

LEVEL 7 ASSESSMENT SPECIFICATION

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Academic honesty / referencing:	Academic honesty is required. In the main body of your submission, you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.		

Table of Contents

1. Introduction.....	3
2. Research Aim, Objectives, and Questions	4
2.1 Research Aim	4
2.2 Research Objectives	4
2.3 Research Questions	4
3. Literature Review	5
3.1 Global EV Adoption: An Overview	5
3.2 Theoretical Frameworks	5
3.3 EV Adoption in Developing Countries and Pakistan.....	6
3.4 Research Gap	7
4. Research Methodology	8
4.1 Research Philosophy and Approach.....	8
4.2 Research Design	9
4.3 Data Collection Instrument	9
4.4 Sampling Strategy	10
4.5 Methodological Justification	10
5. Expected Results and Analysis Plan	11
5.1 Data Preparation and Cleaning	11
5.2 Descriptive Statistical Analysis	11
5.3 Reliability and Inferential Statistical Analysis	11
5.4 Expected Findings	12
6. Evaluation: Significance, Limitations, and Ethical Considerations	12
6.1 Research Significance	12
6.2 Limitations	13
6.3 Ethical Considerations	14
7. Proposed Research Timetable.....	14
References	16

1. Introduction

The automotive sector is in the process of a major transition towards more environmentally friendly systems, and the idea of a circular economy is an important area of concern. Nevertheless, their implementation is also affected by the situational factors that might lead to or hinder their usage, presenting new challenges to managers and policymakers (Du, Bryson and Qamar, 2025). EVs have the lowest CO as well as CO₂ emissions of about 20% each. More than 70% of NO_x and N₂O are also emitted by EVs, which means that they use fossil fuels to generate electricity. The total pollution emissions of SO_x and PM₁₀ are 90 % and 85 % in EVs (Veza et al., 2023). Electric cars are growing exponentially in the market and have already sold more than 10 million in 2022. The market share of the electric cars has risen in the last three years by more than 3 times, around 4 to 14 per cent (IEA, 2023).

The rate of this change is also highlighted in the recent developments. China is continuing to dominate the EV adoption of the world with the emerging economies recording the highest growth rates with the world EV sales share at about 25-percent in the first half of 2025 (ICCT, 2026). On the other hand, the adoption of EVs in Pakistan is still at the nascent stage. The challenges to developing the market are still high because of the large initial investments, funding shortage, inadequate charging infrastructure, and unawareness of the population, particularly in the two- and three-wheeler segment that is already assisting most of the population in their daily movement (SDPI, 2025). The study will therefore seek to examine the most prominent economic, infrastructural, awareness and policy factors that influence the purchase intention of EVs in Pakistan.

However, without an empirical examination of the hurdles faced by the Pakistani population, the policy measures will not be aligned with the requirements of the market. This study helps fill this gap by offering empirical evidence about consumer opinions about the factors such as economic barriers, infrastructure weaknesses, awareness, and effective policy measures. These results will provide decision-makers, automobile producers, and banks with a means to speed up the diffusion of EVs in the Pakistani market.

2. Research Aim, Objectives, and Questions

2.1 Research Aim

The general aim of this study is to critically assess the major factors behind the adoption of electric vehicles by consumers in Pakistan, as an information source to the policy making process and industrial planning.

2.2 Research Objectives

- To determine the key determinants of consumer intention to purchase electric vehicles in Pakistan.
- To assess the effect of economic factors, including purchase price and operating costs, on EV adoption decisions.
- To examine the influence of charging infrastructure availability on consumer adoption behaviour.
- To assess the impact of consumer awareness levels and government policy incentives on EV adoption intentions.

2.3 Research Questions

The following research questions will guide the investigation:

- RQ1: What are the key factors influencing electric vehicle adoption among consumers in Pakistan?
- RQ2: How does vehicle purchase cost affect consumer purchase intention for electric vehicles in Pakistan?
- RQ3: Does the availability of charging infrastructure influence consumer EV adoption decisions in Pakistan?
- RQ4: To what extent do consumer awareness and government policy incentives influence EV adoption intentions in Pakistan?

3. Literature Review

3.1 Global EV Adoption: An Overview

The electric vehicle (EV) adoption literature has grown significantly in the last decade due to the worldwide need to transition to energy and decarbonization. Early groundbreaking studies found the attitude of consumers, perceptions of usefulness, and perceptions of ease of use as the central constructs relying extensively on the Technology Acceptance Model (TAM) that was proposed by Davis (1989). Further research has generalized TAM to include context-based aspects of the market, such as the availability of charging infrastructure, policy guidelines, and cultural orientations towards sustainability (Davis and Granić, 2024).

There are regular patterns identified in a systematic review of the international literature. Major obstacles to EV adoption encompass high initial purchase prices compared to standard internal combustion engine cars, range anxiety due to battery range capacity, lack of coverage of the charging network, and consumer worries about battery life cycle and resale value. The study shows that government financial incentives with their purchase subsidies and tax exemptions together with increased consumer environmental awareness and decreased operational and maintenance expenses and home charging solutions, serve as the main drivers that enable electric vehicle adoption (Rahman and Thill, 2024).

Although this literature on knowledge is growing, there is a critical observation that nearly all empirical research is based in developed economies most especially in Europe, North America and East Asia. This geographical focus casts some critical doubts on the applicability of the results to the context of developing countries where socio-economic situations, infrastructural realities and policy settings are markedly different. Therefore, there is a definite gap in knowledge about the functioning of these globally determined determinants in emerging markets like Pakistan.

3.2 Theoretical Frameworks

This research project utilizes the theoretical framework, which comprises two major theoretical constructs. According to Davis (1989), the TAM (Technology Acceptance Model) proposes two factors that determine whether a user adopts a particular technology or not. The first factor involves perceived usefulness where users assess their views regarding how the adoption of a certain technology can improve their productivity and performance and provide them with

tangible benefits compared to other alternatives. It is believed that adopting electric vehicles would enable users to save money due to reduced costs for the purchase of gasoline and car repairs and obtain environmental and performance-related benefits compared to traditional vehicles. The other factor proposed by Davis is perceived ease of use, which means that users can judge a technology based on its ease of use and how difficult they might find the process of interacting with it. Therefore, when discussing the adoption of EVs, it is essential that users find the process of charging such cars easy, that the cars themselves be easy to operate and drive, and drivers feel no concerns about the driving range.

TAM offers a concise and effective theoretical foundation for the process of making technology acceptance decisions at an individual level. It is especially applicable to the domain of electric cars because accepting this innovation entails a need for the consumer to change their conventional habits of fueling up and driving. The two-dimensional nature of this theory enables its analysis of the consumer's evaluation of both the utility and the difficulties involved in implementing the innovation. Therefore, it is especially useful when studying adoption in underdeveloped countries.

The Theory of Planned Behaviour (TPB) developed by Ajzen (1991) provides a socio-psychological framework that complements the Technology Acceptance Model (TAM). TPB states that three factors control behaviour because they determine the development of behavioural intention which comes before people take action. Subjective norms describe how people believe others expect them to behave. In Pakistan, which has collectivist social systems, people follow family and peer social norms when making their main purchasing choices. People base their decision to buy an electric vehicle on what their family members and friends and local community members think. The third variable which people use to assess their ability to execute the behaviour consists of practical enablers which include charging station access and financial resources.

3.3 EV Adoption in Developing Countries and Pakistan

The studies of EV uptake in developing nations are fewer but increasing. Research (Shetty et al., 2020) in emerging markets has emphasised that in developing markets, the price sensitivity is much greater since consumers are less likely to pay the extra price of EVs without government subsidies. The infrastructure is also an even more pressing issue, as charging networks are frequently unsophisticated or nonexistent in the areas beyond big cities. In the

case of Pakistan, specifically, (Ahmad et al., 2024) investigated the usage of electric vehicles as it really is, and identified the availability of charging infrastructure to be a strong moderating factor in the correlation between consumer attitudes and actual EV use. They indicate that even with positive attitudes, the willingness of consumers to adopt EVs is limited by the more practical inaccessibility of charging infrastructure, especially in areas beyond the main cities, such as Karachi, Lahore, and Islamabad. Another gap that is critical in the context of Pakistan is consumer awareness and knowledge.

In Pakistan, (Mustafa et al. 2026) have established that the extent to which consumers associate their identity with environmental values through environmental awareness and self-identification determines the intentions of EV adoption. Nevertheless, their research also reported that a considerable percentage of Pakistani consumers are still under-informed regarding EV technology, operation expenses, and the existing government subsidies, which means that the awareness campaign may be a successful lever in promoting its adoption. It is generally accepted that government policy is a key facilitator of EV adoption. The Pakistan Electric Vehicles Policy 2020-2025 provides some fiscal support, such as importation duty on EV parts, though critics have reported it has been inconsistently implemented and the policy fails to sufficiently meet the infrastructure gap (Qadir, 2025).

There are multiple barriers that have converged together in the Pakistani electric vehicle market: high sensitivity to prices, lack of charging facilities outside of major cities, lack of awareness among consumers, and poor implementation of policies. All these barriers, taken together, make the situation difficult for electric vehicles. The use of a single barrier solution does not provide an effective outcome. The situation requires a complete solution which includes both infrastructure development and consumer education and fiscal benefits. The complete consumer dedication to electric vehicles will not result in productive outcomes.

3.4 Research Gap

The existing literature review has identified several essential research gaps which require investigation because researchers have not explored these gaps in relation to the Pakistani context.

The EV adoption research field contains a geographical research gap which shows an uneven distribution of studies. Most of the existing research has focused on developed countries located in Europe North America and East Asia while some researchers have started to study

developing markets including India and China. The current state of knowledge about Pakistan shows that researchers have not yet discovered which social economic and cultural aspects drive electric vehicle adoption in the country. The existing research gap creates problems because researchers cannot use findings from developed environments to understand Pakistan's specific conditions.

The current level of consumer understanding about electric vehicles in Pakistan needs thorough research because it has not yet received adequate study. The existing research shows that Pakistani consumers have limited knowledge about electric vehicle technology and operating costs and government incentive programs. The understanding of baseline knowledge requires a complete assessment of campaign effectiveness according to educational programs.

The research showed that charging infrastructure barriers which obstruct electric vehicle adoption more than other factors. The research shows that Pakistan lacks sufficient documentation to prove which charging stations exist and how accessible they are throughout the country. The infrastructure development process progresses at a slower rate in minor cities and rural environments when compared to main urban areas.

The development of electric vehicle policies in Pakistan requires assessment through two essential methods. The assessment of fiscal incentive effectiveness together with infrastructure investment public commitments requires comprehensive investigation. The identification of these research gaps will create practical recommendations that help policymakers and industry leaders to advance electric mobility development in Pakistan.

4. Research Methodology

4.1 Research Philosophy and Approach

The research adopts a positivist research philosophy which asserts that empirical data can objectively measure and assess consumer behavior as a social phenomenon (Saunders, Lewis and Thornhill, 2019). The research uses positivism as its foundation because the study aims to discover measurable connections between independent variables which include economic factors, charging infrastructure, consumer awareness, and government policy and the dependent variable which is EV purchase intention. The research will test its hypotheses through a deductive approach which will use established theoretical frameworks to develop its hypotheses with Technology Acceptance Model (TAM) and Theory of Planned Behavior

(TPB) serving as its base and Pakistani consumer primary data as its testing foundation. The deductive approach leads from theoretical premises toward observational proof which maintains research connections to current scientific knowledge while producing new empirical findings that apply to the Pakistani situation.

4.2 Research Design

A cross-sectional survey design is selected for this study. The design enables researchers to gather data from the target population at one specific moment which suits research needs to study consumer attitudes and perceptions and behavioral intentions within a defined time period. The cross-sectional approach supports both explanatory and exploratory study goals because it permits researchers to test statistical relationships between their main research variables. The research methodology is quantitative in nature as it enables data collection in a standardized form and then statistical analysis can be done using sophisticated techniques. It is necessary for the research results to have a wide audience appeal and hence qualitative research is inappropriate as it produces deep context-specific knowledge.

4.3 Data Collection Instrument

Structured online questionnaires will be used as the primary data collection tool by the researchers through Google Forms. The questionnaire will contain five sections which include

- (i) Demographic information
- (ii) Consumer awareness of EV technology
- (iii) Economic factors which include purchase price and operating costs
- (iv) Perceptions of charging infrastructure availability
- (v) EV purchase intention.

In this research will use established survey items from existing EV adoption instruments to assess respondents using a five-point Likert scale which ranges between "strongly disagree" and "strongly agree". The study will use Section (i) to gather demographic control variables which include age gender monthly income and current vehicle ownership status for subgroup analysis. There will be a pilot study testing ten items of the questionnaire among a group of ten participants for testing and also statistical evaluation of the appropriateness of these items prior to the complete study.

4.4 Sampling Strategy

The target population consists of adults who own cars and hold driving licenses and people who want to buy cars and live in Pakistani cities where electric vehicles will be adopted in the upcoming future. The study will conduct the sampling of participants by employing the technique of convenience sampling through online recruitment in social media forums and automobile forums and even university forums.

Convenience sampling is a sampling technique that makes the study sample statistically non-representative; however, researchers use convenience sampling in exploratory research studies when there is no sampling frame available and even in research studies where resources are limited. The sample size should be between 50 to 60 persons, as the sample size of this magnitude will suffice the requirements of both exploratory nature of the research study and statistical tools employed in the study.

4.5 Methodological Justification

Multiple reasons support the justification of the quantitative survey method. The research method follows positivist principles which support testing theoretical hypotheses by using numerical data (Saunders et al. 2019). The established online survey method has been proved effective for studying electric vehicle adoption in multiple countries (Rani et al. 2024) which establishes research validity for the present study. The online questionnaire serves as an effective data collection tool because it enables research teams to gather information while staying within their limited budget and time resources which are typical for postgraduate research. The research team could have used mixed-methods design with semi-structured interviews to create more comprehensive results but this method requires more time and resources than the current project can manage. The current research should use a sequential mixed-methods design to produce results which will validate existing quantitative data.

5. Expected Results and Analysis Plan

5.1 Data Preparation and Cleaning

Once the data collection process is over, the responses to the survey will be transferred to Microsoft Excel with the help of Google Forms. The initial stage of data cleaning would be to find the missing and inconsistent data entries and rectify them.. The study will treat missing data according to established methods while excluding responses that contain too many missing values from the final study results.

5.2 Descriptive Statistical Analysis

The Analysis will provide a complete overview of all variables by employing descriptive statistical methods. The analysis will include frequency distributions that show the distribution of categorical variables which include gender and income level and vehicle ownership status and content which shows the central tendency through mean values and the dispersion through standard deviation for continuous variables. The research will employ the use of graphs that will involve the use of bar charts and histograms to show how the responses will be distributed among key variables such as the level of consumer awareness and perceived economic barriers and the availability of charging infrastructure.

5.3 Reliability and Inferential Statistical Analysis

The open-source software JASP will be used to conduct both parametric tests and non-parametric tests of inferential statistics. The questionnaire's multi-item scales will be evaluated for internal consistency through the use of Cronbach's alpha method. A coefficient of 0.70 or above will be regarded as the acceptable threshold for reliability.

Pearson correlation analysis will be used to assess how independent variables which include consumer awareness and economic factors and charging infrastructure availability and government policy incentives relate to the dependent variable which is electric vehicle purchase intention. Multiple linear regression analysis will be conducted to assess how each independent variable predicts EV purchase intention while controlling for demographic variables which include age and gender and monthly income and current vehicle ownership status.

5.4 Expected Findings

Based on the theoretical frameworks and existing literature reviewed, the following findings are anticipated from the empirical analysis.

- High purchase price of EVs relative to conventional vehicles will emerge as the strongest negative predictor of adoption intention in Pakistan.
- Lack of widespread and reliable charging infrastructure will be a significant barrier to EV adoption.
- Consumer awareness regarding EV technology, operational cost savings, and government incentives will be positively correlated with purchase intention.
- Perceived ineffectiveness or poor communication of existing government policy incentives will further deter adoption.
- Younger, higher-income, and more educated consumers will demonstrate stronger EV purchase intentions compared to other demographic segments.
- The four variable clusters (economic factors, infrastructure, awareness, and policy) together will explain a substantial proportion of variance in EV purchase intention among Pakistani consumers.

6. Evaluation: Significance, Limitations, and Ethical Considerations

6.1 Research Significance

The current study contributes to the existing body of research in a number of ways both theoretically and practically in a significant manner.

To start with, from the theoretical perspective, the current research is a pioneering effort in presenting a multi-dimensional model to measure the impact of various factors on EV adoption in the socio-economic and cultural milieu of Pakistan. Despite the large amount of literature dedicated to the topic in the context of the developed countries, there is a relative lack of literature on EV adoption in the developing countries of South Asia. The present research is, therefore, a significant addition to the body of knowledge not only in geographical location but also socio-economic and cultural environments.

In terms of practicals, the findings of the study will provide significant information to the Pakistani officials. In case economic aspects and infrastructure restrictions are revealed as the major barriers to the widespread use of electric cars, as hypothesized, this will give rise to some policies concerning the country's budget. These policies entail increased subsidies on the purchases, reduced tariffs on imports of the charging equipment, and increased expenditure on infrastructure projects of the construction of the charging stations. The study will also generate useful information for the auto industry. Identifying target consumer groups that have the highest chance of adopting electric cars will enable companies to design appropriate promotional activities and new product development. Lastly, banks can take advantage of this research in establishing special financial tools to buy electric vehicles.

6.2 Limitations

The proposed study recognizes various methodological limitations that can affect generalizability and validity of its results.

- Sampling represents a limitation to sample representativeness by convenience sampling. The vehicle owners of the urban population might be more educated and technologically aware of the population in general in Pakistan and therefore overestimate the awareness and purchase intention of EVs.
- Cross-sectional design captures attitudes at a single point in time and fails to account for variations in consumer perception as the EV market and policy environment evolve.
- Small sample size (50-60 respondents) limits statistical power for regression analysis and may fail to identify weak yet real effects.
- Self-administered online questionnaire is vulnerable to common method bias and social desirability effects, potentially overestimating intentions to adopt EVs.
- Reliance on self-reported purchase intention rather than actual buying behaviour may not accurately reflect real-world adoption decisions.
- The urban-only focus excludes rural and semi-urban populations where charging infrastructure is even less developed, limiting the applicability of findings to Pakistan as a whole.

6.3 Ethical Considerations

In this study, the basic ethics will be observed in order to protect the welfare and rights of everyone participating in the study. The data will be collected through the means of offering the participants with a participant information sheet (PIS). The PIS will state the rationale of the research and how the participants will be involved in the research. They will be told that the participation is voluntary, and they can pull out of the research at any time without providing reasons without suffering any adverse effects.

At the beginning of the survey, there will be an e-consent form that participants need to acknowledge before continuing the questionnaire. Personal information such as name, address, and contact information will not be collected from any of the participants. The information provided will be kept confidential, and no individual will be able to link their information to any other person. The information will be kept confidential by storing them in encrypted systems. Only the researcher will be able to access the information. The information will be kept for academic purposes and later destroyed appropriately.

The participants in this research are adults who own cars, have driving licenses, or are prospective buyers of vehicles. None of the vulnerable groups like minors, prisoners, or those with impaired cognition will take part in the experiment. There are no sensitive issues that will be dealt with in the research, nor will the participants be exposed to deceptive or distressing materials. They will not be harmed physically or psychologically in any way.

7. Proposed Research Timetable

The Gantt chart below (Table 1) shows the proposed schedule of this research project. The research will be undertaken over eight months, January to August 2026, which will be in line with the academic year and dissertation submission deadline.

Table 1: Proposed Research Timetable (Gantt Chart)

Activity	May	June	July	Aug	Sep	Oct	Nov	Dec
Literature Review	■	■	■					
Research Design & Ethics	■	■						
Questionnaire Development		■	■					
Pilot Study			■					
Data Collection			■	■				
Data Analysis				■	■			
Writing Up					■	■		
Review & Editing						■	■	
Submission								■

Each activity represents a primary focus for the designated month(s). The literature review will continue throughout the project as a background activity

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