is also linked to their specific demographic and socioeconomic characteristics. Studies show that persons who are male, who are younger in age, and who possess higher levels of education, who own properties, and those who have higher income levels, they all are more prone to adopt EVs during the early stages (Hoogland et al., 2023).

Additionally, during this work theory of Consumption Values (TCV) as theoretical foundation (Sheth et al., 1991) of this study has been applied. The TCV explains how consumers do evaluate a product which is based on multiple value dimensions; which shape their overall perceived value and which influence their purchase decisions (Mohd Noor et al., 2025). Therefore, TCV has been considered as suitable to analyse how functional, environmental, emotional, and symbolic value factors (Gupta et al., 2025) such as battery life, battery recycling, range anxiety, and EV symbolism are contributing in the consumers' perceived value (C.-S. Han et al., 2024; Sheykhfard et al., 2025) and how consequently they are affecting purchase intentions toward EVs in Pakistan and Lithuania.

This study on EVs is one of the most relevant study nowadays the reason is that transport is known as one of the main causes of air pollution and climate change. Many countries, which include Lithuania and Pakistan, are now looking for climate friendly and sustainable ways for traveling of routine life of their citizens. EVs are seen as one of the best available solutions. The reasons are obvious: they can reduce usage of the fuel and can lower emissions. At the same time, there is also need to understand how consumers are taking the values of EVs as important for both governments and their own life. If people do not see enough value in EVs, they will not to buy them. Therefore, this study is an attempt to help decision-makers in finding better ways with an aim to encourage consumers to adopt and to

make EV ownership more attractive for these two different societies i.e. Pakistan and Lithuania.

Problem Statement

Despite of the existing ongoing increase in the attention to environmental issues and the rapid expansion of EVs in the market, yet countries such as Pakistan and Lithuania are continuously lagging behind in their adoptions. Although EVs are offering more environmental and functional advantages, yet consumers are exhibiting uncertainty regarding their long-term performance, cost implications, and practical usability.

Moreover, there are several concerns which also influence decision making of consumers. These include battery durability issues, existence of high replacement costs, the limited charging facilities and related infrastructures, issues related to range anxiety, and last but not least the insufficient awareness of recycling procedures. These concerns directly affect the consumer perceptions about EVs and its value. There is a lack of comprehensive research on how these factors together do influence the consumers in making their perceived values; hence, it is a problem not only for policymakers but also for the market strategists in order to promote EV adoption.

Research Gap

Moreover, research review conducted during this study shows that there is a research gap on the subject topic. Though there are numerous consumer surveys which covers the anxiety as a major concern which influence the attitudes toward EVs (Negash et al., 2024)**,** yet research is limited in examination of subject issue in detail. Though range anxiety is one of the acknowledged barrier in adoption of EVs, however, research work only provide surface-level discussions that too without ful exploration on its psychological dimensions, contextual variations, or on the long-term implications, which are also one of major values in the consumer behaviours (W. Wang & Mohamed, 2025).

Furthermore, existing research on EVs has mainly found to be focused on the adoption of new models, with having particular emphasis on various factors such as purchase intentions, government incentives, and environmental benesuits (Tissayakorn, 2025). However, there is a gap in the research on the issues of the long-term ownership experience of EVs. In addition, the other concerns such as battery life expectancy, performance degradation over time, the high costs, etc. which are also associated with battery replacement (Sheykhfard et al., 2025) are not comprehensively discussed in earlier works of research. Further, there is also a practical gap which has been identified in the existing research that is on the lack of an effective end-of-life (EoL) management system for EVs batteries. Although

attention has been given on the production, performance, and adoption of EVs, yet very little focus has been made on the comprehensive frameworks for battery recycling, reuse, or safe disposals, once they reach the end of their functional lifespan (Negash et al., 2024).

Due to the above referred research gap, this research is important being original as it attempts to explore perceived value of EVs after their initial adoption. This includes long-term ownership issues like range anxiety, recycling, and durability, etc. This research attempts to highlight, through comparison of the ways in the above dimensions, factors which are included in influencing the perceived value in the different country environments of Pakistan and Lithuania.

Above all, despite the on-growing global awareness about the environmental issues and increased adoption of EVs, still the countries such as Lithuania and Pakistan are lagging behind (Amusa et al., 2024) (J. Lee et al., 2021). One of the main obstacle is the limited understanding in consumer viewpoints of EV value. There are various concerns for them which are related to battery life, their driving range of EVs, the charging stations, recycling of their EVs components, and overall cost which contribute in navigation of their perceptions and low purchase intentions. Therefore, identifications of these specific factors, which do shape consumer value perception in these contexts, is very important in order to develop an effective policy to accelerate adoption of EVs.

Objectives of the study

The aim of this thesis is to evaluate how battery life and cost, battery recycling, range anxiety, and symbolic values are influencing perceived value of consumers for EVs in Pakistan and Lithuania. To achieve this aim, the following are objectives of this study:

1. To examine how battery-related concerns such as battery life, replacement cost, and long-term performance do affect the perception of consumers about EVs.
2. To evaluate how consumer awareness about recycling and sustainability do contributes to the perceived value of EVs.
3. To analyze the impact of range anxiety and other driving-distance concerns on valuation of consumers about EVs.
4. To explore how economic, environmental, and psychological factors also collectively shape consumer perceptions about EVs.
5. To compare how these factors are different in consumers of Lithuania and Pakistan.

Research methodology (Overview)

This study uses a quantitative, cross-sectional survey which is designed to explore the factors which do influence the perceived value of EVs in two countries i.e. Pakistan and

Lithuania. During this study, the data has been collected through using a structured questionnaire, with an aim to focus on four key value dimensions: one economic, two environmental, three psychological, and fourth the social perspectives. These dimensions are designed in order to understand how people evaluate the value of their EVs in both countries.

Thereafter, the collected data is analysed through the usage of Structural Equation Modelling (SEM) with an aim to test the relationships between variables and to examine the differences between the two countries. This approach helps to validate the research model and to provide more detailed knowledge about the factors which are shaping the perceived value. Moreover, the detailed explanation of the methodology which includes the sampling techniques, questionnaire designing, and the data analysis procedures, is discussed in the third Chapter of this study.

Structure of the Thesis

There are four chapters in this thesis. Chapter 1 introduces the thesis. It outlines the core problem and highlights existing research gaps. It presents the objectives along with the theoretical foundation about this study. Chapter 2 offers a comprehensive review of relevant literature. It covers the factors which are shaping perceived value in EVs. This includes various issues such as battery-related concerns, range anxiety related issues, symbolic value perceptions, and cross-country differences between Pakistan and Lithuania. Chapter 3 of this study explains the research methodology in detail through explaining the research design, strategy of sampling, the instrument development, and analysis and interpretation of the data. Chapter 4 then presents the findings and conclusion of this study. It is supported by a discussion which links the findings of this study with existing literature. It also provides recommendations for future research.

Contribution of the Study

This thesis contributes to the existing literature on the adoption of EVs in the context of consumer perceived value in several ways. Firstly, it extends the Theory of Consumption Values through its application in the long-term ownership of an EV rather than to consize the analysis to initial purchase intentions. This study reframes factors, through treating battery life, range anxiety, battery recycling, and symbolic meaning as value-based dimensions, which are often described as adoption barriers, in the existing literature, as integral components of consumer perceived value. Secondly, this study provides comparative empirical evidence from in the two national contexts: Pakistan and Lithuania. This work is done within the single theoretical framework and measurement model. This country-wise approach shows how do the relative importance of value dimensions differ in both countries economic, infrastructural, and cultural environments. In doing so, this study covers the gap of the limited comparative

research, which existed, between the developing countries and small European markets of EVs.

Furthermore, this study also identifies the symbolic value as a key factor of perceived value in both countries. This shows the importance of the role of identity expression and social-life meanings in the evaluation of EVs. At the same time, the findings also show that functional concerns, such as battery life and range anxiety, also have weightage in Pakistan, whereas the environmental and recycling-related considerations place more influence in Lithuania. Moreover, the findings also provide practical insights for policymakers and market actors through linking perceived value formations into the specific contextual conditions for both countries. This study underscores the development of targeted-based policy measures and communication strategies, through showing that value of an EV is multidimensional and context-based dependent, in order to accelerate adoption of EVs in different national environments.

1. STUDY OF GLOBAL TRENDS IN ELECTRIC VEHICLE ADOPTION

Study shows that the global automobile industry nowadays is experiencing a transformation which is marked by a shift towards the widespread adoption of EVs (Sheykhfard et al., 2025). In recent years, the number of EVs on roads around the globe has increased at an unprecedented pace (Negash et al., 2024). In the year 2023, the worldwide stock of EVs is exceeded 26 million units. This shows a substantial milestone in the transition toward sustainable mobility in the form of EVs (Sheykhfard et al., 2025). This growth reflects an escalation in the adoption of EVs, arising from a mere 22,000 EVs in 2011 which then shows to be surpassing the 02 million units by the year of 2021 (Negash et al., 2024). Moreover, study also shows that in the year 2022, global sales of EVs have exceeded to 10 million units. This figure covers the approximately 13% of total car sales worldwide. This can be said to be a major shift in consumer preferences toward sustainable mobility in the shape of EVs. This also shows that there is an acceleration at which EVs are now becoming part of the global cars market (Wolf & Kovács, 2024).

Furthermore, study also shows that in the year 2023 sales of EVs have reached to an estimated 14 million units. This covers the 35% increase, if we compared it, with the previous year as above referred. This growth shows that EVs are now one in every five new cars which are being sold worldwide (Basmantra et al., 2025). Moreover, studies for the year 2024 show that the sales of EVs are expected to reach approximately 17 million units. This growth reveals that there is a continued growth of EVs in the consumers (Bektaş & Akyıldız Alçura, 2024).

Moreover, in the year 2021, the market shares of EVs, with the both battery electric vehicles (BEVs) and plug-in hybrid vehicles (PHEVs), has been raised to 19.2% in the Europe. This is a considerable increase in adoption of EVs, from the 11.4% share from the previous year in the Europe (Bednarz et al., 2023a). Study also shows that the market of EVs is will maintain its growth throughout the years 2021 to 2031 (Negash et al., 2024).

Notwithstanding, study shows that the pace of EVs adoption is not the same in all countries. There are disparities found in the market penetration and consumer uptake. The existing research highlights that these variations are happening due to the governmental interventions through subsidies, tax incentives, infrastructure development, and regulatory frameworks as per their own countries. These interventions are playing a decisive role in the acceleration or obstacles of adoption of EVs.

At the same time, there are various cultural attitudes, there are various levels of consumer awareness, and perceptions about EVs, which too influence acceptance rates. That is why there is an uneven growth patterns available in the advanced economies and in the

emerging markets (Wolf & Kovács, 2024). For instance, the China nowadays holds a dominant position in the global market of EVs. There is an estimated 9.5 million EVs in operation there. In the year 2022 alone, the sales of New Energy Vehicles (NEVs) shown to be reached approximately 6.887 million units. This covers more than 60% of the total global market share (Negash et al., 2024). This expansion of EVs market in the Chine is attributable to the government support, specially with regards to the direct subsidies, tax incentives, and special regulatory schemes. Such schemes were implemented in major metropolitan areas of the China such as Beijing and Shanghai, and resultantly the EVs covers more than 40% of the sales mix therein. In addition to this domestic adoption, study also shows that the China has also emerged as one of the leading global exporter of EVs (Wolf & Kovács, 2024). There EVs exports have experienced a substantial 120% year-on-year increase in the year 2022 alone. This shows that the country is expanding its role as a global supplier of clean mobility solutions in the shape of EVs (Chen et al., 2025a).

Moreover, the adoption of EVs is also shown to be in advanced stage in several European countries. The Norway is standing out right now as the global leader in this regard. There EVs covers approximately 79% of new car sales. Then there is Iceland which follows an adoption rate of around 45%. Then there is a Sweden which ranks third with about 32% of the sale. In the year 2022, studies show that the average adoption rate of EVs in the entire Europe has reached about 21%. This number shows that there is a progress in this region for EVs (Wolf & Kovács, 2024). In the Norway, the market share of EVs have reached 54% in the year 2020. The projections further show that the number of EVs in the active use will touch about 1.5 million units by the end of the year of 2030 (Yıldız et al., 2024).

Furthermore, the Lithuania also has faced a major growth in the adoption of EVs. Study shows that the new EV purchases has been increased by 50% and the used EV purchases has been increased by 27% between the year of 2017 and 2020. The existing research attributes this trend primarily to the introduction of government incentives. As above discussed, they always plays a main role in EVs market (Ginavičienė & Sprogytė, 2021).

The United States of America (USA) is not behind. Study shows that as of 2023, there had been approximately 3 million EVs on the road. This also shows that there too is a steady but regionally uneven growth in adoption of EVs (Sheykhfard et al., 2025). In the year 2022, the adoption rate of EVs in the USA shown to be reached approximately 7% of total new car sales (Wolf & Kovács, 2024). The California alone has shown consistency at the forefront of EVs adoption. This progress is also supported by state-level initiatives: such as the zero-emission vehicle mandates, rebates, and infrastructure investments, besides in the existence

of federal policies that also provide tax credits and make regulatory support (Hoogland et al., 2023).

There is another country which should be discussed here. The Indonesia, which is the largest market for both two and four-wheel vehicles in Southeast Asia. This country also has increasingly prioritized the promotion of the EVs industry. There are doing it as part of its national strategy with an aim to reduce reliance on fossil fuels. The government has set ambitious electrification targets: the deployment of approximately 13 million electric motorcycles and about the 2.2 million electric cars by the end of the year 2030. Moreover, there is also a broader vision to phase out non-electric vehicles by the end of the year 2050. The recent figures shows major progress. The national EV wholesales has reached 43,188 units in the year 2024. This represents a 153% year-over-year increase. Despite this rapid growth, however, the research shows that the adoption of EVs yet remains slower than anticipated rate. This is due to constrained, in the form of persistent barriers, such as high purchase costs and the insufficient development of charging infrastructure on roads (Negara, 2024).

The Pakistan remains at this moment is in the early stages of EVs adoption. Though the government has introduced its first National EV Policy in the year 2019, however, there is a lack of implementation. Despite this, the policy sets an ambitious target for EVs to be a part with 30% of all new vehicle purchases by the year 2030. This shows that there is a commitment for the sustainable environmental growth in the Pakistan. However, the market shows very limited availability for both electric two-wheelers and four-wheelers EVs. Moreover, the infrastructure is also underdeveloped for the providing the charging platforms for the EVs. The research shows that that this transition is very important for the Pakistan as well. Since the transport sector is one of the largest sources of GGE in this country. (Shakeel, 2022a).

Moreover, the India is also important one to be discussed here. They has established an ambitious goal to achieve 30% electric mobility by the end of the year 2030 (J. Lee et al., 2021). The Indian government has implemented various range of incentives and tax policies with an aim to accelerate EVs adoption. Such efforts are contributing to shift the consumer preferences toward EVs. This momentum is also important for the India, the reason is that their automobile industry also ranks as the fourth-largest in the world (Negash et al., 2024).

1.1. MULTIDIMENSIONAL FACTORS SHAPING CONSUMER PERCEIVED VALUE OF ELECTRIC VEHICLES

The decision to above referred transition from a conventional vehicle to an EV is not easy to understand rather it is complex the reason is that it involves the comprehensive evaluation conducted by the consumers of potential benesuits and perceived risks. Research

shows that this process extends beyond from the simple cost–benefit considerations. This decision making covers various factors such as environmental value, technological trust, and the availability of infrastructure and also the social perceptions (Negash et al., 2024).

Furthermore, there are also the environmental concerns, which are also have consistently been shown by the scholars being one of the most influential factors making the consumer interest in EVs (Wu et al., 2024). The research shows that there is the perception about EVs that they do act as contributors in the reduction of air pollution and in mitigation of climate change. Such perceptions also play major role in the consumer attitudes about EVs (Yıldız et al., 2024). The study shows that those persons who have elevated levels of environmental awareness they exhibit a greater inclination toward purchase of BEVs in comparison with others (Tikoudis et al., 2024).

In addition, there are various economic and financial considerations too which are have been emphasized in the available studies on EVs as one of the key drivers for the consumer interests. The major attraction lies in their lower operating costs. This is main reason which stem from the lower price of electricity when compared with petrol or diesel. The reduced frequency and cost of maintenance is also another factor (Bektaş & Akyıldız Alçura, 2024).

The concept of Total Cost of Ownership (TCO) is also pertinent to discuss here for evaluation of the financial appeal of EVs. TCO covers not only the initial cost but also long-term savings. Those which are derived from lower fuel expenses and from the reduced maintenance requirements. The government incentives or subsidies is additional reason. Scholars argue that when these factors are considered collectively by the consumers, then the EVs present them a more cost-effective option upon the conventional internal combustion engine vehicles (Chen et al., 2025b) Scholars also conducted various empirical studies to prove that presentation to consumers of a clear and transparent information on the TCO makes a positive influence on their preference for EVs (Chen et al., 2025b).

In this study, performance and technological attributes of EVs have also discussed and shown as one of the important contributors in making consumer perceptions of value. EVs are linked with a distinctive driving experience. It is also characterized by special features such as rapid acceleration, smooth in handling, with a quiet ride. These attributes not only differentiate these EVs from conventional vehicles but they also provide hedonic value which gives consumers a sense of enjoyment and satisfaction beyond mere functional utility (Wolf & Kovács, 2024). Moreover, there are other technological advancements available in EVs, particularly those which enhance their battery performances and extend their driving range. The improved batteries and their efficiency not only deals with the concern of consumers

regarding charging frequency and convenience but they also directly influence their perceptions on its reliability for its daily use. (Kim & Heo, 2019).

The studies also highlight the role of symbolic and social values of EVs in mind-making of consumers. The ownership of EV is sometimes interpreted in the form of self-expression, which is beyond practical and economic considerations. It enables persons to show their care and alignment with environmental consciousness, keeping in view the upcoming technological progress in this world (C.-S. Han et al., 2024).

Moreover, studies also show that the social norms, especially the opinions and behaviours of family, friends, and social networks, also play major role in this process. The positive endorsements within one's social circle sometimes act as a reinforcement for making good perceptions about EVs. On the other hand, skepticism or resistance may act as a deterrent. This shows that there is a social influence which also plays its role in the diffusion of technology of EVs (J. Lee et al., 2021).

Not only this, but also there is financial risk which is also shown in the research one of the major barrier in the adoption EVs. This is the reason is that of the high initial cost when it is compared with conventional vehicles (Yıldız et al., 2024). The concerns of consumers regarding the high cost of batteries, then their replacements and the uncertainty which is surrounding around the resale value of EVs, all these also time and again have been discussed in the research as an important contributing factors in making the perceived financial risk. (C.-S. Han et al., 2024)

Then there comes the performance-related issues and technical limitations. These too are sometimes linked to the phenomenon of range anxiety. They are defined as the fear that an EVs battery may be depleted before the driver reaches on a charging point or his or her final destination (Chen et al., 2025b). The key factor which reinforces its range-related concerns is the insufficient development or availability of charging infrastructure or points or stations. This also coupled with the long charging times that is required, if one compared his EV with the quick refuelling of petrol vehicles (Sun et al., 2024). Therefore, these perceived risks which are related with battery issues, their longevity and time durations, and about the overall reliability have been identified as one of the major deterrents in adoption of EVs (C.-S. Han et al., 2024).

Next comes the several psychological and social barriers, which plays their role in hindering the adoption of EVs. One prominent concern is the fear of technological obsolescence. The consumers may worry about rapid advancements in EV technology. This believe that this could render their purchase outdated and old model within a short span of time. Additionally, some perceive that EVs are complex or unfamiliar if they compared it with

their conventional vehicles. This creates uncertainty and hesitation for them (C.-S. Han et al., 2024).

The other notable psychological barrier which time and again have been discussed in earlier research is the “intention–behaviour gap”. This refers to that discrepancy which existed between expressed positive attitudes of consumers or their intentions toward the EVs and their actual purchase behaviour. This gap is also sometimes shaped by practical constraints which outweigh pro-environmental motivations. There are other factors which are pertinent to mention here that the availability or absence of in-home charging facilities may also override positive attitudes of consumers about the sustainability of EVs (W. Wang & Mohamed, 2025).

There also various external factors which play their effective role in making minds of consumer in adoption of EVs. One of the key barrier arises from insufficient access to the reliable information. There are conflicting narratives online. They enhance uncertainty and skepticism among buyers (Sheykhfard et al., 2025). Therefore, without adequate charging facilities in residential areas and on the major travel routes, it would not be easy for the consumers to accept the ownership of EVs. There is dire need of accurate information dissemination and infrastructure to cover above referred barriers in the way of adoption of EVs (Sun et al., 2024).

2. CORE FACTORS SHAPING THE PERCEIVED VALUE OF ELECTRIC VEHICLES

The perceived value of EVs is determined through a multidimensional framework which covers economic, environmental, psychological, and social factors. Each factor plays an important role in making evaluations of benesuits, risks, and overall adoption decisions for the consumers.

2.1 Core Value Dimensions Influencing Electric Vehicle Evaluation

Economic value: purchase cost, total cost of ownership and long-term financial risks

Economic factors are very important to be discussed here. They also play their effective role in influencing consumers regarding EVs. They also shape their willingness in its adoption (Negash et al., 2024). The economic considerations sometimes extend beyond the cost to include the overall total cost of ownership. These considerations also involve the availability of finance schemes and government incentives. The long-term financial commitments helps a lot in shaping decisions of consumers toward EVs (Dua et al., 2024). One of the most time and again cited barriers in the available research in the way of adoptions of EVs is the high initial cost. This causes discouragement of many potential buyers (Negash et al., 2024)

Furthermore, regarding the high purchase cost of EVs, studies show that in developed economies such as the US and China this elevated acquisition prices continuously discourage the mainstream consumers for EVs. Similarly, in developing countries such as India and Pakistan, where the affordability is one of key element in consumer behaviour, the initial cost becomes an even more bigger obstacle, which sometimes outweigh the savings or environmental benesuits as discussed above, and it slow down the sales of EVs (Dua et al., 2024). Researchers have obtained evidence from survey-based studies. They further suggest that a considerable proportion of prospective buyers, sometimes reported as exceeding 60 percent, perceive EVs as one the car which is being priced beyond their financial capacities. This perception reinforces the under discussion view that affordability plays a decisive role toward adoption of EVs (Negash et al., 2024).

However, another important aspect to highlight here is that the influence of price on decision-making of consumer is not always straightforward. For instance, in one study, the evidenciary research from Bangkok illustrates that middle and high-income consumers exhibited lower probabilities for adoption of EVs. This trend has been attributed to their preferences for regular internal combustion engine vehicles. At the same time, it is also attributable to their concerns regarding the performance capabilities and future resale values of their EVs (Tissayakorn, 2025).

Although EVs are generally associated to higher purchase costs when compared with conventional alternatives, yet the existing research also shows that their overall financial attractiveness could becomes more apparent when they are evaluated through the lens of TCO. There are multiple reasons for this, such as the operational lifespan, lower expenses in comparison to fuel, routine maintenance cost, and certain government incentives, all these together sometimes offset the initial price differences. Such understanding makes EVs as a comparatively more cost-effective option in the long term for the consumers (Negash et al., 2024).

EVs have a financial advantage the reason is that their operation and maintenance costs are lower than those of regular conventional cars. Researchers have identified this cost gap as one of the major point of difference. The lower expenses on fuel, together with fewer mechanical components, and less service maintenance issues; all these lead the long-term savings of consumers toward the economic case to own an EV (Chaturvedi et al., 2022). In this regard, the research from Bangkok shows that another reason which is the high daily transport fares have become another important driver in the adoption EVs. As these costs rise, the consumers begins to see EVs as a more affordable and sustainable option over the long term conventional transport (Tissayakorn, 2025).

However, the length of the payback period for the initial investment still remains as the key factor in consumer decision making process. In one study on hybrid EVs in the US shows that most models do not recover their original purchase costs through fuel savings within their expected 16-year lifespan. This outcome suggests that, even with long-term benesuits, the economic case for adoption of EVs may seem weak to many regular consumers when they judge it through its payback feasibility (Duncan et al., 2018). Furthermore, the government backed incentives such as subsidies, rebates, and tax credits also appear in the literature as another key tools that could be used to promote the adoption of EVs. These measures reduce the burden of high costs. They improve affordability, which ultimately allows more consumers to consider Evs as a good option. Scholars have noted in their work that these incentives boost short-term demand and they also lower perceived financial risk. As a result, consumers have developed more positive attitudes toward EVs (Negash et al., 2024).

In this context, one research conducted in California shows that the federal tax credit was the strongest financial incentive which was motivating consumers to buy plug-in electric vehicles. The estimated figure was that this credit accounted for more than 30 percent of total PEV sales there. This study shows how much it lowers financial barriers and how it shapes market demand. These results underscore the importance of well-designed fiscal policies.

These measures deals with affordability issues and they make EVs more competitive in the market of conventional internal combustion engine vehicles (Hoogland et al., 2023).

Moreover, the impact of financial incentives on EVs does not remain consistent in different markets. The reason is that their effect depends on the wider policy and other contextual conditions. One research which was related to China and Pakistan in this context shows that monetary incentives such as subsidies and tax reductions hold less weight in consumer decisions making process as the policy makers expect. The consumers place more value on non-monetary benesuits that gives them direct improvements in their routine daily mobility. The available measures such as priority access to bus lanes, then reserved parking spaces, and other convenience-based advantages, etc, play major role in adoption of EVs. These studies show that financial support can lower main costs, yet many consumers judge the EVs through practical gains that improve convenience and ease of use in everyday travel in their routine life. This study shows that there is a need for policy approaches which also covers local consumer preferences and infrastructure realities, rather than reliance on on financial incentives alone (Xue et al., 2023). In another study S. Wang et al., (2018) shows that although consumers do value the presence of subsidies, yet these financial incentives alone do not always serve as the main factor in making their purchase decisions positive. There are many consumers who see subsidies as a supportive benefit which improve affordability, but they do not, on their own, determine whether they will adopt an EV or not. This research shows in the conclusion that consumers place more weight on more other considerations such as vehicle performance, reliable driving range, access to charging options, and long-term maintenance demands.

Furthermore, there are various other factors pertinent to be discussed here. Firstly, research identifies leasing as an alternative finance option which could reduce the pressure of high purchase costs for EVs. The leasing allows consumers to use an EV for a fixed period, which also gives them a chance to test the technology before their long-term ownership. Thus, this arrangement lowers the perceived risks and uncertainties which is linked to own an EV (Hoogland et al., 2023). Then, the research also shows that the expected cost of battery replacement is another major economic barrier for many potential consumers of EVs. This expense creates an uncertainty about the long-term financial value of an EV. Some consumers fear that this cost of a new battery may damage their savings and they expect from lower fuel use and reduce maintenance. These concerns appear not only in developed markets but also in emerging economies such as India (Dua et al., 2024). In this context, in the China, regulations require EV batteries to be recycled once their capacity falls below the set threshold. This rule reflects that the China has its focus on environmental sustainability and resource efficiency as well. Under this policy environment, the role of clear maintenance and

replacement strategies becomes again important. These strategies then ultimately shape the confidence of consumers in EVs and their ownership. The is even more prominent in leasing models. There the battery belongs to the firm rather than the user. In these cases, companies own full responsibility to manage the battery throughout its lifecycle. This includes its recycling and replacement. Though this responsibility affects the economic and operational feasibility of leasing schemes however it influences the long-term appeal for adoption of EVs in the Chinese market (J. He et al., 2025).

Likewise, in another recent study conducted by Dua et al., (2024) shows that concerns about depreciation and resale values form an important barrier for EVs adoption. Many potential consumers believe that EVs may lose its value faster than conventional internal combustion engine cars. This belief comes from the uncertainty which is revolving about its battery, the limited development of second-hand EV markets, and rapid technological change. This perceived risk plays its role in weakening the confidence of consumer in the long-term financial value of an EV. As a result, many delay or reconsider their decisions. Tissayakorn, (2025) also shows that these concerns about resale value are contributing to the lower adoption of EVs among higher-income consumer groups in the Bangkok. His research indicates that these consumers, although they have more purchasing power, still hesitate to invest in EVs because they doubt about the future resale value of the models which are available to them.

Environmental value: sustainability awareness, pro-environmental motivation and lifecycle implications

The view point regarding EVs as an environmentally sustainable option is one of the major drivers in making the consumer purchase intentions. Research shows that this influence works through both direct and indirect ways. Some consumers feel themselves motivated because they believe that if they choose an EV, it will reduce emissions and support the climate. Others respond to a deeper psychological factor. They consider it as their moral duty, a sense of environmental identity, and a desire to appear socially more responsible than others. These factors also shape people to convert ecological concerns into real purchase choices. The environmental appeal of EVs therefore functions not only as a simple motivation factor but also as part of a psychological process which links values, attitudes, and intentions altogether (Dutta & Hwang, 2021).

Furthermore, the direct influence appears in many studies show how environmental concerns shape intentions of consumer to purchase an EV. In this context, in one research from Vietnam offers a clear viewpoint into the role of pro-environmental cognition of EV adoption. Duong, (2025) through his study finds that two psychological constructs: one which

is Awareness of Consequences (AOC), second which is Ascription of Responsibility (AOR), both have a strong and direct positive effect on the intention of a consumer to buy an EV. AOC refers to the understanding of a person regarding the harmful environmental effects of conventional internal combustion engine vehicles, including air pollution and GGEs. Whereas, the AOR reflects the degree to which an individual may feel personally accountable for these problems and responsible for to handle them through his own choices. Similarly, in another research conducted in Macau it has been shown that environmental concern are a fundamental determinant which influence the consumer behaviours toward EVs (Austmann & Vigne, 2021). In the case of Indonesia, empirical studies similarly reveal that environmental concern have a more significant positive influence on the purchasing intentions of consumers toward EVs (Hartono et al., 2024). In this regard, research conducted in Japan also revealed that among consumers who had not yet adopted EVs, the environmental awareness has a major role in shaping their future intentions to purchase an EV (Okada et al., 2019). This kind of study is also conducted in India and it too confirmed that environmental concern exerts a direct and positive influence on their intentions to purchase EVs (Rafiq et al., 2024).

Moreover, in many works of scholars, it has time and again been highlighted that attitude is another mediating factor in the relationship between environmental values and purchase intention of consumers for EVs. In this context, the consistently observed pattern is that environmental concerns of consumers and evaluations of ecological performance of EVs are playing a more favorable overall attitude toward the technology. This subsequently becomes another predictor of actual purchase intention.

For example, in their research Upadhyay & Kamble, (2023) regarding Germany, Upadhyay & Kamble, (2023) regarding India, and Hasan (2021) regarding Norway, has demonstrated that environmental performance and concern do not merely influence intentions directly but they also work mainly in shaping attitudes of consumers toward EVs. Once these attitudes form, then they increase the likelihood of adoption of EV because they turn broad environmental values into concrete motivation to act for consumers. Moreover, the evidence from Malaysia adds to this view. It has been shown, in another study, that environmental awareness works as a mediating factor which strengthens the link between attitude and purchase intention. This study reports that even when consumers hold a positive attitude toward EVs, their attitude leads towards a more stronger purchase intentions when it is supported by higher environmental awareness. These findings show that environmental concern and awareness together build the main attitudinal base on which purchase intentions rest. This viewpoint also stress on the need to target both attitudes and cognitive understanding of consumers together in designing strategies to increase EVs sales (Phoon et al., 2024).

Furthermore, Javed et al. (2025) show that the link between environmental awareness and purchase intention works in a complex layered process and this is based on both cognitive and social mechanisms. In their study, evidence from Chinese consumers in the period after the COVID-19 pandemic shows that higher environmental awareness does not create a direct increase in the intention to buy an EV. Instead, its effect moves through two indirect pathways. The first is a rational pathway. The more awareness leads consumers to form ethical judgments about the moralities revolving around the adoption of EVs. These judgments then shape their purchase intentions. Through this process, people view EV ownership as a morally responsible choice. It strengthens their willingness to adopt the technology as well. The second is a non-rational pathway. Their study shows that the environmental awareness creates a sense of ethical obligation toward others as well. It then reinforces social expectations which are expressed through subjective norms. These norms then act as drivers to form the purchase intentions because consumers feel pressure to align their actions with their socially approved sustainable practices. Therefore, this study shows the complex yet beautiful nature of consumer decision-making process regarding EVs. It demonstrates that environmental awareness does not produce a simple, linear effect; instead, it works through ethical reasoning and social norms, which then convert ecological values into a concrete behavioural intention. This shows beauty of technological amalgamation with sociology and psychology.

Furthermore, research conceptualizes environmental values not as a single construct but with a multidimensional set of beliefs, attitudes, and psychological states. A core element in this framework is the environmental concern and its awareness. This dimension covers the recognition of a person with his environmental problems and its consequences. It also works with a sense of worry or responsibility about these issues. It forms the base on which broader perceptions of sustainability develop and then lead toward EV adoption (Rafiq et al., 2024). It functions as an antecedent factor, which is one part of the broader framework of environmental value, in shaping and guiding the consumers in the development of more specific beliefs and their attitudes (Dutta & Hwang, 2021).

In this context, in one cross-country study which is conducted about the Pakistan, China, and Saudi Arabia, shows that environmental awareness moderates the link between already available green behaviours of people and then their intention to purchase environmentally friendly vehicles. This study indicate that individuals who already practice recycling, energy conservation, or eco-friendly consumption they are more likely to extend these behaviours to green vehicle adoption if their level of environmental awareness is high (Wu et al., 2024). Moreover, at the most basic level, pro-environmental behaviours, which grow from the core value orientations of a person, shape how environmental issues are

understood and acted upon. These values fall into three main types: one, altruistic; second, biospheric; and third egoistic. In one study from China, there is clear evidence of their influence on consumers. It shows that altruistic values, which reflect concern for the welfare of others, and biospheric values, which reflect concern for the natural environment, both increase awareness of environmental consequences. On the other hand, the third one, egoistic values, which place priority on self-interest and personal gain, show the opposite pattern and reduce such awareness (S. S. Lee et al., 2023).

Likewise, in another pro-environmental study, it has been shown that such responsibilities refer to the degree to which consumers feel personally accountable for the environmental results of their actions. An empirical study from India frames this responsibility as one of the stimulus in activation of the formation of pro-environmental values and attitudes. These values and attitudes then act as mediators, which help in shaping behavioural intentions. This includes the intention to purchase environmentally friendly products such as EVs. This study shows that when persons internalize responsibility for environmental outcomes, then they develop more stronger ecological attitudes, and these increase their likelihood of choosing sustainable consumption practices, which is an EV (Upadhyay & Kamble, 2023).

According to H. He et al., (2021) this link between consumer environmental concern and sales of EVs does not always follow a simple pattern. It can produce unexpected outcomes at the market level. The evidence from an economic pricing model shows that higher environmental concern does not always lead to greater EV adoption. In some cases, it can limit market growth. The environmental consciousness of consumers often accepts a price which is premium for EVs because they view the purchase as an ecological responsibility, and at the same time, a symbol of status. This behaviour demands that within the green consumer segment there is also a room for manufacturers to raise prices in pursuit of higher prosuits. When businesses take advantage of this willingness to pay, they can secure larger margins from environmentally motivated consumers. And the same time they can also make EVs less accessible to price-sensitive conventional consumers. As a result, total EV sales may remain lower than expected, even when environmental concern is high. This dynamic study shows that manufacturers may use consumer values to increase revenue rather than to increase access and support general EV adoption (H. He et al., 2021).

The next point which is important to highlight is the context matters because the effect of environmental values on EV adoption changes according to countries and it also depends on personal experience with the technology. Both the geographical conditions and experiential

familiarity are also important factors in determination of how environmental values translate into actual EV adoption.

The first country is the Norway, which has one of the most advanced EV markets in the world. Their too environmental values play its role in shaping consumer behaviours. This country generates most of its electricity from renewable sources. This strengthens the perceived ecological benesuits of EV ownership. The Norwegian consumers report high satisfaction with the environmental qualities of their vehicles. Their satisfaction confirms that initial purchase choices is EV and it also increases their intention to buy an EV again. Thus, environmental factors help to sustain long-term adoption in mature markets (Hasan, 2021).

The second country which is discussed is the Pakistan. Study shows that there also environmental advantages of electric three-wheelers connect with economic benesuits. These vehicles reduce emissions and improve air quality. They also lower operation costs for drivers who depend on them for their daily income. This combination of ecological and financial gains creates a comprehensive incentive to adopt this technology. Drivers view these electric three-wheelers as a way to support environmental sustainability and also as a practical tool to improve their economic well-being (M. A. Khan et al., 2022). The next country is the India. There too environmental concern and a sense of personal responsibility have been consistently identified as one of the powerful determinants in shaping the consumer behaviour toward EVs (Rafiq et al., 2024).

Next comes, the China which is one of the world's largest and fastest-growing EV markets. There also environmental awareness influences consumer behaviour through indirect ethical and social routes rather than as direct action. Research from the post COVID-19 period also shows that higher ecological awareness often leads to ethical evaluations of sustainable consumption and a perceived social duty to act responsibly in this context. These processes then form the pathway through which environmental values shape purchase intentions (Javed et al., 2025).

The consumer experience with EVs changes the way environmental awareness which influences decision-making. In this context, one study from Japan shows that this difference through comparing non-owners with current EV users. For persons who have not yet purchased an EV, environmental awareness acts as a direct driver for their purchase intention, and a more stronger ecological concern leads them to form a willingness to adopt the technology. Whereas, for existing EV owners, the environmental awareness works through a more indirect route. It shapes post-purchase satisfaction as part of their broader assessment about the vehicle performance and features. This pattern suggests that this environmental

awareness motivates initial adoption, but its role shifts once consumers gain firsthand experience. It becomes part of the evaluative process that strengthens satisfaction and supports long-term loyalty or future purchase decisions (Okada et al., 2019).

Moreover, the research also shows that the environmental value consumers attach to EVs often reflects more complex perceptions when viewed through a full lifecycle lens. Although EVs are widely seen as a cleaner option, rather than conventional internal combustion engine vehicles. Their environmental impact moves beyond tailpipe emissions. Lifecycle analyses show that the production stage, especially battery manufacturing, requires a substantial energy. The production of an EV can generate about 59/60 percent more CO_2 emissions rather than the production of a similar ICE vehicle. Whereas, the battery accounting for 40/50 percent of total lifecycle GGEs. These results underscore the need to consider both the operational phase of EVs and the upstream impacts which is linked to their production. The environmental value of EVs remains more strong in terms of reduction of emissions during use, yet it must be understood within a broader framework which includes the environmental costs built into their lifecycle (Amusa et al., 2024).

Further, the end-of-life management of EV batteries also presents one of the major environmental challenge. It complicates the sustainability narrative regarding the EVs. When these batteries end up in landfills, then they create serious risks because of the existence of toxic substances and heavy metals, such as lithium, cobalt, and nickel, etc. In this context, the research identifies that the recycling of these batteries is as one of the most appropriate way to reduce these risks. However, the collection rates remain extremely low. In the European Union, estimates show rates below 5 percent. The recycling process also faces technical and logistical obstacles. There is a difficult in disassembly, high energy requirements, and limited economic incentives which also restrict large-scale recovery efforts. Among the available recycling approaches, direct recycling stands out as one of the most environmentally sustainable option because it aims to preserve and reuse battery materials with minimal processing. However, this method still in in early stage of development. This is not yet applied at an industrial scale. This gap between policy goals and real-world capabilities shows that end-of-life battery management is a barrier in achieving a fully sustainable EV lifecycle (Amusa et al., 2024).

Psychological value: attitudes, emotions, perceived risks and behavioral motivations

The decision to accept an EV is also depended on several psychological factors. The available research on this point of view shows that these factors sometimes influence consumers in more than mere technical features or about financial considerations. The

attitudes of consumers toward innovation, perceptions of risk, social influence, environmental identity, and the symbolic meaning of EV ownership are main factors which guide their choices. These psychological elements also one of the reasons how people interpret the practical and economic qualities of Evs, if they adopt them. These factors also shape the motivation behind to turn favourable perceptions of consumers into their real purchase decisions (Krishnan & Sreekumar, 2023).

In a research by de Luca et al., (2024), show that much of the existing research also relies on socio-psychological contexts in order to explain the consumer behaviour and their purchase intentions in matters of EVs. Whereas, Li et al., (2020) further observes that personal norms also play a dominant role. These norms reflect an internal sense of moral duty of individual in order to act in a social or environmental responsible way. In the case of EVs, this sense of obligation can convert into a preference for a more sustainable vehicle with an aim to protect the environment as well. In their work, the evidence shows that such moral considerations do have a direct positive effect on purchase intentions of consumers.

Moreover, the researchers also show that anticipated emotions play a dominant role in decisive behavioural intentions of consumers. These consumers sometimes make decisions not only through rational assessment but also on the basis of their expectations that how they will feel in the future, if they adopt an EV. These positive anticipated emotions, such as pride or satisfaction, which arises due to a sustainable option, and the negative emotions, such as guilt or regret, which arises from omission to act in an environmentally responsible way: both influence intentions of consumers. In this context, studies have indicated that these emotional expectations also support the motivation to adopt EVs through connecting the purchase decision to comprehensive psychological endings. (Z. He et al., 2022a).

Moreover, as per Afroz et al., (2015) values also form the deeper principles which then guide attitudes and behaviours of consumers. The biospheric values, which show concern for the natural environment, also tend to support the interest in EV adoption. In contrast, there are other values such as self-enhancement values, for example the pursuit of personal gain or social recognition, and they too can fade pro-environmental intentions. This difference shows how main values form opinions, how persons place more weight on ecological sustainability or on personal utility in their consumption choices. In addition, there are various consumer propensities which do exert an indirect but important influence on purchase behaviours, it includes broader personality traits and predispositions. The environmental propensity which is expressed through green self-identity or strong concern for ecological issues, and innovative propensity, also shown through novelty-seeking and independent judgement, and they also shape purchase intention. Their effect works through attitudes,

personal norms, and perceptions of control. These characteristics do not operate in isolation. In its place, they influence consumers interpretations of information and evaluation of EVs to be taken them as viable options (Moon, 2021). Therefore, beyond widespread psychological factor, research shows the role of specific perceptions and attitudes toward EV attributes. These include views on environmental performance, cost efficiency, technological reliability. It also covers concerns about convenience in charging or battery life. Moreover, scholars also observed that some of these perceptions may be considered as dormant or difficult to observe, but still they shape the choice process in guiding consumers weigh benesuits against perceived risks (de Luca et al., 2024).

In this context, research shows that these psychological variables work together in order to shape purchase intention. In the context of EVs, these purchase intention is also viewed as the good predictor in actual buying behaviour (Y. Jiang et al., 2025). At the same time instrumental attributes such as cost, driving range, and charging availabilities also remain main factors in consumer decision-making. The research shows that these attitudes, beliefs, and perceptions exert an equal influence in this decision making. The positive attitudes toward EVs, which are shaped by environmental concern, social influence, or anticipated emotions, can also support adoption intention even when practical barriers remain there. Therefore, the consumer decision-making emerges as a multidimensional process in which tangible attributes and psychological factors interact with each other in order to shape adoption results of EVs (de Luca et al., 2024).

The literature draws attention to several emotional and perception-based barriers as well which also deter potential EV buyers. In this context, range anxiety is one of the most persistent and documented barriers (Schmalfuß et al., 2017). It originates from the belief that driving range of an EV may not meet daily mobility needs, however, it creates a fear that the battery might run out before reaching on a charging point. The survey conducted by various researchers consistently identify limited range as one of the main disadvantage in EV ownership. It is one of the major cause of hesitation among prospective buyers. To tackle this factor, some experimental studies have attempted to reduce the effect of range anxiety through designing choice scenarios set in urban areas where charging infrastructure was assumed to be fully available. The fear of technological failure and concerns about reliability also appear in the research as strong psychological barriers to EV adoption. Many consumers still view EVs as one of the less dependable and technologically untested product when compared with conventional internal combustion engine vehicles (de Luca et al., 2024). These reliability-related fears are connected with concerns about battery longevity and the high cost of replacement. Research have identified both these issues as important deterrents to adoption (Afroz et al., 2015). In this context, one study found that 38.33% of participants held

a neutral view on whether EVs offer fewer features than conventional cars. This points to a noteworthy level of consumer uncertainty in this scenario (de Luca et al., 2024).

Moreover, the inconvenience of charging issues also appears in the literature as one of the major drawback which do hinders EV adoption. it is admitted that EVs require much longer charging times, even when fast-charging options are available, and they act otherwise to conventional vehicles, which refuel within minutes. (Austmann & Vigne, 2021). In one study, more than 87% of participants agreed on the point that the limited availability of charging stations are major disadvantage in adoption of EVs which is undermining both the practicality and reliability of EV ownership (de Luca et al., 2024). Moreover, research also shows that direct experience has a strong role in reduction of emotional barriers in EVs adoption. In this context, the hands-on interaction through test drives, rentals, or ownership schemes can ease concerns about range, reliability, and performance of EVs. Studies suggest that such experiences would enable consumers to reassess key attributes of EVs such as driving comfort, acceleration, and charging practicality. Resultantly, it can leads them to more favourable attitudes (Chu et al., 2019).

Another important issue to discuss is consumer trust and the perception of risk. These factors also act as key psychological determinants which influence EVs adoption. Trust in the technology and the brand also support acceptance. Whereas, perceived risk sometimes creates a big barrier. Perceived risk reflects uncertainty. Then these possibility of negative outcomes are linked to the purchase decision. Because EVs remain new and unfamiliar to many consumers, therefore, these risks appear more prominent in comparison with conventional vehicles. Moreover, research also shows that perceived risk takes several forms. Firstly, performance and functional risk arise from concerns that EVs may not meet everyday expectations, for example limited driving range, lower top speed, or doubts about reliability when compared with gasoline-powered vehicles. Secondly, financial risk is also important in the EV context. Consumers show worries about the high upfront cost, the potential expense of battery replacement, and uncertain resale values. The next is time risk which relates to long charging durations and the inconvenience in these delays may create in daily mobility routines. Next comes the psychological risk which reflects the anxiety of adoption of a new and unfamiliar technology, which can discourage consumers who feel cautious about change. The research has shown consistently that perceived risk has a substantial negative effect on consumer attitudes toward EVs and their purchase intentions (Liao, 2022).

Another relevant concept is green trust. Research defines it as willingness of consumer to rely on a product which is based on confidence in its environmental claims and performance. In the context of EV, green trust helps in shaping perceptions of sustainability and in

influencing purchase decisions. A lack of trust can become a major obstacle as in research it is shown that some consumers stay sceptical about the real environmental benesuits of EVs. Their doubts relate to pollution from battery production, resource extraction, and the intensity of carbon of electricity generation. These concerns fade the perceived ecological value of EVs and it also reduce their appeal as a sustainable option. In this context, studies also show that green trust acts as one of the moderating factor in the link between psychological variables and purchase intention. When green trust is low, consumers rely more on their own attitudes, judgments, and direct assessments of performance of EVs. When green trust is high, then they place more weight on subjective norms and the opinions or behaviours of peers, family, and social groups (Moon, 2021).

Social and symbolic value: prestige, identity expression and social norm influence

The next important discussion is about social value and purchase intention. In the context of subject thesis, the social value refers to the utility which a consumer derives from association of product with a specific social group, social status, or prevailing norms (Riptiono, 2022). Status and prestige form important components of social value in adoption of EVs. For higher-income consumer groups, the symbolic meaning of EV brands play an important role. Ownership is seen not only as a sustainable choice but also as a signal of higher social standing (M. Jiang et al., 2025a). The research indicates that EVs are perceived as products which are linked to high social prestige. This symbolic position of EVs has a positive effect on consumer purchase intention (Kottala et al., 2025). This view harmonise with the theory of conspicuous consumption by Veblen. This theory holds that consumers sometimes buy and display goods not only for functional use but also to signal economic power, prestige, and social standing (M. Jiang et al., 2025b).

This social approval and acceptance form a key part of social value. Consumers seek validation or sometimes aim to create a positive impression through their purchase choices. One study found that the belief that to buy an EV would improve social perception and also gain approval from others was a main element of its social value. Social value does not always affect purchase intention directly. Instead, it can improve environmental concern, which then supports a more positive attitude toward green products and increases purchase intention. Consumers who adopt green products such as EVs can also influence their colleagues through motivation of others and creation of social pressure within their networks. This process reinforces the indirect role of social value in making sustainable consumption (Riptiono, 2022).

Social value differs in various contexts. In this context, one study conducted in Pakistan found that social value identity, which reflects how EV ownership expresses and reinforces self-concept, was a major predictor of consumer attitude. In contrast, social value

responsibility, which relates to collective obligation, has shown no significant effect. These results suggest that, in this context, personal identity played an important role in making attitudes toward EVs than collective social responsibility (Zamil et al., 2023).

Furthermore, Social norms also play an important role in the adoption of EV. Research shows that social influence from reference groups such as family, friends, and colleagues shapes consumer attitudes and purchase intentions toward EVs (Rehman, 2025). Moreover, subjective norms are defined in the research as the perceived social pressure which is exerted by others such as family, friends, or other social groups to engage in or refrain from a particular behaviour (Kottala et al., 2025). This is regarded as a powerful influence, because it comes from relatives and friends who affects the intention to buy an EV (M. Jiang et al., 2025a).

Moreover, descriptive norms reflect how persons perceive common behaviour within their social group. For example, the belief that few people drive of EVs shows how perceived ownership levels are shaping adoption judgments. Whereas, the injunctive norms relate to perceptions of social approval or disapproval. The belief that friends approval about driving of EVs illustrates how perceived approval increases the appeal of EV ownership. Together, these two forms of social norms explain how social context shapes consumer attitudes and intentions toward EV adoption (Ramachandaramurthy et al., 2023). Moreover, the research also shows that social norms exert more influence on consumer attitudes toward EVs (X.-W. Wang et al., 2021a). Study also shows that friends or family express positive views about EVs provides social proof. Such endorsement signals that ownership of EV is a shared value. It also supports perceptions of social acceptance and desirability. As a result, EV adoption appears more legitimate and attracting (Kottala et al., 2025). However, social norms do not always influence purchase intention directly. Instead, they shape overall attitudes toward EVs. These attitudes then act as the main factor of purchase intention (X.-W. Wang et al., 2021a).

Likewise, research also shows that there are mixed findings on social influence in the adoption of EV. Its effect depends on market maturity. In regions with low EV penetration, social influence may also appear weak. Few visible adopters exist to serve as examples, and normative pressure within social networks remains limited. Without broad exposure or peer reinforcement, the social influence alone has less power to shape attitudes and purchase intention (Kottala et al., 2025). On the other hand, evidence from collectivist societies shows a different pattern. In these contexts, subjective norms become the strongest factor in shaping adoption intentions. Consumers place high weight on opinions, expectations, and behaviour of family, friends, and peer groups (Klabi & Binzafrah, 2021).

The next point of analysis is symbolism, status, and identity. Research shows that, beyond practical transport use, EVs can also function as symbolic resources. They allow

consumers to construct, express, and communicate identity (M. Jiang et al., 2025a). The symbolic meaning which attached with EVs often emerges in research as one of the key driver for its adoption. In some cases, it carries more weight than instrumental attributes such as cost, range, or technical performance. Moreover, one major symbolic link is the green identity. Consumers who have strong environmental awareness use EV ownership to affirm ecological values and signal environmental responsibility. In this context, the empirical evidence shows that to perceive an EV as symbol of environmentalism stands as one of the strongest predictor of adoption intention in multiple ways. This symbolic role also mediates link between concern about climate change and intention to adopt an EV. It converts broad environmental feelings into concrete purchase motivation for EVs. The other second symbolic dimension also relates to social innovator identity. This identity connects EV adoption with technological progress, novelty, and trend leadership. For some consumers, to choose a new and demanding technology serves as a form of status gaining. It reinforces self-image as early adopter and innovation leader. Research also shows that social innovator symbolism ranks as second predictor of willingness to buy or lease an EV. It exceeds practical factors such as price and range related issues. Taken together, these findings show that adoption of an EV depends not only on rational evaluation but also on identity formation and symbolic expression (White & Sintov, 2017).

Moreover, the status and face consciousness appear in the research as cultural dimensions which is also playing its role in shaping symbolic value of EVs. In some contexts, EV adoption links closely to reputation and social standing. In China, face consciousness, which is defined as desire to preserve or enhance social image, shows a positive effect on consumer intentions toward EVs. In this context, EV ownership represents not only environmental responsibility but at the same time it is a signal of prestige and modernity (X.-W. Wang et al., 2021b).

2.2. Cross-country comparison of factors shaping electric vehicle perceived value in Pakistan and Lithuania

This section analyses economic drivers and perceived value perspectives. Economic value though remains a central factor in both Pakistan and Lithuania, however, its meaning and influence differs. Each country reflects distinct needs, market conditions, and consumer priorities that shows how economic value is perceived.

In the context of Pakistan, M. A. Khan et al., (2022) in their work sheds some light regarding the subject topic. This study shows that perceived economic value of EVs links to direct and short-term gains in income and livelihood. This link appears important among commercial users from lower socioeconomic groups. Income generation emerges as another

important consideration. Evidence indicates that drivers of electric three-wheeled rickshaws can increase monthly earnings up to 50%. These gains result mainly from lower fuel and maintenance costs. Then the study also describes electric three-wheelers as a highly lucrative option. It has an estimated payback period of 13 to 16 months. This short recovery period makes them attractive. At the same time, this research also points to high initial purchase cost as a major barrier. Although reduced operation expenses motivate adoption, yet the large upfront investment consistently limiting its access for many drivers. Survey data shows that conventional rickshaw operators spend about PKR 15,000 (around USD 89) per month on fuel and maintenance. This number highlights the scale of savings that EVs can offer in the vehicle lifecycle. In this context, government support is necessary. Easy loan schemes and targeted financial assistance can reduce cost pressure and improve financial feasibility for low-income commercial users. In the case of Pakistan, the availability of government-backed easy loan schemes is viewed as a decisive mechanism to make the cost of EVs more manageable. Such financial interventions are desired by potential buyers. The prominence of a used vehicle market is another important role in shaping consumer behaviour. Many drivers prefer to purchase second-hand rickshaws and refurbish them rather than to invest in new models. This reliance on used vehicles gives them both the affordability and the cultural acceptance as a cost-saving measure (Shakeel, 2022a).

In Lithuania, study conducted by(Kaveckis, 2017) shows that perceived economic value of EVs is mainly measured through the framework of TCO. This approach considers costs in full vehicle lifespan rather than to focus only on initial purchase price. Despite this broader evaluation, high upfront cost still remains as a major economic barrier. This issue becomes more acute in markets which have lower purchasing power. In Lithuania, the affordability limitations minimize access to EVs. Survey data illustrate this gap clearly. Price of a Toyota Prius equals about 58.1 average monthly salaries in Lithuania, when it is compared with 7.5 in Germany (Raslavičius et al., 2015). Moreover, the research also highlights reliance on subsidies. In Lithuania, subsidies are considered to be an important factor in decision making and willingness to adopt EVs. Financial measures such as compensation of €2,000 for purchase of a used EV and €4,000 for a new EV are acting as key policy tools that support market integration (Petrauskienė et al., 2021). The durable used car market dynamics define Lithuania's automotive sector and it also helps in shaping EV adoption. This country has a very active second-hand vehicle market. The average age of passenger cars stands at about 16 years (Raslavičius et al., 2015). This long-standing reliance on used internal combustion engine vehicles creates a major barrier in the EV diffusion, because the new EVs usually carry much higher upfront costs (Kaveckis, 2017). In this context, the macroeconomic analyses point to wider structural challenges which are linked to EV adoption in smaller economies such

as Lithuania. One study used a general equilibrium model and then suggests that a 20% shift toward EVs could reduce national GDP and employment levels (Balsiūnaitė et al., 2025).

Then comes the environmental and social motivations**.** (M. A. Khan et al., 2022) in their study observed that environmental concern also shapes EV adoption in both Pakistan and Lithuania, but in differ contexts. In Pakistan, environmental motivation links more closely to immediate and visible gains in local air quality and public health. There is no connection with distant global objectives in consumers. Social discourse connects environmental benefit with economic uplift and livelihood improvement. To tackle severe pollution nowadays stands as a key driver in EV adoption. Environmental degradation creates both short and long term risks. It is admitted fact that Pakistan faces high vulnerability to climate change. This is in the form of rise in temperatures, unstable weather patterns, and pressure on natural resources. Simultaneously, the air quality is exceptionally poor. Big cities such as Lahore are categorized as one of the most polluted in the world. Therefore, in another study (Butt & Singh, 2023) shows that zero tailpipe emissions make EVs a motivator for adoption in Pakistan. This feature holds particular importance for consumers who are well aware of harmful health effects which are linked to air pollution.

Further, it is also admitted in research that the transport sector is a major source of GGE in Pakistan. Transition toward EVs is being viewed as a key strategy for emission reduction. Estimates indicate that replacement of one conventional three-wheeler with an EV as an alternative can reduce carbon dioxide emissions by 3 to 6 tonnes per year. Moreover, the EV adoption is also framed as a pathway in social and economic development. There are various potential benesuits in it. It includes poverty reduction, job creation, and improved living standards. Scholars further observed that possible expansion of economic opportunities for women and marginalised groups could also be seen in the EV sector. However, survey evidence shows that many participants remain doubtful about whether such inclusive benesuits will occur in practice ever (M. A. Khan et al., 2022).

Whereas, in Lithuania, these environmental concern is framed mainly around national and EU policy goals. Here various social concern also arises around fairness of EV promotion policies. In the European context, the EV promotion links closely to policy-led environmental aims. However, it also needs focus on reduction of urban air pollution and noise (Kaveckis, 2017). The environmental benesuits in the research also show that they depend on electricity generation mix. EVs remove tailpipe emissions, but overall emission reduction relies on energy sources which are used for charging. The studies indicate that impact becomes strongest when renewable energy sources such as wind and solar form a large share of electricity production (Petrauskienė et al., 2021). The research also raises concerns about

social fairness in electric mobility. EV adoption is sometimes associated with perceptions of elitism. Government subsidies though aim to promote EV, yet they more focused on wealthier households who can afford new vehicles than deserving class. At the same time, wider economic effects, such as higher wholesale electricity prices, covers whole society. Lower-income groups may bear these costs without receiving direct benesuits from incentives (Gesevičius et al., 2021).

The next point of analysis in the literature review concerns policy and governmental influence. This factor is also examined in the context of both countries.

First of all, in Pakistan, consumers and industry analysts stress on the role of government intervention to make EV more affordable and accessable. A stable policy framework with financial support are seen as an essential factor in order to tackle high upfront costs. Research identifies financial incentives such as subsidies, tax relief, and low-interest loan schemes as good initiatives of purchase intention. In many situations, these incentives outweigh environmental or technological factors (Butt & Singh, 2023). The research signifies that consumers in Pakistan favour direct subsidies, tax exemptions, and accessible finance initiatives as quintessential in EV adoption. Other measures such as reduction of Goods and Services Tax from 17.5% to 1%, along with government-backed loan schemes, have also been regarded as good steps. These policies lower purchase cost and ease financial burden (Shakeel, 2022b) However, the research also highlights concern that effective implementation of pro-EV policy may face resistance from domestic manufacturers of conventional vehicles (Asghar et al., 2021).

Next comes the Lithuania. In this country, study shows that government policies are appearing as mixed in nature. Research points to some supportive incentives, yet at the same time it also shows lack of a unified national strategy and weak coordination among relevant departments in order to uplift EVs. This absence of a coherent national EV policy is another major political barrier in its adoption (Kaveckis, 2017).

The research also stresses on the role of both financial and non-financial incentives to accelerate EV adoption. Direct compensation for EV purchase stands out as major factor in market growth. The evidence shows that subsidies reduce affordability barriers and it stimulates demand (Petrauskienė et al., 2021). Alongside financial support, non-financial incentives such as free parking and access to bus lanes also contribute to adoption (Kaveckis, 2017). Whereas, some studies describe government and political agendas as sceptical and conservative toward EV promotion. In such contexts, policymakers sometimes view EVs as a preference of wealthier groups rather than a national priority (Raslavičius et al., 2015).

The next point of analysis in this literature review covers infrastructure and technical barriers. Both countries are facing scarcities in charging infrastructure, and these are major obstacles in EVs adoption.

Pakistan is facing a severe shortage of public charging infrastructure for EVs. This acts as a major deterrent for potential buyers. Research identifies this as an infrastructure gap. This country has no public charging facility for electric two-wheelers or four-wheelers (Shakeel, 2022b). The research also emphasis that EV adoption also depends on easy access to charging infrastructure (M. A. Khan et al., 2022).

Lithuania also faces limits in charging infrastructure. The researchers viewed this limited charging access as main technical barrier to EV adoption (Kaveckis, 2017). In this context, studies also raise concern about grid pressure and price volatility which is linked to wider EV adoption. Evidence suggests that even moderate EV numbers could strain electricity system, and this results in wholesale price increases which reaches up to 19.3% during winter peak periods. Then beyond grid issues, research also notes several technical constraints. Many EV models provide limited driving range. This strengthens earlier discussed concern about daily practicality. Studies also point that there is a weak collaboration among universities, research institutions, and municipalities, and this also slows progress in EV-related technological development (Gesevičius et al., 2021)

The next attention is on cultural and psychological factors. Psychological and cultural perspectives also shape adoption of EVs.

In Pakistan, cultural values such as collectivism and social norms also influence consumer attitudes. Research which uses Hofstede's cultural dimensions shows that cultural values also influence views on sustainable mobility. The collectivism places group welfare above personal gain. The long-term propensity reflects focus on future benefit and not on the immediate reward. Yet these dimensions show positive links with consumer behaviours toward adoption of hybrid vehicles (Sharif et al., 2021). The research also sheds light on social influence, especially subjective norms. They are core element in making of EV adoption intentions (Shakeel, 2022b).

In Lithuania, the key psychological factors include low public awareness and a conservative consumer mindset. Research identifies that this prevailing public attitudes is also a barrier to EV adoption (Kaveckis, 2017). Studies also describe political climate and consumer culture as conservative, which has slowed acceptance of new technologies such as EVs (Raslavičius et al., 2015). This conservatism appears mostl as preference for used internal combustion engine vehicles, which consumers view as familiar and economically practical (Kaveckis, 2017)

In summary, the perceived value of EVs differs between Pakistan and Lithuania due to various socioeconomic and policy reasons. In Pakistan, the adoption of EV is mainly activated due to the prospect of direct economic improvement, mainly among lower-income commercial drivers, for the reason of savings on fuel and maintenance. The need to tackle acute environmental health problems, such as urban air pollution, also shapes value perceptions. Whereas, in Lithuania, consumers assess EVs through a long-term cost–benefit lens. They pay more focus on the total cost of ownership over the lifespan of an EV. There the adoption depends on the availability of government subsidies and on wider macroeconomic factors. These are reliance on imported vehicles and concerns about grid stability. This above referred comparison shows that the drivers of perceived value reflect not only on environmental priorities but also on the cultural, economic, and infrastructural conditions of each market.

2.3. Application of the Theory of Consumption Values and Conceptual Model Development

Theoretical foundation: application of the theory of consumption values to electric vehicle adoption

The Theory of Consumption Values (TCV) was introduced by Sheth, Newman, and Gross in the early 1990s (Sheth et al., 1991). It provides a multi-dimensional framework which is crucial to understand the consumer motivation and choice behaviour. This theory is also important to comprehend complex and sustainable products like EVs (Mohd Noor et al., 2025). This is basically a marketing theory. This theory sheds insight into the motivation for consumption behaviour of consumers through consumption values. This theory specifically seeks to answer questions like: why consumers choose buy or not buy (or to use or not to use) a specific product (Gupta et al., 2025). The TCV works on an assumption that consumer buying choice is a function of various consumption values (Amin & Tarun, 2020). And the consumption value is described as the degree to which the level of consumer need is met by the total evaluation of net utility of consumers or to the satisfaction which is related to a product after its purchase (Gupta et al., 2025). The TCV provides five core values which shape consumer decision-making: 1) functional value (FV), 2) conditional value (CV), 3) social value (SV), 4) emotional value (EM), and 5) epistemic value (EP) (S. N. Khan & Mohsin, 2017).

The FV is that perceived usefulness which a consumer gains from a product or service on the basis of how it performs. It reflects the quality, physical performance, reliability, and overall ability of the product. This also shows that whether the product meets with the consumer’s practical or functional needs (Pauwels Delassus & Mogos Descotes, 2012). Further, the FV is measured on various attributes such as price, quality, maintenance, performance, durability, and dependability (Ali et al., 2019). In the context of EVs, these

aspects like functionality, utility, or advantages which are obtained from features of EVs are the FV (L. Han et al., 2017). Whereas, the CV refers to that perceived usefulness of a product or service which a consumer has in a specific situation or set of circumstances (H.-Y. Wang et al., 2013). One product gains this value for the reason that the existence of physical or social contingencies raises the functional or social value (Mohd Noor et al., 2025). On the other hand, the SV refers to the perceived usefulness of a consumer gains from the product or services for the reason that it associates with certain social groups (L. Han et al., 2017). This value involves social well-being which is attained when a person purchases a product which is associated with their social group(s), social interests, cultural values, or societal norms (Kenter et al., 2015). Likewise, the SV also relates to some extent to a product or service in the context of its helps which an individual maintain or enhance in his social self-image (Sweeney & Soutar, 2001). Then comes the EV which refers to the perceived usefulness of a consumer gains from a product or service on the basis of its ability which evoke feelings or emotional responses (Asshidin et al., 2016). This value represents the satisfaction of emotions or feelings which are generated from purchasing or experiencing a product. For instance the pride, desire, awe, or contentment (Phoon et al., 2024). Epistemic value also refers to the perceived usefulness that one consumer gains from a product or service due to its ability that stimulate curiosity. This value covers new experiences, or satisfaction of a desire for knowledge (Sánchez-Fernández & Iniesta-Bonillo, 2007). This value is found when a consumer encounter with a new product and is curious about its new appearance, function, or quality. This stimulates a desire in him to acquire more knowledge about the product (Zailani et al., 2019).

The TCV framework has also been applied in study EV adoption (K. C. H. Lee et al., 2025). This theory is appropriate for EV adoption for the reason that the decision of consumers often involves economic and functional evaluations, besides social and emotional attachments (Mohd Noor et al., 2025). In the context of EVs, FV include monetary value (e.g., price, cost, financial incentives, lower fuel costs), PV (e.g., quality, reliability, driving range, charging time), and CV (e.g., time savings, reserved parking, access to bus lanes). Non-functional values covers EV and SV, and epistemic value (Schuitema et al., 2013; Sheth et al., 1991; Sweeney & Soutar, 2001). Further, in another study, FV were found to have direct effects on intentions of consumers in EVs. Specifically, monetary value and performance value shows to be positively influencing these intentions. The emotional value, social identity value, social responsibility value, and epistemic value also shows to be positively affecting consumers' attitudes in their intentions to purchase EVs (L. Han et al., 2017). For instance, in one study conducted in Malaysia found that functional, conditional, and epistemic values have substantial influence on willingness of consumers to purchase EVs (K. C. H. Lee et al., 2025).

Moreover, the perceived value is that value which covers consumer's implicit view about price and quality (Phoon et al., 2024), but which is not restricted to practical facets such as quality and price (Sheth et al., 1991), and which covers consumer's overall assessment about the utility of a product or service on the basis of their perceptions about what is received and what is given (Schuitema et al., 2013). Here the question arises, why this is relevant in this study. The answer is that it helps to examine consumer behaviour towards complex products which is an EV.

TCV provides a multidimensional framework through which researcher can capture the functional, social, emotional, novelty, besides conditional values which are attached with (Sheth et al., 1991). This is the very reason that EV adoption requires a high-involvement decision which involves economic and utilitarian factors (e.g., cost, performance), social factors (e.g., status), emotional factors (e.g., environmental pride), and contextual factors (e.g., subsidies) (Mohd Noor et al., 2025). In this context, the TCV provides conceptual framework to understand the main reasons behind consumer decisions through their perceived values (Mohd Noor et al., 2025; Sheth et al., 1991; Xu et al., 2024).

The input variables in this study align with the core dimensions of the TCV and highlight the functional and social aspects of an EV adoption.

Table 1

Mapping Study Variables with TCV Dimensions

Variable	TCV Value Dimension	Description
Battery Life /Range Anxiety	**Functional Value (FV)**	FV is the perceived utility from the physical performance, utilitarian aspects, quality, and dependability of a product (Tanrikulu, 2021). In EV studies, FV includes performance, price and convenience value, Range anxiety specifically relates to performance and utility (L. Han et al., 2017).
Symbolism	**Social Value (SV)**	SV is the perceived utility gained from a product association with specific social groups and its capacity to maintain one's social self-image or reputation. Symbolism in EVs relates to social signalling (status) and improving how one is perceived by others. (L.

		Han et al., 2017; Mohd Noor et al., 2025; Tanrikulu, 2021)
Battery Recycling	**Conditional/Environmental Value**	Though not a standard TCV dimension, yet environmental concern sometimes drives consumption decisions and is incorporated into extensions of TCV. This concern can be covered under Conditional Value (CV), which arises from satisfaction generated when following situational influences, such as environmental threats or government regulations, or related concepts like Social Value (S. N. Khan & Mohsin, 2017; Phoon et al., 2024).

Conceptual framework of the study

The conceptual framework of this study is developed with an aim to illustrate how main factors, which have been obtained from both the literature review and the TCV, collectively shape the perceived value of EVs and influence consumer purchase intentions in Pakistan and Lithuania. This framework amalgamates four core dimensions that have been emerged in above referred studies as main determinants in the adoption EVs: 1) battery life and cost, 2) battery recycling and environmental responsibility, 3) range anxiety, and 4) social or symbolic value.

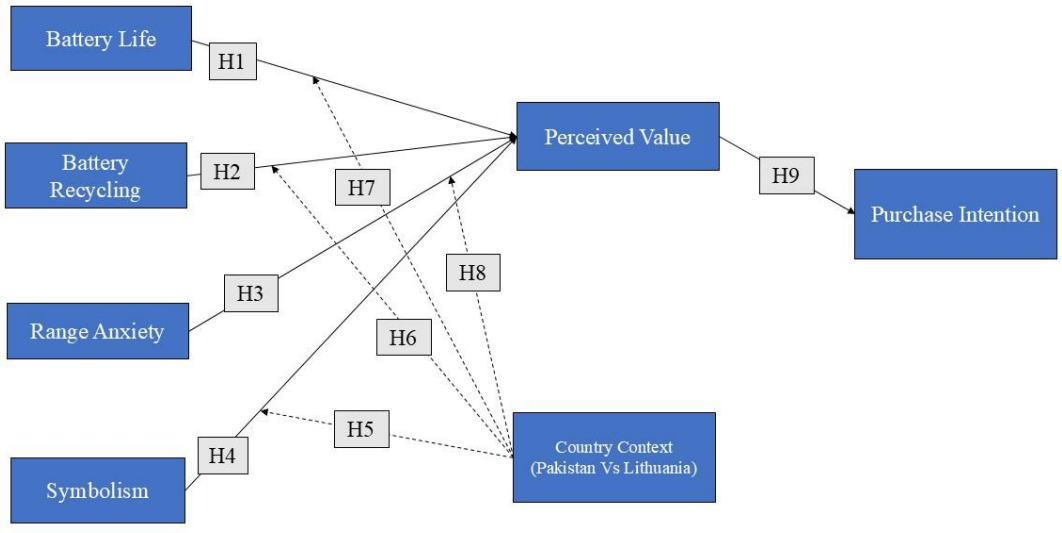
These four paradigms represent distinct value dimensions which are aligned with TCV. Battery life and cost covers the *functional value*. This captures the utilitarian and performance-related aspects which influence consumer evaluations about EVs reliability, long-term cost savings, and durability. Battery recycling and sustainability awareness deals with *conditional or environmental value*. This expressed when consumers purchasing decisions are shaped through ecological considerations, government policies, and situational pressures about environmental protection. Then the Range anxiety, this value corresponds to *functional and psychological value*. It represents the perceived risks, uncertainties, and emotional discomfort which are associated with limited driving range and insufficient charging infrastructure for consumers. Finally, symbolism and social value which reflects *social value*. This value covers the extent to which ownership of an EV deals with self-image, identity image, social prestige, and conformity to social norms.

In accordance with TCV, this model assumes that each of these four dimensions have influence on perceived value, which serves as a mediating variable, in this study, in order to synthesizes overall assessment of benesuits of consumers relating to sacrifices. Perceived value then predicts purchase intention, which represents the likelihood which consumers will choose an EV in comparison of conventional alternatives. Through structuring this model in this way, this framework acknowledges that EV adoption is not controlled by any single factor yet it is the outcome of a multidimensional evaluation process that depends economic, environmental, psychological, and social considerations simultaneously.

The framework is also designed with an aim to capture potentials in both countries and the differences. On the basis of different socioeconomic, cultural, and infrastructural contexts of Pakistan and Lithuania, this model allows to make comparative analysis through multi-group structural equation modelling (SEM) methodology. This approach enables, the researchers, to make an assessment of whether the strength or significance of each dimension differs between the two countries, and thereby, this study provides comprehensive insights into how contextual conditions do shape perceived value formations.

Figure 1

Conceptual Framework of the Study



This diagram shows the hypothesized relationships between the four independent variables, which are Battery Life and Cost, Battery Recycling, Range Anxiety, and Symbolism, with the mediating variable which is Perceived Value. The arrows in the figure extend from

each independent variable to Perceived Value. This indicates direct effects. Perceived Value is then linked to Purchase Intention, and this represents its role as a mediator in the model. This framework is designed with an aim to to make cross-country comparison between Pakistan and Lithuania regarding the subject.

3. APPROACH TO ANALYSE ELECTRIC VEHICLE PERCEIVED VALUE

3.1. RESEARCH DESIGN AND MEASUREMENT OF PERCEIVED VALUE

The research uses empirical study with an aim to test the relationships, which is presented in the proposed conceptual framework, which connects different perceived value factors with purchase intentions of EVs. This study examines how do battery life, its recycling, range anxiety, and symbolism influence perceived value for consumers, and how this perceived value affects their intention to purchase an EV. In addition, context of two countries Pakistan and Lithuania are used as a moderator with an aim to identify the influence of cultural, economic, and environmental differences in these relationships. Moreover, the analysis conducted in this chapter finds that the empirical analysis directly supports the main aim of this thesis which is to examine the impact of perceived value on purchase decisions of EVs in Pakistan and Lithuania. Through this analysis, this study seeks to understand which value-related factors are more important in each country and how the perceived value impacts consumer behaviour toward adoption of EVs.

With regards to the research approach and design, this study applies a quantitative research approach for the reason that it focuses on collection of numerical data for the purpose of testing one specific hypotheses statistically. The quantitative method further allows identification of patterns and relationships. It also establishes connections between variables such as perceived value and purchase intentions. Further, in this research the data is collected from participants only once. This is done with an aim to cover current perceptions and attitudes toward EVs in both countries. This design also helps to compare the differences and similarities between Pakistani and Lithuanian consumers with regards to EVs. In addition, this study also uses a comparative design. Attempt is made to analyse two markets which are different in their economic development, cultural norms, and infrastructure regarding EVs. This comparison of Pakistan (which is a developing country) with Lithuania (which is a developed EU market) helps to understand the importance of perceived value dimensions which is shown to be changing in both countries.

Table 2

Definition of variables (ivs, mediator, moderator, dv)

Variable Type	Variable	Definition	Theoretical Link
Independent Variable (IV1)	**Battery Life**	Refers to the expected duration and performance capacity of an EV's battery before needing replacement. Longer battery life	Economic Value (TCV)

		enhances perceived reliability and economic value.	
Independent Variable (IV2)	**Battery Recycling**	Represents the environmental sustainability and recyclability of EV batteries, influencing consumers' environmental consciousness and green value perception.	Environmental Value (TCV)
Independent Variable (IV3)	**Range Anxiety**	Describes the consumer's fear of running out of charge before reaching a destination. Higher range anxiety lowers perceived convenience and emotional comfort.	Psychological Value (TCV)
Independent Variable (IV4)	**Symbolism**	Refers to the social meaning and identity which is linked to electric vehicle ownership, including modernity, innovation, and environmental responsibility.	Social Value (TCV)
Mediator	**Perceived Value**	The overall assessment consumers make after evaluating the benesuits and costs of owning an EV. It integrates functional, emotional, social, and environmental values.	Central construct linking TCV
Moderator	**Country Context (Pakistan vs. Lithuania)**	Represents country-wise differences that may shape how perceived value factors influence consumer attitudes.	Cultural/Contextual Influence
Dependent Variable (DV)	**Purchase Intention**	The likelihood that a consumer will consider for purchasing an EV in the future. It is shaped by the perceived value and moderated by the cultural context.	Behavioural Intention

Hypotheses development

Battery life and perceived value (h1)

H1: Battery Life has a positive effect on Perceived Value

Battery life is one of the most important functional attributes which influence evaluation of consumers about EVs. It represents the expected performance and longevity of the vehicle and it directly contributes in the perceived functional value for consumers (Bednarz et al., 2023b). The cost of battery replacement is also one of the major financial concern. This too affects the TCO and the potential resale value of Evs for consumers (Dua et al., 2024). However, when consumers have access to accurate information about battery performance and about longevity of their EV, then it enhances their confidence and trust in the new EV technology, and thus it helps them to make their purchase intentions (Xue et al., 2023). In one study conducted by (Bednarz et al., 2023b) they found that for Polish consumers, functional factors, for instance driving range and battery life, were the key determinants to make EV purchase intentions. Similarly (Shakeel, 2022b) found that the perceptions of product attributes, which covers battery performance, substantialy affects consumer purchase decisions and their willingness to pay its cost.

Battery recycling and perceived value (h2)

H2: Battery Recycling has a positive effect on Perceived Value.

The next one is battery recycling. This also plays an important role to shape consumer's perceptions about the value and sustainability of an EV, taken as a whole. Although direct empirical modelling between battery recycling and the perceived value is still limited, however, the existing evidence provides a positive link between them through environmental performance and consumer satisfaction. As per the findings of (Amusa et al., 2024) the proper management and recycling of batteries improve the environmental credentials of Evs. This perspective again reinforces their image as sustainable and responsible products in this modern age. The consumers also exhibit a preference to adopt eco-friendly products if they have a belief that they are making a positive contribution in environmental conservation (Upadhyay & Kamble, 2023). Furthermore, studies on green consumer behaviour also show that environmental awareness also effect perceived value and purchase intentions of consumers (H. He et al., 2021). Moreover, the environmentally conscious consumers are encouraged by means of pro-environmental values. They obtain psychological satisfaction and a sense of contribution when they purchase sustainable products. This sense of moral fulfillment that their purchase also supports environmental conservation enhances their perceived value about the EV and it increases their willingness to adopt it (Upadhyay & Kamble, 2023).

Range anxiety and perceived value (h3)

H3: Range Anxiety has a positive effect on Perceived Value.

According to one study conducted by Bednarz et al., (2023b) range anxiety is also one of the powerful predictor in making adoption intention toward technological innovations. The consumer have this fear which arises from the limited and uncertain vehicle range that occurs when their battery charge depletes, especially during long journeys (Negash et al., 2024). This issue is identified in the research as a substantial barrier in the way of EV adoption (Dua et al., 2024). Likewise, in one study which was conducted on Polish consumers, it was found that among internal factors the driving range is the first priority which consumers had in their minds in purchasing the EV (Bednarz et al., 2023b). However, when consumers perceive the risks of EVs, then they tend to doubt in the overall usefulness of it (S. Wang et al., 2018a). Similarly, Dua et al., (2024) in their work found that the presence of driving range anxiety is a classified barrier that affects the overall satisfaction of consumer about the EV owners and then it substantially influences their likelihood of purchase. Additionally, the dissatisfaction which directly translates into a negative evaluation of the ownership experience also undermines the perceived value of EVs.

Symbolism and perceived value (h4)

H4: Symbolism has a positive effect on Perceived Value

In one study about EV users it was found that self-expressive value also affects significantly and positively to the perceived quality of the brand (Hasan & Simsekoglu, 2020). It was also suggested that the development of perceived value is impacted because of psychological aspects which are related to consumers' view about EVs as a means to express their personality. This aspect was highlighted by Austmann & Vigne, (2021) in their work and they explained that the symbolic attributes are recognized ones and they acts as major factors which influence the evaluation and adoption of EVs. Additionally, in another study, which was about purchasing an EV, it has been discussed that consumers show they are socially responsible when they purchase an EV and this act amounts to reaping the psychological benesuits of Evs for them (X.-W. Wang et al., 2021b).

Moderating effect of country context on battery life and perceived value (h5)

H5:Country Context (Pakistan vs Lithuania) moderates the relationship between Battery Life and Perceived Value.

The importance of battery life differs in both countries. There are various reasons for this such as the infrastructure and usage patterns. In this context, the travelers in Lahore, Pakistan during one study has revealed their willingness to purchase an EV if the charging batteries have a long life and if the maintenance and battery costs are less than fossil fuel vehicles costs (Javid et al., 2022). This shows that the longer battery life is important for consumers in order to reduce high replacement cost anxiety and to ensure a reliable, profitable

economic return (M. A. Khan et al., 2022). On the other hand, in Lithuania, in one study the consumers also tend to value EVs if they can maintain a long battery lifecycle (Peleckienė & Peleckis, 2024). For instance, in another study it has been shown that assumption that a battery lifespan is around 150,000 km enhances the perceived reliability and overall value of EVs in comparative analyses (Petrauskienė et al., 2021). Therefore, longer battery life is an essential element to overcome the obstacle of the expensive inbuilt battery system in order to maintain competitiveness against cheaper ICEVs and to secure the substantial savings which incurred during the operational stage (Gesevičius et al., 2021).

Moderating effect of country context on battery recycling and perceived value (h6)

H6: Country Context (Pakistan vs Lithuania) moderates the relationship between Battery Recycling and Perceived Value.

The relationship between battery recycling and the perceived value of EVs is moderated differently in Pakistan and Lithuania. This for the reason due to respective maturity of each country EV markets, their economic priorities, and their own regulatory environmental concerns and waste management systems. As a member of the European Union (EU), the Lithuania's EV market and waste management system operate under well-established rules which covers battery and vehicle recycling as well. This regulatory act of the Lithuania's government not only make sures the environmental accountability but it also shapes consumers perceptions about the value of EVs. Lithuanian consumers, who are generally considered to be more environmental conscious and well aware about the sustainability policies, are more connected with efficient battery recycling systems and with higher environmental value of EV ownership. Consequently, their purchase intentions are backed by their recognition that battery end-of-life (EoL) management system also contributes in tangible environmental benesuits (Petrauskienė et al., 2022).

On the other hand, in Pakistan, the battery recycling and localized production are viewed through an economic lens. The policy efforts are seemed to be focused on reduction of the high import bill and to lower overall EV costs. The initiatives are mostly aimed to improve the economic feasibility of EV ownership. However, the relationship between battery recycling and perceived value is also moderated due to these national policies and recycling infrastructure. Here, when battery management systems are efficient, then there is good chance in enhancement of Cost Satisfaction (CS) through reduction in long-term maintenance and replacement costs, at the same time to lower perceived Functional Barriers (FB) which are associated with ownership. However, there is limited recycling infrastructure and there is low consumer awareness which further weakens this relationship, and this diminishes the perceived environmental and functional benesuits of EVs (M. A. Khan et al., 2022).

Moderating effect of country context on range anxiety and perceived value (h7)

H7: Country Context (Pakistan vs Lithuania) moderates the relationship between Range Anxiety and Perceived Value

The range Anxiety is defined as the form of a psychological stress which is caused due to limitations of EVs, and it includes low battery range (Hasan, 2021). This as perceived risk negatively affects the perceived usefulness and attitude (S. Wang et al., 2018a). In this context, one evidence which is obtained about Pakistan regarded this as a major barrier in adoption of EVs particularly due to range anxiety and battery life; these are the drawbacks and challenges in adoption of EVs in Pakistan (Masood et al., 2024). Fruther, the Consumers' evaluation about the product attributes, such as battery life and safety also influences their willingness to purchase an EV (Shakeel, 2022b). Similarly in Lithuania, the consumers also connect EVs with negative functional perceptions such as a lower battery range and long recharging time. Furthermore, one researcher also mentioned that being worried about running out of a charge at the time of driving an EV is identified as one of the perceived functional barrier for potential buyers in EVs markets (Hasan, 2021).

Moderating effect of country context on symbolism and perceived value (h8)

H8: Country Context (Pakistan vs Lithuania) moderates the relationship between Symbolism and Perceived Value

The social and symbolic meaning of ownership of an EV is also different in both cultures. In the case of Pakistan, the social status factors such as masculinity and social influence do not appear to have a major impact on purchase intentions of consumers (Sharif et al., 2021), however, in Lithuania, a one impactful reinforcing effect is observed which is the policy structures which create an “elitism effect,” here the the perceived value of EV becomes linked to social status and affluence, and thus it diminishes the impact of the high initial purchase price (Gesevičius et al., 2021).

Perceived value and purchase intention (h9)

H9: Perceived Value has a positive effect on Purchase Intention.

According to the TCV, purchase intentions of consumers are shaped due to the overall value what they perceive from their products (Sheth et al., 1991). When they perceive higher value from EVs, then they are more likely to intend to purchase them. In this regard, prior studies also show that consumer perceived value have a positive influence on purchase intentions (Hasan, 2021). The study on EVs also confirms that perceived value components influence the intentions of consumers to purchase or adopt EVs (S. Wang et al., 2018a).

3.2. Data collection method and research instruments

Data collection method

This study collects data through an online structured questionnaire which is created through using Google Forms. This method enables efficient access to participants from both countries the Pakistan and Lithuania. It allows to make a direct comparison between two distinct markets. The online data collection approach also saves time and it is cost efficient and at the same time it maintains a good wide geographical reach. In earlier studies (Shakeel, 2022b) (Banka et al., 2025) (Javid et al., 2022) (Z. He et al., 2022b) (Yıldız et al., 2024) (Rahman et al., 2025) (Hasan, 2021) (Hartono et al., 2024) (Okada et al., 2019) (S. S. Lee et al., 2023) the researchers have examined the drivers of perceived value in EVs through commonly used survey-based research methods.

Further, during data collection the questionnaire link was circulated through various social media platforms, it includes university mailing lists, and technology-related groups available in the Facebook, Linkedin, WhatsApp, etc. with an aim to reach maximum people who are familiar with EVs in both countries. In the survey, both the EV users and potential buyers have participated and thereby it is attempted to capture a variety of opinions on the subject of EV and perceived value. Yet the participation was voluntary and anonymous keeping in due regards to the ethical aspect of the research. All participants receive have been shared information about the research purpose and confidentiality is ensured. The questionnaire was prepared in English in order to make language accuracy.

Research instruments

This study uses a structured, self-administered questionnaire as its main research instrument. This method covers the quantitative design of this study and it also enables direct measurement of relationships between the research variables. Following prior studies conducted earlier on the similar issues (Shakeel, 2022b) (Rahman et al., 2025) (Moon, 2021) (Chaturvedi et al., 2022) (Javid et al., 2022) (Z. He et al., 2022b) (Bednarz et al., 2023b) all questions are designed to be closed-ended and the seven-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree) is used with an aim to capture respondent attitudes and perceptions at maximum level.

Measurement of constructs

Table 3

Measurement of constructs

Code	Full Construct Name	Meaning / What It Measures

RA	Range Anxiety	Measures users' fear of running out of battery while driving an EV.
BRC	Battery Recycling	Measures perceptions and attitudes toward recycling EV batteries.
BL	Battery Life	Measures users' evaluation of EV battery lifespan and reliability.
SYM	Symbolism (Perceived Symbolic Value)	Measures social image, identity expression, pride, and status gained from using EVs.
PI	Purchase Intention	Measures willingness and likelihood to buy or recommend an EV.
PV	Perceived Value	Measures overall value evaluation of EVs: price, performance, range, charging, service, battery, etc.

Table 4

Construct Measurement Items, Measurement Scales, and References

Code	Description	Measurement	Reference
RA	• I would often worry about running out of battery charge while driving an EV. • I would worry about finding places to charge an EV in new areas. • I believe limited driving range is a major disadvantage of EVs.	7-point Likert-type scale	(Gore et al., 2024)
BRC	• Recycling EV batteries helps protect the environment. • Recycling EV batteries helps reduce waste and environmental harm. • Recycling EV batteries helps create a better environment for future generations. • Proper EV battery recycling helps prevent unsafe disposal and accidents. • Information about environmentally safe battery recycling increases my trust in EVs.	7-point Likert-type scale	(Lizin et al., 2017)
BL	• Knowing the expected lifespan of an EV battery is important to me. • A long battery lifespan increases my confidence in buying an EV. • Manufacturer warranty on battery life increases my trust in EVs. • I am concerned about EV battery depreciation over time. • I am concerned that the battery might lose value due to advancing EV technologies.	7-point Likert-type scale	(Gore et al., 2024)

SYM	• Driving an EV makes me feel proud. • Driving an EV reflects my values and lifestyle. • Driving an EV enhances my social status.	7-point Likert-type scale	(Hasudungan & Saragih, 2024)
	• EVs represent a modern and innovative spirit.	7-point Likert-type scale	(H. N. Lee et al., 2019)
	• Driving an EV expresses my social status and my environmentally friendly values to others.	7-point Likert-type scale	(Krishnan & Sreekumar, 2023)
PI	• I am willing to purchase an electric vehicle (EV) within the next two years.	7-point Likert-type scale	(M. Jiang et al., 2025b)
	• I would still consider buying an environmentally friendly EV even if its quality is slightly lower than that of a conventional car.	7-point Likert-type scale	(Klabi & Binzafrah, 2021)
	• I would recommend electric vehicles to my friends or family members.	7-point Likert-type scale	(S. Wang et al., 2018b)
PV	• The price of electric vehicles is reasonable for the value they provide. • The cost of electricity needed to charge an EV is affordable. • The driving range of electric vehicles meets my daily transportation needs. • There are enough charging stations available to make using an EV convenient. • I believe EV batteries last long enough to be reliable over many years. • I think electric vehicles retain their value well over time.	7-point Likert-type scale	(Bednarz et al., 2023b)

3.3. Research sample size and structure

This part of the study explains how the sample was chosen and how the data was collected. This study focuses on adults who are 18 years old or older with a perception that they can make their own decisions to purchase products. Since in this research comparison between Lithuania and Pakistan is being conducted, therefore, people from both countries were invited to join. However, there was no condition for the participants to own an EV. Both EV owners and non-owners were allowed to answer and participate in the survey.

A sample size of 218 participants was determined on the basis of a review of best practices in marketing research. The supporting evidence is presented in the table below:

Table 5

Overview of Questionnaire Types, Sampling Methods, and Sample Sizes in Previous Studies

Author(s)	Questionnaire Type	Sampling	Participants
(Zarazua de Rubens, 2019)	Offline survey	Targeted experts	227
(Chen et al., 2025b)	Online survey	Random social media	173
(Wolf & Kovács, 2024)	Online survey	University students	108
(Austmann & Vigne, 2021)	Online survey	Street intercept	308
(Dong, 2025)	Online survey	Dealership visitors	112
(Tu & Yang, 2019)	Online survey	Coastal residents	300
(Tsai et al., 2025)	Online survey	Convenience, Taiwan	203
(Hartono et al., 2024)	Online survey	General population	140
(S. Wang et al., 2018b)	Online survey	Random survey	320
(Butt & Singh, 2023)	Online survey	Automobile user	203

4. EMPIRICAL RESULTS OF VALUE PERCEPTIONS AND PURCHASE INTENTIONS

4.1. Overview of participants and basic characteristics

This study collected 218 valid responses. No demographic or screening data were missing. The complete dataset supports reliable statistical analysis. The descriptive results present the basic characteristics of participants, their familiarity with electric vehicles, and their exposure to the use of EV. These details provide basic context for the behavioural findings which are discussed later in this chapter. Further, the sample comprises on 61.5% male and 35.8% female with 2.8% who did not disclose their gender. This data shows a reasonable level of gender diversity in this research. The inclusion of all gender groups enables the analysis of the broader relevance of the findings.

Moreover, the data regarding age differences between the participants shows that 47.2% fall within the 25 to 34 years of age group, which is followed by 30.7% in the 18 to 24 years of age group. Participants who are aged 35 to 44 years old are 17.0% in the sample, whereas, the 45 to 54 years old and 55+ in the age represent 4.1% and 0.9%, respectively. The younger adults form the majority of the sample. This indicates that the views covered in this study mainly are of individuals who are in early professional or personal life stages. This age of participants show more openness towards new technologies besides having interest in sustainability issues.

Moreover, the data regarding country distribution shows that 55.0% of participants live in Pakistan and 45.0% in Lithuania. This almost balanced split suits the aims of the study, which is to compare perceived value and purchase intentions between two national contexts. The sample is meaningful for cross-country analysis which is done later in this chapter.

Likewise, the exposure to an EV was measured through the question, *“Have you ever driven or ridden in an electric vehicle?”.* A large share of participants (80.7%) answered in yes that they have prior experience. Only 19.3% had never used an EV. This high level of exposure improves the analysis of this study because the participants are in better position to evaluate their issues about range anxiety, battery life, battery recycling, symbolism, and perceived value, etc. Furthermore, the participants also rated their general familiarity with EVs on a five-point scale, which is shared with them in the questionnaire. In response, most of them selected higher levels: 32.1% selected level 4, and 28.9% selected level 5. Only 3.2% selected the lowest familiarity level. These results suggest that the sample which was collected includes many participants who have already understandnigs about attributes of EVs and their broader sustainability themes. Their responses on value and purchase intentions, therefore, shows

that their answers are informed opinions rather than guesses. Therefore, the descriptive results show that the dataset is suitable for the analyses which is conducted later in this chapter. The demographic distribution, good EV exposure, and high familiarity levels have created a solid base for reliability testing, correlation analysis, regression modelling, and country-wise comparisons. These conditions support the hypothesis testing in the subsequent sections of this chapter.

Table 6

Descriptive Statistics for Demographics, Vehicle Ownership, and EV Exposure

Statistics of the search							
		Gender	Age Group	Country of Residence	Have you ever driven or ridden in an electric vehicle?	How familiar are you with electric vehicles?	Do you currently own a vehicle?
N	Valid	218	218	218	218	218	218
	Missing	0	0	0	0	0	0
Mode		1.00	2.00	1.00	1.00	4.00	3.00

Table 7

Gender Distribution of Participants

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	134	61.5	61.5	61.5
	Female	78	35.8	35.8	97.2
	Not to Say	6	2.8	2.8	100.0
	Total	218	100.0	100.0	

Table 8

Age Distribution of Participants

Age Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	67	30.7	30.7	30.7
	25-34	103	47.2	47.2	78.0
	35-44	37	17.0	17.0	95.0
	45-54	9	4.1	4.1	99.1
	55+	2	.9	.9	100.0
	Total	218	100.0	100.0	

Table 9

Country Distribution of Participants

Country of Residence					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pakistan	120	55.0	55.0	55.0
	Lithuania	98	45.0	45.0	100.0
	Total	218	100.0	100.0	

Table 10

Participants' Experience with Electric Vehicle Use

Have you ever driven or ridden in an electric vehicle?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	176	80.7	80.7	80.7
	No	42	19.3	19.3	100.0
	Total	218	100.0	100.0	

Table 11

Level of Familiarity with Electric Vehicles

How familiar are you with electric vehicles?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	7	3.2	3.2	3.2
	2.00	18	8.3	8.3	11.5
	3.00	60	27.5	27.5	39.0
	4.00	70	32.1	32.1	71.1
	5.00	63	28.9	28.9	100.0
	Total	218	100.0	100.0	

Table 12

Vehicle Ownership Status of Participants

Do you currently own a vehicle?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, EV	46	21.1	21.1	21.1
	No	52	23.9	23.9	45.0
	Yes, Petrol/diesel	120	55.0	55.0	100.0
	Total	218	100.0	100.0	

4.2. Reliability of the Study Constructs (Battery Factors, Range Anxiety, Symbolism, Perceived Value, and Purchase Intention)

Reliability of the Range Anxiety Scale

The Range Anxiety scale has included three items in it in order to measure the concerns about battery depletion, charging availability issues, and limited driving range. All 218 cases were valid, and no responses were removed. The scale has showed strong internal reliability, with a Cronbach's Alpha of 0.839. This is above the accepted threshold for behavioural research. Further, the item means ranged from 5.48 to 5.90. This indicates that participants expressed high levels of concern about EV range and charging limitations issues. The corrected item-total correlations were all above 0.63. This shows that each item has contribution in the scale. The "Alpha if item deleted" values also confirmed that no item has weakened the construct. By removing any item there would not be any improvements in the reliability, so all three items were retained.

Moreover, the scale mean was 17.13 with a standard deviation of 3.88, and this shows that there is moderate variation among participants, however, there is a consistent and strong pattern of range-related concern. The results confirm that the three items work well together and they provide a dependable measure of range anxiety for later analyses in this thesis.

Table 13

Case Processing Summary for Range Anxiety Scale

Case Processing Summary			
		N	%
Cases	Valid	218	100.0
	Excluded[a]	0	.0
	Total	218	100.0
a. Listwise deletion based on all variables in the procedure.			

Table 14

Reliability Analysis of the Range Anxiety Scale

Reliability Statistics	
Cronbach's Alpha	N of Items
.839	3

Table 15

Descriptive Statistics of Range Anxiety Measurement Items

Item Statistics			
	Mean	Std. Deviation	N
I would often worry about running out of battery charge while driving an EV.	5.4817	1.56345	218
I would worry about finding places to charge an EV in new areas.	5.7477	1.56742	218
I believe limited driving range is a major disadvantage of EVs.	5.8991	1.31944	218

Table 16

Item–Total Correlation and Scale Reliability for Range Anxiety

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I would often worry about running out of battery charge while driving an EV.	11.6468	6.322	.801	.672
I would worry about finding places to charge an EV in new areas.	11.3807	6.956	.683	.797
I believe limited driving range is a major disadvantage of EVs.	11.2294	8.426	.639	.837

Table 17

Overall Scale Statistics for the Range Anxiety Construct

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
17.1284	15.062	3.88095	3

Reliability of the Battery Life Scale

The Battery Life scale is consisted on five items that are designed to measure views on battery lifespan, warranty trust, depreciation concerns, and the impact of technological change. All 218 responses were valid, and the reliability test produced a Cronbach's Alpha of 0.870. This value shows internal consistency with the suitability for further statistical analysis.

Further, the item means ranged from 5.38 to 6.10. This shows that participants have expressed their high interest in battery-related issues. This pattern shows that battery lifespan is an important factor in consumers judgements about EVs. The corrected item-total correlations were found solid for all items and it reached values above 0.62. Each item have contributed to the overall scale, and none of it weakened the construct. Moreover, the “Alpha if item deleted” values show that removing any item would not improve reliability. This ensures that all five items are fit together and they measure the same original perception of battery life. The full scale had a mean score of 29.31. The standard deviation is 5.34. The overall results show that the Battery Life scale is proved to be reliable one in this study. It also covers the consistent pattern of consumer concerns and expectations about EV battery performance. The construct is stable and the same is ready for use in later analyses of perceived value and purchase intention.

Table 18

Case Processing Summary for the Battery Life Scale

Case Processing Summary			
		N	%
Cases	Valid	218	100.0
	Excluded[a]	0	.0
	Total	218	100.0
a. Listwise deletion based on all variables in the procedure.			

Table 19

Reliability Analysis of the Battery Life Construct

Reliability Statistics	
Cronbach's Alpha	N of Items
.870	5

Table 20

Descriptive Statistics of Battery Life Measurement Items

Item Statistics			
	Mean	Std. Deviation	N
Battery lifespan refers to how long an EV battery lasts before it needs replacement	6.0229	1.20078	218
A long battery lifespan increases my confidence in buying an EV.	6.0963	1.21621	218

The manufacturer warranty on battery lifespan increases my trust in EVs	6.0596	1.13232	218
I am concerned about EV battery depreciation over time.	5.7523	1.39885	218
I am concerned that the battery might lose value due to advancing EV tech2logies.	5.3807	1.59116	218

Table 21

Item–Total Correlation and Scale Reliability for Battery Life

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Battery lifespan refers to how long an EV battery lasts before it needs replacement	23.2890	19.764	.689	.844
A long battery lifespan increases my confidence in buying an EV.	23.2156	19.165	.744	.832
The manufacturer's warranty on battery lifespan increases my trust in EVs	23.2523	19.876	.734	.836
I am concerned about EV battery depreciation over time.	23.5596	17.934	.732	.833
I am concerned that the battery might lose value due to advancing EV technologies.	23.9312	17.650	.627	.868

Table 22

Overall Scale Statistics for the Battery Life Construct

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
29.3119	28.566	5.34470	5

Reliability of the Battery Recycling Scale

The Battery Recycling scale has included five items with an aim to measure attitudes toward environmental protection, waste reduction, safety, and trust in EVs of consumers. All

218 responses were valid. The scale produced a Cronbach's Alpha of 0.888. This shows positive internal reliability. Further, the item means ranged from 5.80 to 6.10. This number shows that participants held some positive views about the importance of proper battery recycling in EVs matter. The corrected item–total correlations were solid for most items. The same has reached values above 0.70. The exception is to the final item, which showed a lower value of 0.53. Even with this value, the item still contributes to the construct and it is still within acceptable limits. Moreover, the "Alpha if item deleted" values also show that by removing any item there would not be any improvement in the overall reliability, although deleting the last item would raise the alpha to 0.911. Despite this increase, the item adds value through capturing trust in safe battery recycling, therefore, it is kept in the scale. The full construct had a mean of 30.13. The standard deviation is 4.88. This indicates moderate variation in responses. The overall results prove that the Battery Recycling scale is reliable one in this research. The items work together in order to capture the consistent view of participants about battery recycling within the context of EVs value.

Table 23

Case Processing Summary for the Battery Recycling Scale

Case Processing Summary			
		N	%
Cases	Valid	218	100.0
	Excluded[a]	0	.0
	Total	218	100.0
a. Listwise deletion based on all variables in the procedure.			

Table 24

Reliability Analysis of the Battery Recycling Construct

Reliability Statistics	
Cronbach's Alpha	N of Items
.888	5

Table 25

Descriptive Statistics of Battery Recycling Measurement Items

Item Statistics			
	Mean	Std. Deviation	N
Recycling EV batteries helps to protect the environment.	6.0550	1.22067	218
Recycling EV batteries helps reduce waste and environmental harm.	6.0826	1.12474	218

Recycling EV batteries helps create a better environment for future generations.	6.0917	1.11166	218
Proper EV battery recycling helps prevent unsafe disposal and accidents.	6.1009	1.15160	218
Information about environmentally safe battery recycling increases my trust in EVs.	5.8028	1.25635	218

Table 26

Item–Total Correlation and Scale Reliability for Battery Recycling

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Recycling EV batteries helps to protect the environment.	24.0780	14.957	.782	.851
Recycling EV batteries helps reduce waste and environmental harm.	24.0505	15.348	.819	.844
Recycling EV batteries helps create a better environment for future generations.	24.0413	15.256	.845	.839
Proper EV battery recycling helps prevent unsafe disposal and accidents.	24.0321	16.040	.701	.870
Information about environmentally safe battery recycling increases my trust in EVs.	24.3303	16.784	.531	.911

Table 27

Overall Scale Statistics for the Battery Recycling Construct

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
30.1330	23.830	4.88161	5

Reliability of the Symbolism Scale

The Symbolism scale has included five items in order to measure participants view point about EVs in terms of personal identity, lifestyle fit, social meaning, and modern image. All 218 responses were valid. The scale produced a Cronbach's Alpha of 0.934. This value shows very strong internal reliability. Further, the item means ranged from 4.57 to 5.44. This indicates positive views toward the symbolic and expressive value of EVs. The corrected item–total correlations were high for all items. It is ranged from 0.76 to 0.88. These values show that each item suits well with the construct in general. Moreover, the "Alpha if item deleted" values remained above 0.90 for all items. This shows that by removing any item there would not be any improvement in the scale. Each item contributes how the construct is measured. The full scale had a mean of 25.22. The standard deviation number is 7.45. The overall Symbolism scale shows to be highly reliable. The items work together to cover aspects of how EVs have expressed identity, social meaning, and modern values in the context of perceived value for participants.

Table 28

Case Processing Summary for the Symbolism Scale

Case Processing Summary			
		N	%
Cases	Valid	218	100.0
	Excluded[a]	0	.0
	Total	218	100.0
a. Listwise deletion based on all variables in the procedure.			

Table 29

Reliability Analysis of the Symbolism (Perceived Symbolic Value) Construct

Reliability Statistics	
Cronbach's Alpha	N of Items
.934	5

Table 30

Descriptive Statistics of Symbolism Measurement Items

Item Statistics			
	Mean	Std. Deviation	N
Driving an EV makes me feel proud.	5.0229	1.65850	218
Driving an EV reflects my values and lifestyle.	5.0367	1.68171	218

Driving an EV enhances my social status.	4.5734	1.95258	218
Driving an EV expresses my environmentally friendly values to others.	5.1514	1.63206	218
EVs represent a modern and in2vative spirit.	5.4404	1.41377	218

Table 31

Item–Total Correlation and Scale Reliability for Symbolism

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Driving an EV makes me feel proud.	20.2018	35.867	.854	.913
Driving an EV reflects my values and lifestyle.	20.1881	35.241	.877	.909
Driving an EV enhances my social status.	20.6514	32.883	.843	.918
Driving an EV expresses my environmentally friendly values to others.	20.0734	36.907	.807	.922
EVs represent a modern and in2vative spirit.	19.7844	39.884	.767	.930

Table 32

Overall Scale Statistics for the Symbolism Construct

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
25.2248	55.576	7.45493	5

Reliability of the Perceived Value Scale

The Perceived Value scale has included six items with an aim to cover views on EV pricing, charging costs, driving range, charging availability, battery reliability, and long-term value retention of participants. All 218 responses were valid. The scale produced a Cronbach's Alpha of 0.876, therefore, the number shows strong internal reliability. Further, the item means ranged from 4.61 to 5.62. This shows moderate to positive evaluations in all different value dimensions. The corrected item–total correlations are ranged from 0.55 to 0.81. All items have contributed to the scale in a meaningful way. The item on the daily driving range has showed the weakest correlation (0.55), but it still met acceptable standards and it is also aligned with

the construct. No item showed evidence to weaken the scale. Moreover, the “Alpha if item deleted” results also support keeping all six items. Through removing any item there would not be any improvement in the reliability, however, some deletions would reduce the alpha value. This shows that each item has measured an important aspect of participants views about the value of EVs. The scale had a mean number of 30.08 and a standard deviation number of 8.18. The overall results show that the Perceived Value scale is reliable one for this study. The items have worked together in order to reflect participants’ assessment on the economic and functional worth of EVs in this study.

Table 33

Case Processing Summary for the Perceived Value Scale

Case Processing Summary			
		N	%
Cases	Valid	218	100.0
	Excluded[a]	0	.0
	Total	218	100.0
a. Listwise deletion based on all variables in the procedure.			

Table 34

Reliability Analysis of the Perceived Value Construct

Reliability Statistics	
Cronbach's Alpha	N of Items
.876	6

Table 35

Descriptive Statistics of Perceived Value Measurement Items

Item Statistics			
	Mean	Std. Deviation	N
The price of electric vehicles is reasonable for the value they provide.	4.8578	1.77098	218
The cost of electricity needed to charge an EV is affordable.	5.0642	1.70267	218
The driving range of electric vehicles meets my daily transportation needs.	5.6193	1.33613	218
There are enough charging stations available to make using an EV convenient.	4.6101	2.00444	218

I believe EV batteries last long e2ugh to be reliable over many years.	5.1193	1.66683	218
I think electric vehicles retain their value well over time.	4.8073	1.85650	218

Table 36

Item–Total Correlation and Scale Reliability for Perceived Value

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
The price of electric vehicles is reasonable for the value they provide.	25.2202	45.951	.742	.844
The cost of electricity needed to charge an EV is affordable.	25.0138	49.239	.618	.865
The driving range of electric vehicles meets my daily transportation needs.	24.4587	54.268	.552	.875
There are enough charging stations available to make using an EV convenient.	25.4679	44.702	.679	.857
I believe EV batteries last long e2ugh to be reliable over many years.	24.9587	45.883	.808	.834
I think electric vehicles retain their value well over time.	25.2706	45.664	.709	.850

Table 37

Overall Scale Statistics for the Perceived Value Construct

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
30.0780	66.911	8.17991	6

Reliability of the Purchase Intention Scale

The Purchase Intention scale has included three items that has measured participants' willingness to buy an EV, their openness to choosing an EV with slightly lower quality, and their likelihood of recommending EVs to others. All 218 responses were valid. The scale

produced a Cronbach's Alpha of 0.845. This shows that there is a strong internal reliability. The item means have ranged from 4.27 to 5.32. This shows moderate interest in EV purchase and recommendation. The corrected item–total correlations are ranged from 0.65 to 0.78. This shows that each item has suited well with the construct. No item showed signs of weakening the scale. In this case, as well, the "Alpha if item deleted" values remained within acceptable limits. By removing any item there would not be improvement in the reliability in a meaningful way. This supports to keeping all three items as part of the construct. The full scale had a mean number of 14.44 and a standard deviation number of 4.83, which reflects moderate variation in participants' purchase intentions. The overall Purchase Intention scale is reliable. The items have worked together to capture how participants think about purchasing an EV and recommending it to others.

Table 38

Case Processing Summary for the Purchase Intention Scale

Case Processing Summary			
		N	%
Cases	Valid	218	100.0
	Excluded[a]	0	.0
	Total	218	100.0
a. Listwise deletion based on all variables in the procedure.			

Table 39

Reliability Analysis of the Purchase Intention Construct

Reliability Statistics	
Cronbach's Alpha	N of Items
.845	3

Table 40

Descriptive Statistics of Purchase Intention Measurement Items

Item Statistics			
	Mean	Std. Deviation	N
I am willing to purchase an electric vehicle (EV) within the next two years.	4.8486	1.91285	218

I would still consider buying an environmentally friendly EV even if its quality is slightly lower than that of a conventional car.	4.2661	2.01671	218
I would recommend electric vehicles to my friends or family members.	5.3211	1.57387	218

Table 41

Item–Total Correlation and Scale Reliability for Purchase Intention

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I am willing to purchase an electric vehicle (EV) within the next two years.	9.5872	10.585	.733	.763
I would still consider buying an environmentally friendly EV even if its quality is slightly lower than that of a conventional car.	10.1697	10.695	.652	.852
I would recommend electric vehicles to my friends or family members.	9.1147	12.286	.779	.742

Table 42

Overall Scale Statistics for the Purchase Intention Construct

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
14.4358	23.362	4.83345	3

The above referred all six constructs which have been used in this study has showed strong internal reliability. The Cronbach's Alpha values have ranged from 0.839 to 0.934. This meets accepted standards for quantitative research. Each construct has reached the threshold of $\alpha \geq .70$, and this shows that the items within each scale measure have the same underlying concept. Further, the Range Anxiety, Battery Life, Battery Recycling, Perceived Value, and Purchase Intention Scales have displayed alpha values within the good range. This shows

that their items are working together in a consistent way. The Symbolism scale has reached an alpha of 0.934, which means that there is an excellent reliability.

In sum, these results make sure that the measurement instruments which have been used in this study are dependable. The constructs have captured participants' views on EVs value and the purchase intention in a clear and consistent manner. The scales are suitable for the following statistical analyses, which includes descriptive tests, correlations, and regression models.

Table 43

Summary of Reliability Analysis for Study Constructs

Construct	**Number of Items**	**Cronbach's Alpha (α)**	**Reliability Level**
Range Anxiety (RA)	3	0.839	Good
Battery Life (BL)	5	0.870	Good
Battery Recycling (BRC)	5	0.888	Good
Symbolism (SYM)	5	0.934	Excellent
Perceived Value (PV)	6	0.876	Good
Purchase Intention (PI)	3	0.845	Good

4.3. Descriptive statistics of key study variables

This section of the study presents the main tendencies and distribution patterns of the variables. These descriptive statistics are helpful in order to clarify the participants viewpoints about their evaluation of each construct and also to confirm that the data is suitable for later analyses covering the correlations and regression. In this context, the Range Anxiety had shown a mean score of 5.71 with a standard deviation number of 1.29. These numbers show that most participants have expressed high concern about battery range and charging availability issues. Its skewness value of –1.28 and kurtosis of 1.48 also indicate that the left-skewed distribution with more responses is leaning toward higher concern levels.

Furthermore, the Battery Life has showed a mean of 5.86 and the standard deviation number is 1.07. The distribution has displayed a skewness of –1.55. This suggests that many participants have believed battery lifespan as an important factor for EVs. The kurtosis value of 3.67 also reflects a more peaked distribution where responses are shown to be clustered around stronger agreement. Likewise, the Battery Recycling had a mean score of 6.03. This is the highest among all constructs. The standard deviation number is 0.98. This shows support to environmental-based responsible battery disposal. The skewness of –1.58 also confirms this tendency, though the kurtosis number of 3.66 suggests that the available responses were tightly grouped around higher values.

Moreover, the Symbolism had shown a mean number of 5.05 and a standard deviation number of 1.49. This shows that there is a difference in participants' viewpoints about the symbolic and social meanings of their EVs. The skewness value of –0.57 points to a slight lean toward higher agreement. The kurtosis value of –0.23 shows a flatter distribution. Likewise, the Perceived Value has showed a mean of 5.01 with a standard deviation number of 1.36. The skewness of –0.20 and kurtosis of –0.75 shows a symmetric distribution with moderate variation in how participants have judged the general value of EVs. The Purchase Intention had a mean score of 4.81 and a standard deviation number of 1.61. This shows more diverse opinions regarding willingness to buy or to recommend an EV. The skewness of –0.48 shows a slight lean toward positive intentions, though the kurtosis of –0.37 shows a flatter distribution.

In sum, in all variables, skewness and kurtosis values shows to be fallen within acceptable ranges for large-sample behavioural research. The data distribution further supports the use of parametric techniques for the next stages of analysis.

Table 44

Descriptive Statistics and Distribution Characteristics of Study Constructs

Table #									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Range Anxiety	218	1.00	7.00	5.7095	1.29365	-1.277	.165	1.478	.328
Battery Life	218	1.00	7.00	5.8624	1.06894	-1.552	.165	3.674	.328
Battery Recycling	218	1.00	7.00	6.0266	.97632	-1.582	.165	3.656	.328
Symbolism	218	1.00	7.00	5.0450	1.49099	-.572	.165	-.229	.328
Perceived Value	218	1.00	7.00	5.0130	1.36332	-.204	.165	-.754	.328
Purchase Intention	218	1.00	7.00	4.8119	1.61115	-.484	.165	-.373	.328
Valid N (listwise)	218								

4.4. Correlation analysis between key variables

This portion of the study is an attempt to examine how the main constructs relate to each other. All correlations were measured using Pearson's r. The results have shown several meaningful relationships among the variables. The Range Anxiety showed a positive correlation with all other constructs. Its improved relationship was with Battery Life (r = .632). This shows that participants who are more worry about range also pay attention on battery performance. The Range Anxiety also correlated with Symbolism (r = .321), Perceived Value (r = .276), and Purchase Intention (r = .309), although these relationships were weaker. Further, the Battery Life have also displayed positive correlations across all variables. It had shown moderate relationships with Symbolism (r = .558) and Battery Recycling (r = .489). Its correlation with Purchase Intention (r = .442) shows that more confidence in battery performance is aligned with higher interest to buy an EV. Likewise, the Battery Recycling has shown moderate relationships with Symbolism (r = .479) and Perceived Value (r = .444). It also correlated with Purchase Intention (r = .390). Participants who view battery recycling positively they show their tendency to value EVs more and show interest in buying them. Similarly, the Symbolism has shown good correlations with Perceived Value (r = .727) and Purchase Intention (r = .773). This means that participants who see EVs as good, modern, or reflective of their identity, they also view them as more valuable and they are the ones who are more willing to consider them than rest of people. The Perceived Value, in this context, has showed the strongest relationship with Purchase Intention (r = .790). This shows that participants who see EVs as good value, either financially or functionally, they are more willing to purchase one.

In sum, all correlations were statistically important at the 0.01 level. The pattern of relationships has shown support for the next step in the analysis, where the direct effects of these variables on Purchase Intention are tested through regression.

Table 45

Pearson Correlation Matrix of Study Constructs

Table #							
		Range Anxiety	Battery Life	Battery Recycling	Symbolism	Perceived Value	Purchase Intention
Range Anxiety	Pearson Correlation	1	.632**	.334**	.321**	.276**	.309**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	218	218	218	218	218	218
Battery Life	Pearson Correlation	.632**	1	.489**	.558**	.421**	.442**

	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	218	218	218	218	218	218
Battery Recycling	Pearson Correlation	.334**	.489**	1	.479**	.444**	.390**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	218	218	218	218	218	218
Symbolism	Pearson Correlation	.321**	.558**	.479**	1	.727**	.773**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	218	218	218	218	218	218
Perceived Value	Pearson Correlation	.276**	.421**	.444**	.727**	1	.790**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	218	218	218	218	218	218
Purchase Intention	Pearson Correlation	.309**	.442**	.390**	.773**	.790**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	218	218	218	218	218	218
**. Correlation is significant at the 0.01 level (2-tailed).							

4.5. Differences between Pakistan and Lithuania (t-test)

In this study, the independent samples t-test has compared the mean scores of participants from Pakistan and Lithuania in all main variables. The results have shown differences between the two groups. All tests have produced p-values below .001. This number confirms that the observed differences have not occurred by chance during the analysis of this study. The positive mean differences indicate that participants in Pakistan have scored more on every construct than those in Lithuania. The Range Anxiety has shown a mean difference of 1.33. This shows that participants in Pakistan have expressed much concern about driving range and charging access issues. Then the Battery Life has also differed, with a mean difference of 1.07, and this shows that participants in Pakistan have placed more emphasis on battery lifespan and reliability. The Battery Recycling has shown a smaller difference of 0.55; this shows more concern in Pakistan regarding the environmental handling of used batteries. The Symbolism has shown a much larger gap, with a mean difference number of 1.52, this shows that EVs have carried more symbolic and social meanings for participants in Pakistan. Furthermore, the Perceived Value has shown a mean number difference of 1.17, and this shows that participants in Pakistan have evaluated EVs on higher value than those in Lithuania. Purchase Intention has shown the largest difference, at 1.88, which shows much willingness in Pakistan to purchase or recommend an EV.

These findings have highlighted the different contexts in which EVs have been evaluated in these two countries. They suggest that cultural, economic, and environmental

conditions have shaped their consumers assessment criterias about EVs benefits and how they express adoption intentions. The results have also justified analysing each country separately in later stages, as the patterns of perception and intention have differed in a consistent manner.

Table 46

Independent Samples t-Test Results Comparing Pakistan and Lithuania

		t	Sig. (2-tailed)	Mean Difference
Range Anxiety	Equal variances assumed	8.793	<.001	1.33214
	Equal variances not assumed	8.455	<.001	1.33214
Battery Life	Equal variances assumed	8.463	<.001	1.06986
	Equal variances not assumed	7.980	<.001	1.06986
Battery Recycling	Equal variances assumed	4.291	<.001	.54884
	Equal variances not assumed	4.112	<.001	.54884
Symbolism	Equal variances assumed	8.704	<.001	1.52388
	Equal variances not assumed	8.439	<.001	1.52388
Perceived Value	Equal variances assumed	6.957	<.001	1.16984
	Equal variances not assumed	6.969	<.001	1.16984
Purchase Intention	Equal variances assumed	10.537	<.001	1.88282
	Equal variances not assumed	10.258	<.001	1.88282

4.6. Individual assessment of hypotheses using simple regression models

During this study before testing all predictors concurrently in the multivariate regression model, each hypothesis has been examined separately through simple linear regression. This approach has allowed to evaluate the direct relationship between each independent variable and the dependent variable without the influence of other factors. It has also enabled verification of whether the expected direction of each relationship has appeared in the data. These initial results have provided a foundation for hypothesis evaluation, after which the full model has been applied to determine the unique effect of each predictor.

H1: Battery Life → Perceived Value

Battery Life has a positive effect on Perceived Value.

Battery Life has been hypothesised in this study to have a positive effect on Perceived Value. A simple regression has tested whether Battery Life predicts Perceived Value. The

results have shown a positive and statistically important relationship between the two variables (β = 0.421, p < .001). Participants who have perceived EV batteries as durable and reliable have shown to assign higher perceived value to EVs. The model has explained 17.7% of the variance in perceived value, which indicates that battery performance has formed an important component of overall value assessment. The unstandardized coefficient (B = 0.537) has shown that a one-unit increase in the Battery Life score has increased the perceived value through approximately half a scale point. This result has shown that confidence in battery longevity, replacement cycles, and long-term stability has improved the value which is attributed to EVs. The positive direction of the relationship has aligned with the hypothesised expectation. On the basis of this individual regression test, H1 has been shown to be supported.

From a theoretical perspective, this result can be interpreted through the functional value dimension of the Theory of Consumption Values. The strong effect of battery life indicates that perceived value is closely linked to reliability and long-term usability of the vehicle. This suggests that, in the context of electric vehicles, functional performance attributes remain central to value formation when consumers evaluate ownership feasibility rather than short-term purchase appeal.

Table 47

Regression Coefficients for the Effect of Battery Life on Perceived Value

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.867	.469		3.980	<.001
	Battery Life	.537	.079	.421	6.816	<.001

H2: Battery Recycling → Perceived Value

Battery Recycling has a positive effect on Perceived Value.

The Battery Recycling has been hypothesised to have a positive effect on Perceived Value. A simple regression has tested whether Battery Recycling predicts Perceived Value. The results have shown a positive and statistically important relationship between the two variables (β = 0.444, p < .001). Participants who have held strong views about effective battery recycling systems, they have rated the value of EVs higher. The unstandardized coefficient (B = 0.620) has indicated that a one-unit increase in the Battery Recycling score has increased the perceived value through more than half a scale point. Battery Recycling has explained

19.7% of the variance in perceived value, and this shows that views on circularity and end-of-life battery management have shaped how participants have evaluated value of EVs. The direction of the relationship has aligned with the hypothesised expectation. On this basis, H2 has been supported. Within the TCV, this result show consonance with the environmental value dimension. The importance of battery recycling shows that consumers integrate sustainability considerations beyond the use of vehicles into their value judgments. Perceived value therefore shows lifecycle awareness rather than only immediate environmental benefits, such as emission reduction.

Table 48

Regression Coefficients for the Effect of Battery Recycling on Perceived Value

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.276	.520		2.455	.015
	Battery Recycling	.620	.085	.444	7.284	<.001

H3: Range Anxiety → Perceived Value

Range Anxiety has a positive effect on Perceived Value.

In this study, the Range Anxiety has been hypothesised to have a positive effect on Perceived Value. Through a simple regression it has been examined whether Range Anxiety predicts Perceived Value. The results have shown a positive relationship between the two variables. The unstandardized coefficient (B = 0.291) has shown that a one-unit increase in Range Anxiety which has shown to increase Perceived Value by 0.291 units. The standardized coefficient (β = .276) has reflected a moderate effect size during the analysis. This relationship has been regarded as statistically important ($t = 4.226$, $p < .001$). This finding has indicated that participants who have expressed stronger concerns about driving range, they have assigned higher value to EVs. The range considerations have therefore formed an important element in how respondents have evaluated EV usefulness and suitability. On the basis of the positive and significant effect, H3 has been supported in this study. This finding shows the role of functional and emotional value within the TCV. Range anxiety reduces perceived value through increasing uncertainty and perceived risk which is associated with EV use. The result confirms that psychological concerns which are linked to functional limitations can

substantially shape overall value assessments, particularly in environments where infrastructure constraints are present.

Table 49

Regression Coefficients for the Range Anxiety on Perceived Value

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.350	.403		8.305	<.001
	Range Anxiety	.291	.069	.276	4.226	<.001

H4 Symbolism → Perceived Value

Symbolism has a positive effect on Perceived Value.

The Symbolism has been hypothesised to have a positive effect on Perceived Value. A simple regression has examined whether Symbolism predicts Perceived Value. The results have shown a positive relationship between the two variables ($\beta = 0.727$, $p < .001$). Symbolism has explained 52.9% of the variance in perceived value. This represents a substantial share for the single predictor. Further, the unstandardized coefficient ($B = 0.665$) has shown that a one-unit increase in the Symbolism score has increased the perceived value through approximately two-thirds of the scale point. Participants who have attached symbolic meaning to EVs, including identity expression, social signalling, and lifestyle fit, they have assigned higher value to them. The positive direction of the relationship has aligned with the hypothesised expectation. On this basis, H4 has been supported. This result of this analysis highlights the importance of symbolic value within the TCV. The strong effect of symbolic meaning suggests that EVs are evaluated not only for their functional or environmental benefits but also for their ability to express identity, modernity, and social values. This finding indicates that symbolic considerations play an important role in perceived value formation in the adoption of EV.

Table 50

Regression Coefficients for the Symbolism on Perceived Value

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.659	.225		7.385	<.001
	Symbolism	.665	.043	.727	15.561	<.001

H9: Perceived Value → Purchase Intention

Perceived Value has a positive effect on Purchase Intention.

In this study, the Perceived Value has also been hypothesised to have a positive effect on Purchase Intention. A simple regression has examined whether Perceived Value predicts Purchase Intention. The results have shown a positive relationship between the two variables (β = 0.790, p < .001). The unstandardized coefficient (B = 0.933) has shown that a one-unit increase in perceived value has increased purchase intention through one scale point. Perceived Value has explained 62.3% of the variance in purchase intention, because it is indicated by the R^2 value. This proportion has represented a substantial explanatory power. This shows that perceived value as the main factor which is shaping participants' intentions to purchase an EV. The direction of the effect has aligned with the hypothesised expectation. On this basis, H9 has been supported.

Table 51

Regression Coefficients for the Perceived Value

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.134	.256		.523	.602
	Perceived Value	.933	.049	.790	18.913	<.001

4.7. Moderation analysis (H5–H8)

H5: Moderation of Country on Battery Life → Perceived Value

The results found during this study have shown that both countries have moderated the relationship between Battery Life and Perceived Value. The interaction term has been significant (β = –0.4038, p = .0465), which shows that the relationship has differed between Pakistan and Lithuania. Although the increase in explained variance has been small (ΔR^2 = .014), yet the interaction has still improved the model. Further, the Battery Life has also shown to have a positive effect on Perceived Value in both countries. The effect has been shown improved in Pakistan. When CU = 1 (Pakistan), then the conditional effect has been .6564 (p = .0002). Participants in Pakistan have placed more value on long battery life when they have measured the worth of an EV. When CU = 2 (Lithuania), the effect has decreased to .2525 (p = .0123). This pattern has shown that Lithuanian participants have still valued battery life, at the same time it has shaped their value judgements to a lesser extent. These results have

confirmed that the importance of Battery Life has differed in both these two national contexts. The positive but unequal effects have approved the moderation hypothesis (H5).

R	R^2	MSE	F	df1	df2	p
0.504	0.254	1.406	24.315	3	214	< .001

Predictor	Coefficient (β)	Std. Error	t	p	LLCI	ULCI
Constant	−0.287	2.296	−0.125	.901	−4.813	4.240
BL_M (Battery Life)	**1.060**	0.364	2.911	**.004**	0.342	1.778
CU	1.662	1.240	1.340	.182	−0.782	4.107
Int_1 (Interaction)	**−0.404**	0.202	−2.003	**.047**	−0.801	−0.006

Interaction Term (X × W)	ΔR^2	F	df1	df2	p
BL_M × CU (Int_1)	0.014	4.010	1	214	.046

CU Level	Effect (β)	Std. Error	t	p	LLCI	ULCI
1.00	**0.656**	0.175	3.749	< .001	0.311	1.002
2.00	**0.253**	0.100	2.523	.012	0.055	0.450

Country significantly moderates the effect of battery life on perceived value, with battery performance playing a stronger role in value formation among Pakistani consumers than among Lithuanian consumers.

H6: Moderation of Country on Battery Recycling → Perceived Value

The model has also tested whether country has moderated the relationship between Battery Recycling and Perceived Value. During the analysis it was found that the interaction term has not been significant (β = –0.2585, p = .1433). The change in explained variance has been small (ΔR^2 = .007) and has not improved the model. This result has indicated that the effect of Battery Recycling on Perceived Value has not differed between Pakistan and Lithuania. Further the Battery Recycling has shown a positive effect on Perceived Value overall (β = .9219, p = .0028). Participants who have viewed recycling practices more

favourably they have rated EV value more higher. However, the strength of this effect has shown to be stable in both countries. The coefficient for country itself has not been meaningful (p = .5347), and this has proved the conclusion that national context has not shifted how participants have evaluated battery recycling when forming value perceptions. Because the interaction effect has not been significant, therefore, the moderation hypothesis H6 has not been proved.

R	R^2	MSE	F	df1	df2	p
0.551	0.304	1.312	31.169	3	214	< .001

Predictor	Coefficient (β)	Std. Error	t	p	LLCI	ULCI
Constant	0.703	1.908	0.368	.713	−3.059	4.465
BRC_M (Battery Recycling)	0.922	0.305	3.026	.003	0.321	1.523
CU	0.674	1.084	0.622	.535	−1.462	2.810
Int_1 (BRC_M × CU)	−0.259	0.176	−1.469	.143	−0.605	0.088

Interaction Term	ΔR^2	F	df1	df2	p
BRC_M × CU (Int_1)	0.007	2.159	1	214	.143

Battery recycling positively influences perceived value, but this relationship does not differ between Pakistan and Lithuania, indicating no moderating effect of country.

H7: Moderation of Country on Range Anxiety → Perceived Value

The results have shown that country has moderated the relationship between Range Anxiety and Perceived Value. The interaction term has been significant (β = –0.5283, p = .0007), and the model has gained power with the interaction included (ΔR^2 = .0422). This result has indicated that the effect of Range Anxiety has differed between Pakistan and Lithuania. Further, the Range Anxiety has had a positive effect on Perceived Value in Pakistan. When CU = 1 (Pakistan), the conditional effect has been .4237 (p = .0008). Participants in Pakistan have given more value to EVs when they have experienced lower concern about

driving range. When CU = 2 (Lithuania), the effect has become weak and non-significant. The coefficient at this level has been –.1046 (p = .2542), which has shown that range concerns have not shaped their value judgements among Lithuanian participants. The direction and strength of the conditional effects have shown clear variation in both the two countries. The positive relationship has appeared only in Pakistan. Because the interaction effect has been significant and the relationship has changed in both national contexts, therefore, the moderation hypothesis (H7) has been supported.

R	R^2	MSE	F	df1	df2	p
0.479	0.230	1.452	21.259	3	214	< .001

Predictor	Coefficient (β)	Std. Error	t	p	LLCI	ULCI
Constant	0.843	1.652	0.510	.610	−2.413	4.099
RA_M (Range Anxiety)	0.952	0.265	3.594	< .001	0.430	1.474
CU	2.023	0.921	2.196	.029	0.207	3.839
Int_1 (RA_M × CU)	−0.528	0.154	−3.423	< .001	−0.833	−0.224

Interaction Term	ΔR^2	F	df1	df2	p
RA_M × CU (Int_1)	0.042	11.718	1	214	< .001

CU Level	Effect (β)	Std. Error	t	p	LLCI	ULCI
1.00 (Pakistan)	0.424	0.124	3.409	< .001	0.179	0.669
2.00 (Lithuania)	−0.105	0.092	−1.143	.254	−0.285	0.076

Country significantly moderates the effect of range anxiety on perceived value, with range concerns influencing value perceptions in Pakistan but not in Lithuania.

H8: Moderation of Country on Symbolism → Perceived Value

The model has also examined whether country has moderated the relationship between Symbolism and Perceived Value. The interaction term has been significant (β = –0.2679, p = .0079). The change in explained variance (ΔR^2 = .0152) has shown that the

inclusion of the interaction has improved the model. This result has indicated that the strength of the symbolic value effect has differed between Pakistan and Lithuania. Further, the Symbolism has had a strong positive effect on Perceived Value in both countries, although the magnitude of the effect has differed. When CU = 1 (Pakistan), the conditional effect has been .7907 ($p < .001$). Participants in Pakistan have placed more value on the symbolic meaning of EVs when forming overall value perceptions. When CU = 2 (Lithuania), the effect has remained positive but weaker. The conditional effect has decreased to .5228 ($p < .001$), which has shown that symbolic meaning has continued to contribute to perceived value, though with less weight than in Pakistan. Thus, the pattern of results has shown that symbolism has mattered in both markets, but it has played a larger role in Pakistan. Because the interaction term has been shown to be important but the effect has varied in the two countries, therefore, the moderation hypothesis (H8) has been supported.

R	R^2	MSE	F	df1	df2	p
0.740	0.548	0.852	86.537	3	214	< .001

Predictor	Coefficient (β)	Std. Error	t	p	LLCI	ULCI
Constant	−0.154	0.948	−0.162	.872	−2.023	1.716
SYM_M (Symbolism)	1.059	0.168	6.317	< .001	0.728	1.389
CU	1.162	0.533	2.181	.030	0.112	2.212
Int_1 (SYM_M × CU)	−0.268	0.100	−2.682	.008	−0.465	−0.071

Interaction Term	ΔR^2	F	df1	df2	p
SYM_M × CU (Int_1)	0.015	7.192	1	214	.008

CU Level	Effect (β)	Std. Error	t	p	LLCI	ULCI
1.00 (Pakistan)	0.791	0.078	10.178	< .001	0.638	0.944
2.00 (Lithuania)	0.523	0.063	8.327	< .001	0.399	0.647

Country significantly moderates the effect of symbolism on perceived value, with symbolic

meaning playing a stronger role in value formation among Pakistani consumers than among Lithuanian consumers.

These differences highlight the findings of context-dependent nature of value formation proposed by the TCV. The variation in dominant value dimensions in both Pakistan and Lithuania demonstrates that perceived value is shaped through local economic conditions, infrastructure availability, and social norms.

4.8. Multiple Regression Analysis (Direct Effects)

In this portion, it is attempted to examine how the four predictors Range Anxiety, Battery Life, Battery Recycling, and Symbolism explain variation in Perceived Value. A second model tests whether Perceived Value predicts Purchase Intention. These models help identify the direct effects within the conceptual framework and show how each factor contributes to consumer evaluations of EVs.

Model 1: Predicting Perceived Value

Tables 52 to 54 present the results of the multiple regression analysis which is conducted to examine the effects of symbolism, range anxiety, battery recycling, and battery life on perceived value in the context of subject study. The table 52 shows that the regression model shows strong overall fit ($R = .736$). The model explains 54.2% of the variance in perceived value ($R^2 = .542$), with an adjusted R^2 of .533. This shows that the explanatory power of the model remains high after accounting for the number of predictors. The standard error of the estimate is .931, and this suggest that there is an acceptable level of prediction accuracy. The change statistics further indicate that the model is statistically significant ($F(4, 213) = 63.03$, $p < .001$). Moreover, the ANOVA results in the table 53 also confirm the significane of overall of the regression model. The predictors explain a substantial portion of variance in perceived value (Regression SS = 218.62), and the model significantly improves prediction compared to a null model ($F = 63.03$, $p < .001$). The individual regression coefficients are reported in the table 54. Symbolism emerges as the strongest predictor of perceived value amongst four, and this exhibits a positive and statistically significant effect ($\beta = .678$, $p < .001$). This result shows that higher symbolic value perceptions are associated with higher overall perceived value of EVs.

Battery recycling also shows a positive and statistically significant relationship with perceived value ($\beta = .128$, $p = .022$). This suggest that perceptions which are related to battery recycling contribute positively in overall value assessments of consumers, although the effect

is smaller in magnitude if compared to symbolism. On the other hand, range anxiety (β = .047, p = .433) and battery life (β = –.050, p = .478) do not show statistically significant effects on perceived value in this model, and thereby it indicates that these factors do not independently predict perceived value when the other variables are held constant. Moreover, the collinearity diagnostics show no multicollinearity concerns, with tolerance values exceeding .40 and variance inflation factor (VIF) values which is ranging between 1.43 and 2.29.

Table 52

Model Summary of Multiple Regression Predicting Perceived Value

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.736[a]	.542	.533	.93121	.542	63.029	4	213	.000
a. Predictors: (Constant), Symbolism, Range Anxiety, Battery Recycling, Battery Life									

Table 53

ANOVA Results for the Multiple Regression Model Predicting Perceived Value

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	218.623	4	54.656	63.029	<.001[b]
	Residual	184.702	213	.867		
	Total	403.324	217			
a. Dependent Variable: Perceived Value						
b. Predictors: (Constant), Symbolism, Range Anxiety, Battery Recycling, Battery Life						

Table 54

Multiple Regression Coefficients for Predictors of Perceived Value

Coefficients[a]											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.897	.441		2.031	.043					
	Range Anxiety	.050	.063	.047	.785	.433	.276	.054	.036	.598	1.673

	Battery Life	-.064	.089	-.050	-.711	.478	.421	-.049	-.033	.437	2.287
	Battery Recycling	.179	.078	.128	2.304	.022	.444	.156	.107	.697	1.434
	Symbolism	.620	.053	.678	11.621	.000	.727	.623	.539	.631	1.585
a. Dependent Variable: Perceived Value											

Model 2: Predicting Purchase Intention

The second model has examined whether Perceived Value predicts Purchase Intention. The Model Summary has shown an R value of .790 and an R^2 of .623, which indicates that Perceived Value has explained 62.3% of the variance in the intention to purchase an EV. The ANOVA results have confirmed the model fit, with an F value of 357.70 and a p-value below .001. The Coefficients table has shown a clear effect. Perceived Value has recorded a standardized beta of .790 with a p-value below .001, which shows that strong and meaningful predictive relationship. Higher perceived value has led to more willingness to purchase or recommend an EV.

Table 55

Model Summary of Regression Predicting Purchase Intention

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.790[a]	.623	.622	.99088	.623	357.703	1	216	.000
a. Predictors: (Constant), Perceived Value									

Table 56

ANOVA Results for the Regression Model Predicting Purchase Intention

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	351.210	1	351.210	357.703	<.001[b]
	Residual	212.079	216	.982		
	Total	563.289	217			
a. Dependent Variable: Purchase Intention						
b. Predictors: (Constant), Perceived Value						

Table 57

Regression Coefficients for the Effect of Perceived Value on Purchase Intention

Coefficients[a]											
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.134	.256		.523	.602					
	Perceived Value	.933	.049	.790	18.913	.000	.790	.790	.790	1.000	1.000
a. Dependent Variable: Purchase Intention											

Conclusions, Practical Implications, and Future Research Directions

This study contributes, through extension of the TCV, in the existing literature on EVs and consumer behaviour. The findings of this study show that consumer evaluation of EVs reflects not only in functional and economic considerations but also in symbolic and environmental value dimensions. The symbolic value plays an important role in making the overall perceived value for consumers, and this indicates that consumers view EV as an expression of their identity and modernity besides than only as transport technologies. further, the comparative analysis conducted in this study also shows that there is a difference between Pakistan and Lithuania regarding value dimensions which operate differently in both national contexts. In Pakistan, perceived value depends more on battery life and range anxiety, which shows that there are infrastructure constraints and cost sensitivity. Whereas, in Lithuania, the battery recycling awareness and symbolic meaning show more influence, and this reflects there is a higher environmental awareness and established sustainability norms. These patterns show that perceived value formation remains context dependent and resists explanation through a single universal adoption model.

Moreover, this study adds value in the research, that has shown its focus mainly on short-term adoption intentions, through incorporation of long-term ownership considerations into a value-based framework. The results refer the limits of barrier-based explanations and it also highlight the joint role of technical, environmental, and symbolic attributes in perceived value for consumers. This study therefore offers a more nuanced knowledge and comprehension of adoption of EVs and it provides a foundation for future theory development and in both countries research.

This study has examined how consumers in Pakistan and Lithuania have judged the value of EVs and how these judgments have shaped their intentions to purchase an EV. Though the literature review has shown that the interest in electric mobility has increased, yet the findings have shown that many consumers in both countries have remained uncertain about long-term battery performance, driving range, recycling systems, and the symbolic meaning of to own an EV. These concerns then have formed the core research problem and the need to identify which value dimensions are important for consumers in their decision-making.

Furthermore, this study also has its focus on four factors which have been drawn from the literature review: 1) battery life, 2) battery recycling, 3) range anxiety, and 4) symbolism. Then this study has examined how the functional, environmental, psychological, and social elements have shaped perceived values of EVs. The purpose of this study has also emerged

from gaps which have been identified in the theoretical chapters. The earlier studies which have been reviewed during the literature review shown to have examined adoption intentions, environmental motives, or policy incentives, yet very limited attention was given on the long-term ownership issues such as battery degradation, replacement costs, end-of-life handling issue, and range concerns. In addition, the Symbolism, as a social and psychological dimension of value, has been recognised as an important element but it has rarely been explored in earlier work in two different national situations. Therefore, with an aim to cover these gaps this study developed a more complete view of how perceived value forms. In this regard, special attention is drawn towards markets scenarios where EV adoption still is in early stage and consumer concerns also differ due to infrastructure, culture, economic conditions, and policy environments in both countries, Lithuania and Pakistan.

Moreover, this study also contributed through sharing original perspectives in the form of integration of these elements into a single empirical model which is grounded in the TCV. The purpose of this study included in it to understand how these value dimensions have operated in both two contrasting national perspectives. The study found that the cultural attitudes, infrastructure maturity, environmental awareness, policy support, and economic realities have shaped how consumers in each country are evaluating EVs. Further, the study has tested whether the relationships between the four value dimensions and perceived value have differed in strength or direction between Pakistan and Lithuania. This comparison has aimed to generate knowledge that can assist, in future, the policymakers, industry sectors, and researchers in identification of different aspects of EV values to give more weight in each market and to promote sustainable mobility. This study has therefore been conducted with an aim to explain not only what helps in shaping perceived value, but also to show how these patterns vary in both two distinct social and economic environments.

Moreover, the analysis conducted during this study has shown that all four value dimensions in the model have shaped how consumers have judged the value of an EV. Battery life has shown an effect on perceived value. It has also been found that the Participants have placed more importance on long battery life, predictable performance, and lower replacement cost risk. These concerns have put emphasis on long-term ownership dimension as discussed in the literature review chapter. Further, the results have also confirmed that consumers are also evaluating EVs through a functional lens in both markets, and reliable battery performance which improved value perceptions. The battery recycling factor has also contributed to perceived value, although its effect has been weaker than that of the other factors. Participants have shown awareness about environmental issues but have remained uncertain about end-of-life battery management. This finding has linked with earlier sections of the thesis that have highlighted gaps in recycling infrastructure and consumer knowledge.

Despite the weaker influence, the positive effect has indicated that environmental and circularity considerations have played a role in value formation.

In addition, the range anxiety has also shown an obvious effect on perceived value. Participants have judged EVs partly through concerns about driving distance and access to charging. When users have anticipated difficulty in meeting mobility needs, then the perceived value has shown decline. This result has reinforced concepts obtained from the literature review, where range anxiety has appeared as one of the main barrier in adoption and has influenced satisfaction and perceived usefulness. The findings have also confirmed that psychological comfort with driving range has remained a core element of EV value evaluation. The symbolism has emerged as the strongest predictor of perceived value. Participants have linked the ownership of EV to identity, status, technological progress, and environmental responsibility. The symbolic meanings have also shown to be helpful for consumers to develop a sense of personal and social alignment with EV, which has strengthened their preceptions about evaluation. This finding has shown consonance with prior studies that have highlighted the role of image, self-expression, and social meaning in decision-making process of EVs.

Besides, the perceived value, as a combined construct, has shown a direct and positive effect on purchase intentions. Participants who have reported higher perceived value have also shown a stronger likelihood to consider an EV for future purchase. This result has supported the theoretical foundation of the study, where value formation has been described as a key driver of behavioural intention. The findings have shown that perceived value has acted as main mechanism which links battery life, battery recycling, range anxiety, and symbolism to eventual purchase decisions.

The results have also shown that consumers have evaluated EVs through a combination of functional, environmental, psychological, and social considerations. Battery life has stood out as a core element of functional value. Its positive effect on perceived value has shown that consumers have placed strong weight on long-term durability and predictable performance. This has reflected concerns which were raised in the literature review regarding battery life and replacement costs and has suggested that consumers have judged EV usefulness and reliability largely through this component. Battery recycling has contributed to value formation through environmental considerations, even where knowledge about recycling systems has remained limited. The weaker effect has pointed to a gap between awareness and confidence. Consumers have recognised environmental benefits, yet their evaluations have remained cautious due to uncertainty about end-of-life processes. This outcome has mirrored those gaps which were noted in earlier researches, where battery recycling infrastructure has remained underdeveloped and poorly understood.

The range anxiety has also continued to shape how consumers have judged EVs. The findings have reinforced the view that consumers have linked usefulness of EVs with driving freedom and infrastructure access. When range concerns have increased, perceived value has declined. This result is in consonance with earlier studies that have identified range anxiety as both a functional and psychological barrier. It has also indicated that, despite rising global adoption, basic mobility needs have continued to frame value judgments. The symbolism has shown the strongest effect, which has shown that consumers have not evaluated EVs only on practical grounds. EVs have also served as expressions of identity, modernity, and environmental responsibility. This has confirmed the relevance of social value within the TCV and has shown that symbolic meaning has guided value formation even in developing markets of EVs.

There are differences in both countries which are further shaping how consumers in Pakistan and Lithuania are judging values of EVS. The results have shown that the importance of battery life has differed in the two contexts. In Pakistan, long battery life has related to lower maintenance costs and the ability to meet daily mileage demands. These concerns have reflected the high cost of battery replacement and limited charging reliability. Whereas, in Lithuania, battery life has also carried value, but it has reflected expectations about durability, lifecycle performance, and competition with used internal combustion vehicles. This contrast has shown how the same functional attribute has gained meaning through different economic and practical conditions.

Likewise, the battery recycling has also shown to carry different interpretations in both countries. In Lithuania, the recycling has shown consonance with a more developed regulatory framework and higher public awareness of environmental policies. There consumers have viewed effective end-of-life management as part of a credible sustainability system. Whereas, in Pakistan, the recycling has carried a more economic meaning. The literature review has shown more focus on reduction of import costs and supporting local production. Recycling has gained value when it has reduced long-term costs or perceived risk. Limited infrastructure and awareness have shown weakening the environmental interpretation. As a result, the same factor has contributed to perceived value through different expectations and policy environments.

Similarly, the range anxiety has differed in both markets as well. In Pakistan, limited charging infrastructure and scarce public stations have created risk perceptions. The consumers have doubted the ability of EVs to meet routine mobility needs, which has reduced the perceived value. In Lithuania, range concerns have remained present yet they have related more to grid capacity, charging speed issues, and winter conditions. The symbolism has

shown the clearest cultural contrast. In Pakistan, symbolic meaning has played a limited role, and consumers have relied more on functional and economic evaluations. In Lithuania, the symbolism has gained improvements through the social and policy environment. EVs have signalled affluence, early adoption, and modern identity, reinforced by policy incentives. This contrast has shown how cultural and social norms have shaped the meaning and importance of the same value dimension in both countries.

Recommendations

On the basis of findings of this study, it is recommended that clean communication about core technical aspects of EVs can support consumer confidence. Information dissemination on battery life, expected degradation patterns, and long-term maintenance costs should be presented in simple and transparent terms with an aim to enhance sale of EVs. This can help to cover practical concerns that shape early evaluations of EVs in both countries. More efforts to inform consumers about battery recycling systems are also needed. These should explain how end-of-life processes work, and what environmental benefits they offer and how they may reduce long-term costs. These steps can help to close the awareness gap which limits the environmental dimension of perceived value.

Furthermore, improvements in charging infrastructure is also important for both markets, though with different priorities. Pakistan can benefit with the placement of basic charging stations to ease concerns about daily issues. Lithuania may focus more on expansion on fast-charging options and to improve grid capacity. The infrastructure planning should cover the specific challenges of each country. The charging network is required to be improved to reduce the range anxiety and to support the functional value of EVs. The role of symbolism in shaping perceived value points towards opportunities for communication strategies that frame EVs as part of a broader shift toward modern and responsible mobility. In Lithuania, such strategies can be build on existing social and policy patterns. In Pakistan, the symbolic meaning may gain improvements through efforts that link EV use to environmental and economic goals. These approaches can complement technical and economic improvements and they can help EVs adoption in two different consumer groups.

Limitations and future research

This study has relied on a non-probability sampling method, which has its limitations on the ability to make general findings in the wider populations of Pakistan and Lithuania. The data have reflected the views of participants who chose to take part, and their experiences may not represent all types of consumers. The study has also used self-reported measures, which have depended on understandings of participants on the questions and their willingness to report views accurately. These responses may not fully reflect actual behaviour. The design

of this study has covered perceptions on a single point in time, and this has restricted the ability to observe how attitudes toward EVs change as markets, infrastructure, and policies evolve. The scope of the study has covered only two countries, which has also narrowed its geographical reach. The model has also focused on four value dimensions drawn from the literature. Other factors, such as cost structures, environmental concern, or technological readiness, may also influence perceived value.

Therefore, the future research can expand this work through including other countries with different levels of EV markets and their maturities. Such studies can help further to clarify how cultural norms, charging infrastructure, and economic conditions do shape the value dimensions as examined in this thesis. Longitudinal designs can also track how perceptions evolve as markets develop, policies change, and new technologies enter use. This approach can cover shifts in expectations which are related to battery performance, recycling awareness, and comfort with driving range. Further studies can also extend the model through addition of new constructs. Factors such as cost perceptions, environmental concern, and technological readiness may also offer more knowledge into value formation and it can help to explain variation in different consumer groups. Qualitative approaches, including interviews can also provide more information on how consumers interpret the symbolic and psychological meaning of EVs. These methods would improve more understanding of perceived value and support the development of more targeted strategies with an to encourage adoption of EVs.

This study has provided a good view of how different value dimensions have shaped consumer judgments of electric vehicles in two markets. The findings have shown that functional, environmental, psychological, and social elements combine to form values that affects purchase intentions. The results have provided insights into factors that support or constrain adoptions of EVs. Last but not least, the findings of this study have underlined the importance of knowledge and understandings on how consumers form value and how it changes in knowledge, infrastructure, and social meaning which can support progress toward electric mobility.

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ANNEX 1: Questionnaire

I am Muhammad Ali, a master's student at Vilnius University.

This survey is part of my thesis research and examines consumer perceptions, concerns, and attitudes toward electric vehicles. The aim is to explore the factors that shape consumers' views and influence their intention to adopt electric vehicles.

Contact: muhammad.ali@vm.stud.vu.lt.

It takes 5–7 minutes, and all responses are anonymous and used only for academic research. For any questions, please contact:

Thank you for your participation.

1. Have you heard of electric vehicles (EVs)?

- YES
- NO

2. Country of residence.

- Lithuania
- Pakistan
- Other

3. Have you ever driven or ridden in an electric vehicle?

- YES
- NO

4. How familiar are you with electric vehicles?

Not at all familiar				Very familiar
1	2	3	4	5

5. I would often worry about running out of battery charge while driving an EV.

   7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

6. I would worry about finding places to charge an EV in new areas.

7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

7. I believe limited driving range is a major disadvantage of EVs.
   7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

8. Knowing the expected lifespan of an EV battery* is important to me.

   *Battery lifespan refers to how long an EV battery lasts before it needs replacement.

   7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

9. A long battery lifespan increases my confidence in buying an EV.

   7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

10. The manufacturer's warranty on battery lifespan increases my trust in EVs
    7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

11. I am concerned about EV battery depreciation over time.
    7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

12. I am concerned that the battery might lose value due to advancing EV technologies.

7-point Likert-type scale; reference (Gore et al., 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

13. Recycling EV batteries helps to protect the environment.
    7-point Likert-type scale; reference (Lizin et al., 2017)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

14. Recycling EV batteries helps reduce waste and environmental harm.

    7-point Likert-type scale; reference (Lizin et al., 2017)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

15. Recycling EV batteries helps create a better environment for future generations.
    7-point Likert-type scale; reference (Lizin et al., 2017)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

16. Proper EV battery recycling helps prevent unsafe disposal and accidents.
    7-point Likert-type scale; reference (Lizin et al., 2017)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

17. Information about environmentally safe battery recycling increases my trust in EVs.
    7-point Likert-type scale; reference (Lizin et al., 2017)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

18. Driving an EV makes me feel proud.
    7-point Likert-type scale; reference (Hasudungan & Saragih, 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

19. Driving an EV reflects my values and lifestyle.
    7-point Likert-type scale; reference (Hasudungan & Saragih, 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

20. Driving an EV enhances my social status.
    7-point Likert-type scale; reference (Hasudungan & Saragih, 2024)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

21. Driving an EV expresses my environmentally friendly values to others.
    7-point Likert-type scale; reference (Krishnan & Sreekumar, 2023)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

22. EVs represent a modern and innovative spirit.
    7-point Likert-type scale; reference (H. N. Lee et al., 2019)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

23. The price of electric vehicles is reasonable for the value they provide.
    7-point Likert-type scale; reference (Bednarz et al., 2023b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

24. The cost of electricity needed to charge an EV is affordable.
    7-point Likert-type scale; reference (Bednarz et al., 2023b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

25. The driving range of electric vehicles meets my daily transportation needs.
    7-point Likert-type scale; reference (Bednarz et al., 2023b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

26. There are enough charging stations available to make using an EV convenient.
    7-point Likert-type scale; reference (Bednarz et al., 2023b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

27. I believe EV batteries last long enough to be reliable over many years.
    7-point Likert-type scale; reference (Bednarz et al., 2023b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

28. I think electric vehicles retain their value well over time.
    7-point Likert-type scale; reference (Bednarz et al., 2023b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

29. I am willing to purchase an electric vehicle (EV) within the next two years.
    7-point Likert-type scale; reference (M. Jiang et al., 2025b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

30. I would still consider buying an environmentally friendly EV even if its quality is slightly lower than that of a conventional car.
    7-point Likert-type scale; reference (Klabi & Binzafrah, 2021)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

31. I would recommend electric vehicles to my friends or family members.
    7-point Likert-type scale; reference (S. Wang et al., 2018b)

Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly Agree
1	2	3	4	5	6	7

32. Age Group
    - 18-24
    - 25-34
    - 35-44
    - 45-54
    - 55+

33. Gender.
    - Male
    - Female
    - Not to say

34. Do you currently own a vehicle?
    - Yes, EV
    - Yes, Petrol/Desiel
    - NO