

DETERMINANTS OF ELECTRIC VEHICLE ADOPTION IN ETHIOPIA: ASSESSING THE MEDIATING ROLE OF PERCEIVED APPLICABILITY

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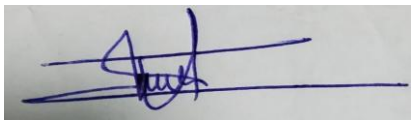
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Addis Ababa, Ethiopia

Declaration

I, Ismail Fedlu Abdu hereby declare that the thesis entitled “Determinants of Electric Vehicle Adoption in Ethiopia: Assessing the Mediating Role of Perceived Applicability”: is based on my original work, except for quotations and citations, which have been duly acknowledged.

I further declare that this thesis has not been previously or currently submitted to Addis Ababa University or any other institution for any degree or academic qualification.

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Statement of Certificate

This certificate certifies that the thesis entitled *" Determinants of Electric Vehicle Adoption in Ethiopia: Assessing the Mediating Role of Perceived Applicability"* was conducted by Ismail Fedlu Abdu as partial fulfillment for the Master of Business Administration at Addis Ababa University.

I confirm that this work is original and has not been submitted for any degree, either at AAU or any other university. With my approval, this thesis is now submitted for consideration.

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This is to certify that thesis prepared by Ismail Fedlu Abdu, entitled: *Determinants of Electric Vehicle Adoption in Ethiopia: Assessing the Mediating Role of Perceived Applicability* and submitted in partial fulfillment of the requirements for the Master of Business Administration complies with the regulations of the university and meets the accepted standards concerning originality and quality.

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Abstract

This study examines the determinants of electric vehicle adoption in Ethiopia, specifically assessing the mediating role of perceived applicability. Utilizing a descriptive-explanatory quantitative research design, the study focuses on how technological, infrastructural, and economic factors shape consumer behavior. By surveying 235 participants via a two-stage non-probability sampling technique, the research obtained reliable and objective data. The rigor of the research instrument was confirmed by high internal consistency scores, featuring a Cronbach's alpha of 0.913 for EV adoption intention.

Structural equation model revealed a distinct mediation paradox: whereas established models pose that consumers evaluate lifestyle compatibility before deciding to adopt a technology, this structural path is statistically insignificant in the current Ethiopian market. Instead, macroeconomic, technological, and infrastructural factors influence consumers directly.

Driven by functional necessity rather than voluntary lifestyle choices, consumer decision-making is heavily mitigated by social factors, which act as vital risk-reduction tools against anxieties regarding charging infrastructure, battery longevity, and resale value. The structural model explains 70.1% of the variance in adoption intention ($R^2 = 0.701$).

This high explanatory power is heavily accelerated by macro-environmental pressures, including the national ban on internal combustion engine imports, the influx of cost-effective Chinese EVs, and escalating fuel prices.

While these regulatory mandates have compressed the traditional decision-making cycle and forced high adoption intent, stakeholders must urgently address infrastructural deficits. Failure to bridge the gap between regulatory pressure and infrastructural readiness may compromise consumer satisfaction and the long-term sustainability of Ethiopia's EV transition.

Keywords: Electric Vehicles, Perceived Applicability, Structural Equation Modeling, Adoption Intent, Internal Combustion Engine Vehicles, Mediation Paradox, Social Factors

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List of Acronyms and Abbreviation

EV: Electric vehicles

PHEV: Plug-in hybrid electric vehicles

HEV: Hybrid electric vehicles

ICE: Internal combustion engine

BEV: Battery electric vehicles

FCEV: Fuel cell electric vehicles

AVE: Average Variance Extracted

EA: EV Adoption

EF: Economic Factors

IF: Infrastructural Factors

TF: Technological Factor

SF: Social Factors

PA: Perceived Applicability

RMSEA: Root Mean Square Error of Approximation

SEM: Structural Equation Modeling

JASP: Jeffreys' Amazing Statistics Program

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Chapter One: Introduction

1. Introduction

The world automotive industry is undergoing a radical change due to the rapid introduction of electric vehicles through changing technology and environmental concerns. Further governments in most countries are pursuing more stringent regulations on emissions and increasing the use of EVs in their strategies for combating climate change.

Top vehicle manufacturers are concentrating their resources on electrification, spending significantly on R&D to improve battery performance, driving range, and cost. The largest producers and sales of EVs are currently located in countries such as China, United States and other European countries.

This transition is changing supply chains and opening new opportunities for renewable energy integration and redefining the future of mobility by spurring innovation in areas like autonomous driving, smart grid systems, and sustainable urban planning.

1.1 Background of the study

Electric vehicles are becoming an important part of the solution to environmental problems and the global shift toward sustainable transportation. The transportation sector contributes significantly to greenhouse gas emissions, and vehicles that run on fossil fuels worsen urban air pollution, especially in cities that are growing rapidly (International Energy Agency [IEA], 2023).

Globally the transport sector accounts for around 15% of total worldwide greenhouse gas emissions, with road transport accounting for the bulk of the amount at 12–13%. The adoption of electric vehicles is therefore a necessary part of the global de-carbonization process as EVs provide a solution to eliminate tailpipe emissions. When used in conjunction with a decarbonized electricity EVs make the transport sector compatible with global climate objectives such as the net zero emissions by 2050 (IEA, 2024).

EVs when charged with electricity from renewable energy sources offer a chance to cut emissions, reduce environmental impact of transportation, and support energy sustainability (Sierzchula et al., 2014).

Moving towards a cleaner energy and using electric vehicles can help meet various sustainable development goals especially for goals related to health, urban sustainability, and climate action (United Nations, 2015).

Historically, global regulatory requirements and increasingly stringent fuel economy requirements have been the driving force behind the change towards electric mobility in the automotive sector (Hasselwander, 2026).

Although this change is still strategic in nature in the long run; the present market environment featuring differences in regional regulation, along with the need for price competitiveness in the short run has led to a diversification of electrified powertrains within the industry, including battery and hybrid electric drives (Ritchie, 2026).

The automotive market for most Africa countries continue to rely on imported second hand internal combustion engine vehicles (UNEP, 2024).

According to the study by (UNEP, 2024) Africa receives approximately one third of globally traded used light-duty vehicles making it the largest destination for such imports. As a result, affordable used vehicles remain the dominant choice for many consumers due to lower purchase prices. This widespread availability of low cost internal combustion engine (ICE) vehicles creates a significant challenge for the adoption of electric vehicles which requires higher upfront investment (UNEP, 2024).

Consequently, EV manufacturers often struggle to compete on price particularly in markets where vehicle affordability is a primary purchasing consideration. While declining battery costs and technological advancements may improve the competitiveness of EVs over time broader adoption is likely to depend on supportive government policies, investment in charging infrastructure, and targeted market incentives (UNEP, 2024).

The Ethiopian context however represents a unique global outlier in the evolution of EV adoption characterized by what analysts term structural compression. Following the October 2022 moratorium on the import of internal combustion engine vehicles the nation has rapidly pivoted toward an EV-centric transport ecosystem (Energy for Growth Hub, 2026).

This state-led mandate leverages Ethiopia's significant renewable energy advantage, with over 90% of electricity generated from clean hydropower to position e-mobility as a core pillar of national industrialization and decarburization (Ministry of Transport and Logistics, 2026; World Bank, 2023).

By mid-2026 Ethiopia had successfully integrated approximately 115,000 EVs into its national fleet, representing an adoption rate of roughly 8.3%, which significantly outpaces many developed economies (Energy for Growth Hub, 2026; EV24.africa, 2026).

The economic benefits of EVs for Ethiopia is substantial in terms of the potential to grow the local industry, attract foreign investments, and create eco-jobs. Given that Ethiopian government is making efforts to change the policies for EV use and providing various financial incentives it can be assumed that the introduction of EVs will foster market growth, public-private cooperation, and establishment of local assembly (IEA, 2023).

Lastly, the introduction of EVs into the Ethiopian context is seen as a way of making an intervention aimed at minimizing greenhouse gases and decreasing its reliance on imported fossil fuels (Ministry of Finance, 2022).

1.2 Statement of the problem

On global level the process of sustainable electric mobility has already shifted from the niche market phenomenon to the default international standard in the automobile industry. For instance, the number of passenger electric vehicles sales is projected to reach 23 million units in 2026, which will be a new all-time high (BloombergNEF, 2026; International Energy Agency [IEA], 2026).

The number of EVs sales is projected to grow by 11% compared to 2025 and constitute approximately 27% to 30% of all new car sales internationally (BloombergNEF, 2026; International Energy Agency, 2026).

Such a dramatic shift is becoming possible due to sharp declines in lithium-ion battery costs, increased availability of model Varity and enhanced regulation standards. Moreover, forecasts show that EVs will constitute more than 52% of passenger vehicle sales globally by 2035 (BloombergNEF, 2026).

In the African continent sustainable electric mobility is on the rise with the growth of the African EV industry expected to be robust at a CAGR above 50% until 2031; growing from the nascent phase in which it currently finds itself in (Mordor Intelligence, 2026).

Although early growth was seen in passenger categories and countries with manufacturing facilities such as Morocco and South Africa, the continent wide fleet has been increasingly characterized by the widespread rollout of two-and three-wheelers in countries such as Kenya and Rwanda (United Nations Economic Commission for Africa [UNECA], 2026).

Pressed financially due to costly fuel imports and energy independence needs, some African nations are using strategic policies including zero tariffs and micro leasing to leapfrog over existing structures. Nevertheless, there is a marked unevenness in the transition process due to the presence of serious structural differences in infrastructure and institutions (UNECA, 2026).

Within this context Ethiopia has emerged as an aggressive leader enacting a mandatory ban on importing ICE vehicles to mitigate a massive $4.2 billion annual fuel import bill and over ETB 20 billion in monthly fuel subsidies (Energy for Growth Hub, 2026; Tymon, 2026).

Driven by the national electric mobility strategy 2025–2030 which targets putting over 500,000 EVs into circulation by 2030, the domestic EV fleet has boomed to more than 115,000 vehicles rapidly climbing to account for roughly 8% of the total national vehicle population far outpacing the global average fleet penetration (Energy for Growth Hub, 2026; Tymon, 2026).

Despite the fast-paced and state-imposed transformation which has seen the country electric vehicle fleet surpass 115,000 vehicles the sector is experiencing a massive shortfall in terms of infrastructure. Given the low capacity for electricity distribution from public charging stations, which stand at less than 50 commissioned stations across the nation, the gap between vehicle ownership and electricity distribution infrastructure poses serious challenges to the government bold e-mobility agenda (Energy for Growth Hub, 2026; Xinhua, 2026).

Given that the EV technology is at early stage the extreme regulation pushes the consumers to a very volatile environment lacking local after-sales service, qualified technicians and grid distribution. The costs of purchasing these vehicles are very high compared to the average income in the region, creating an economic crisis in terms of the inflated cost of second-hand cars.

Further the number of people adopting electric vehicles is substantially outpacing the development of the necessary infrastructure for their functioning. People who choose to adopt EVs get into a world where the necessary infrastructure for charging is very little and is limited only to urban areas. It poses a geographic challenge for people to travel beyond Addis Ababa using the vehicle.

A central challenge remains the governments pursuit a revolutionary shift in technology without sufficient empirical evidence and the implementation of far-reaching policies with limited information on socio-economic factors which creates a systematic dissonance.

1.3 Research question

1. How do technological aspects influence electric vehicle adoption intent through the mediating role of perceived applicability?
2. To what extent does infrastructural readiness impact EV adoption intent as mediated by perceived applicability in the Ethiopian automotive sector?
3. In what ways do economic conditions affect the intent to adopt EVs through the mediating lens of perceived applicability?

4. Does social influence have a significant direct impact on the intent to adopt electric vehicles in the Ethiopian context?

1.4 Objective of the Study

1.4.1 General objective of the study

The general objective of the study is to examine the determinants electric vehicles adoption in Ethiopia specifically assessing the mediating role of perceived applicability.

1.4.2 Specific objective of the study

1. To evaluate the influence of technological aspects on EV adoption intent through the mediating role of perceived applicability.
2. To assess the impact of infrastructural readiness on EV adoption intent through the mediating role of perceived applicability.
3. To examine how economic conditions, affect EV adoption intent through the mediating role of perceived applicability.
4. To investigate the direct influence of social factor on the intent to adopt electric vehicles.

1.5 Significance of the study

The significance of this study lies in its empirical finding of a critical behavioral paradox where factors of EV adoption such as infrastructure readiness and technological reliability do not operate through standard logical pathways.

For policymakers the findings serve as evidence for transition management and indicates that current adoption intent is driven by regulatory necessity rather than perceived situational fit. In order to prevent potential public backlash this research serves as empirical data for policy makers to transition from import restrictions to robust investment in charging infrastructure and provide additional incentives like green mobility investment zones, battery swapping stations for public transport, and standardized battery health certification systems to effectively make EV adoption a structurally feasible reality.

Furthermore, this study serves as a direction for automotive stakeholders to move in to a strategic shift in capital allocation by redirecting funds from generic marketing toward diagnostic infrastructure and technical training to bridge the trust gap created by the rapid regulatory transition.

For private investors this study serves as risk-assessment tool by showing that state mandates stimulated electric vehicles demand and western-centric market models are insufficient. In addition, the research emphasizes the necessity of investing in localized commercial charging networks and micro-leasing models that specifically address consumer anxieties.

For importers and automotive assemblers, the results provide intelligence for surviving a volatile market and the disconnect between traditional consumer perception and consumer intent suggests that distributors should prioritize vehicle specification such as battery longevity over luxury features.

For global academic literature this study makes a substantive contribution to behavioral economics by using traditional framework like UTUAT to study EV adoption in a new market context.

The lack of support for traditional mediating hypotheses constitutes a major empirical finding demonstrating that aggressive regulatory shocks fundamentally disrupt standard technology acceptance pathways. By providing a validated, context-specific scale for East African mobility; this thesis shifts the academic discourse from abstract engineering metrics to the socio-psychological complexities of forced technological transitions.

In summary this research generates important information on the opportunities and challenges of adopting electric vehicles in Ethiopia. The outcome is helpful to policymakers, stakeholders, and investors who want to learn about the key issues that need to be considered to achieve the shift towards sustainable e-mobility systems.

1.6 Scope and Limitation of the study

The scope of this research is defined by four parts:

Content Scope: This study looks at what makes people buy vehicles like battery electric vehicles and hybrid electric vehicles. It focuses on how good the technology is, if there are enough infrastructure, if it is economically viable and impact of social influences. This research does not investigate how electric vehicles affect environment or what government says. The research only looks at why people do or do not intend to buy EVs.

Geographical Scope: This research conducted only Addis Ababa, Ethiopia. Due to time and budget constraints regional cities as well as rural areas are not covered. Further, Addis Ababa is chosen because most it is a major capital and economic city where potential buyers of EV are expected to exist.

Target Population: From the total population of Addis Ababa using a purposive & convince sampling techniques respondents based on certain traits, their job positions, or knowledge about the research phenomenon are targeted.

Parameters: Due to the fast pace at which legal regulations in Ethiopia change from a top-down perspective, this study considers policy as part of the context.

It should be noted that the aim of this research is to analyze determinants related to electric vehicle adoption and not technical specifications of electric vehicles. Thus, a discussion about technical features of electric vehicles or an analysis of different electric vehicles models will not be included in this paper.

1.7 Definition of Terms

Technological Factors: Technical factors that affect the performance and reliability of the EV in regards to its range, capabilities, charge speed, battery life, and required future maintenance.

Infrastructural Factors: Environmental conditions such as the accessibility of chargers for vehicles, energy grid stability and infrastructure investments.

Economic Factors: The financial realities of EV ownership, focusing on total cost, the burden of battery replacement and how the vehicle holds its value over time compared to traditional assets.

Social Factors: refer to interpersonal and cultural influences like community support, social prestige, and public awareness shaping consumer behavior.

Perceived Applicability: How suitable a person finds EVs to be in relation to their own particular lifestyle; it is a personal judgment about usability that a consumer makes before adoption.

EV Adoption Intent: The probability of purchase and utilization of the EV by the consumers.

Chapter Two: Review of Related Literature

2. Literature review

This literature review regarding EV adoption in Ethiopia will cover the existing literature in relation to the various factors involved in the adoption process of EVs. The literature review in this study is important since it gives an insight into the existing body of knowledge on EV adoption and its various factors, as well as highlighting gaps in existing literature and providing an analytical framework for understanding the various complexities of EV adoption through the interaction of various variables such as technology, economics, infrastructure, and social influences.

Identifying and understanding the driving and restraining factors involved in the adoption process of EVs is important for formulating appropriate policies and strategies to promote the adoption of EVs in order to deal with the various environmental and economic challenges facing Ethiopia. It will also inform the theoretical framework of the study.

2.1 Theoretical Review

2.1.1 What is an Electric Vehicle (EVs)

Electric vehicles are defined as those vehicles which utilize electric motor-driven wheels. They get their energy from batteries that are recharged by an external source of electricity (European Environment Agency, 2024).

2.1.2 The History of an Electric Vehicles (EVs)

Electric vehicles have a long and storied history. The interest for them largely varied over the years due to environmental issues and available energy resources. The first electric cars were built in the 1830s, immediately after the development of the first electrical machines. In the next period, numerous electrical vehicles were constructed but without a significant breakthrough in transportation (Văscan & Szabó, 2022).

In 1827 the Hungarian Benedictine monk Ányos Jedlik built the first rudimentary but working D.C electrical machine. Only within one year, he used it to drive a simple small-scaled car model (Văscan & Szabó, 2022).

Another small-scale electric cell supplied electrical vehicle was built in 1835 by Sibrandus Stratingh, a professor of chemistry and technology at the University of Groningen (Netherlands). It weighed about 3 kg and could move for 20 minutes with a 1.5 kg load with its fully charged cells (Văscan & Szabó, 2022).

Scotsman Robert Anderson is the inventor of the first full-scale electricity driven carriage. His prototype was built sometime from 1832 to 1839 in Aberdeen It used primary cells (non-rechargeable batteries) to generate electrical power and had a maximum speed of 12 km/h (Văscan & Szabó, 2022).

The first successful commercially available electric cars were named in an inspired way Electro bats. Its first variant was built in 1894 by the combined efforts of a mechanical engineer and a chemist, Henry G. Morris and Pedro G. Salom in Chicago upon their own patented technologies. The first variant was a slow and very heavy car having steel tires. The rechargeable batteries alone weighed more than 725 kg of the 2 tons' gross mass of the vehicle (Văscan & Szabó, 2022).

Thanks to the continuous research and development efforts, later Electro bats became lighter, faster, and less unwieldy. They had pneumatic tires and were steered by their two rear wheels. These vehicles were powered by two 1.1 kW claw pole motors. Due to their state-of-the art batteries at the time, they could travel 40 km at an average speed of 32 km/h on a single charge (Văscan & Szabó, 2022).

Due to high interest in these cars, the two partners expanded their business by building several hansom variants based on the model. One of these is given in Fig. 4. These electric vehicles were also used as taxis in many cities in the USA (Văscan & Szabó, 2022).

Here also the main achievements in this field of the Austrian-born Ferdinand Porsche must be mentioned. In 1899, while working at Jakob Lohner & Company, the 22-year-old brilliant designer created his first electric car. This could achieve a speed of 25 km/h. His electric cars included cutting-edge technology at the time, such as the electrical hub motor that drove the vehicle's wheels directly (Văscan & Szabó, 2022).

2.1.3 The Early Modern History of Electric Cars

In the mid-1970s some automobile manufacturers attempted to convert conventional cars to electric ones, but the market was not ready for such expensive, hard to charge vehicles. Having in the mind the future need for clean vehicles not needing fossil fuels, the Japanese government began to strongly support the research in the electrical vehicles field. The results were seen in the 1990s, when Japanese automakers (such as Toyota and Nissan) dominated this market (Văscan & Szabó, 2022).

Following the embargo of 1973–1974 and resulting shortages that led to expensive gas, there was renewed interest in electric cars. However, while different companies and inventors created electric vehicles like General Electric's Citi car and small-scale producers, there were limitations due to

battery technology and the high price of such cars, thus making their mass production out of reach. The government helped through the 1976 Electric and Hybrid Vehicle Research, Development and Demonstration Act that gave financial aid to research on electric and hybrid cars. Several prototype vehicles came onto the market at that time (Nichols, 2025).

From the nineties onwards, however, innovations in EV design brought about significant progress, with leading automobile brands unveiling their products such as the Ford Ranger EV, the Honda EV Plus, the Nissan Altra, Chrysler TEVan, and General Motors EV1 – the first model designed for electric cars by one of the major manufacturers. The vehicles exhibited notable advancement in terms of performance and range but, at the same time, were expensive and faced low consumer demand. During this period, the industry began paying attention to batteries, which became a crucial prerequisite for further innovations in the field (Nichols, 2025).

The real turning point, however, came a decade later when Tesla Motors, founded by Martin Eberhard and Marc Tarpenning with Elon Musk as an active investor, introduced the Roadster – the world's first mass-produced electric car to feature lithium-ion batteries that promised a considerable increase in performance and range and significantly altered consumers' opinions on the potential of EVs. Subsequent developments in battery design combined with their lower cost paved the way for the emergence of several successful mass-market models (Tesla Model S, X, 3, and Y) that resulted in the rapid global spread of the technology (Nichols, 2025).

2.1.4 Types of Electric Vehicles (EVs)

Electric vehicles (EVs) are categorized based on their powertrain configuration and how they use electricity for propulsion. The three main types of EVs are Battery Electric Vehicles (BEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Hybrid Electric Vehicles (HEVs). Each of these types has distinct characteristics, benefits, and challenges.

2.1.4.1 Battery Electric Vehicles

Battery Electric Vehicles are all-electric vehicles that run only using electricity generated by huge batteries. Such cars are externally powered through an electric source like a charging station, and they do not have an internal combustion engine. It is believed that Battery Electric Vehicles are environment-friendly because they emit no emissions through their tailpipes; therefore, they play a key role in the quest for reducing air and greenhouse emissions (Alternative Fuels Data Center, 2024; Transportation.gov, 2025). Notable examples are the Tesla Model 3 and Nissan Leaf.

2.1.4.2 Plug-in Hybrid Electric Vehicles

The Plug-in Hybrid Electric Vehicle consists of both an electric motor and a gasoline-powered engine, providing the advantages of each type of vehicle. It is capable of operating solely on electricity over a distance of up to 20-50 miles after which it switches to the use of gasoline fuel, enabling long-distance travels without worries about running out of power (U.S. Department of Energy, 2024). The car can be charged by plugging it into an electric source, allowing its usage on electricity at least on daily commute trips, with gasoline serving for long trips.

2.1.4.3 Hybrid Electric Vehicles (HEVs)

Similarities exist between HEVs and PHEVs, although HEVs do not have the ability to be charged by plugging them into an electrical outlet. The battery of an HEVs is charged via regenerative braking and internal combustion engines. Both engines, i.e., gasoline engine and electric engine, are used together to ensure that maximum efficiency is achieved. Unlike PHEVs and BEVs, HEVs cannot operate fully in electric mode. Toyota Prius and Honda Insight are good examples of HEVs (Toyota, 2024; Honda, 2024).

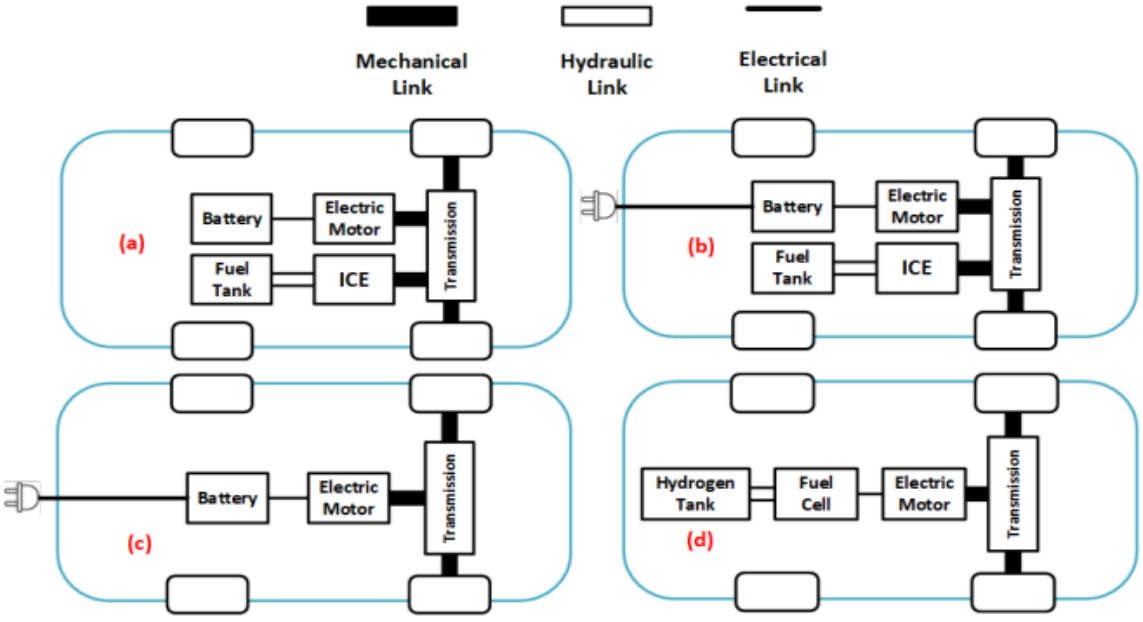


Figure 1. Basic structure of different electric vehicles (EVs) types. (**a**) Hybrid Electric Vehicle (HEV); (**b**) Plug-in Hybrid Electric Vehicle (PHEV); (**c**) Battery Electric Vehicle (BEV); and (**d**) Fuel Cell Electric Vehicle (FCEV).

Figure 2.1.7 Basic structure of electric vehicle types

(Source adopted from Morsy, José, Gabe, Álvaro, 2020)

2.1.5 Advantage and Disadvantage of EVs

Electric vehicles are rapidly gaining popularity as a cleaner and more sustainable transportation option. However, while EVs offer several benefits they also come with a set of challenges. Below are the key advantages and disadvantages;

2.1.5.1 Advantages

A. Environmental Benefits

Since there are no exhaust emissions from an EV, air pollution is greatly reduced. In contrast to conventional fuel automobiles, electric cars emit no CO2 or any other pollutants and thus are vital for lowering greenhouse emissions (International Energy Agency [IEA], 2024). Moreover, since EVs can be powered by renewable forms of energy such as solar and wind power, they minimize their carbon footprint even further (U.S. Department of Energy, 2024).

B. Energy Efficiency

EVs tend to be more energy efficient compared to the ICE-powered vehicles. Energy used by an electric motor is more efficiently transformed into movement (approximately 85-90%), whereas the rest of the energy is lost during engine work, mostly as heat in conventional vehicles (U.S. EPA, 2024). Thus, EVs represent the cost-effective choice for regular commuting purposes (IEA, 2024).

C. Reduced Operating Costs

Operating and maintaining an EV is usually cheaper than that of a normal car. Electric cars don't need any oil changes, and their brakes are expected to wear out less often because of the use of regenerative braking (Tesla Motors, 2024). Electricity is also usually more affordable per mile when compared to diesel or gas (U.S. DOE, 2024).

D. Noise Reduction

Electric vehicles have less sound compared to conventional automobiles, which helps to minimize noise pollution, especially in urban regions. This enhances the quality of life, especially in suburban neighborhoods (U.S. EPA, 2024).

2.1.5.2 Disadvantages of EVs

A. Range Anxiety

Range anxiety is a significant problem for those using electric vehicles, where they experience the fear of running out of battery life before reaching a charging facility. In spite of advances in battery technologies, many electric cars today still feature a short range as compared to cars that run on fuel (IEA, 2024).

B. Charging Infrastructure and Time

Although more public charging stations are becoming available, they are still not enough in certain areas, which makes long travels difficult. In addition, charging an electric vehicle takes longer than refueling a fuel-based car. With fast charging stations, one can recharge their electric car up to 80% within 30 minutes, while it usually takes a few minutes for gasoline cars to be refueled (U.S. DOE, 2024; Tesla Motors, 2024).

C. High Initial Cost

Despite the overall cost of owning being lower because of the decreased cost of operation, the initial buying cost of electric cars is more expensive than that of their gas counterparts mainly because of the expensive nature of the batteries (IEA, 2024). Nevertheless, this will change as improvements in battery technology continue.

D. Environmental Impact of Battery Production

Although electric vehicles emit no pollution directly from their operation, the manufacturing of batteries, especially the lithium-ion type, poses some environmental concerns. The extraction of minerals such as lithium, cobalt, and nickel is environmentally disruptive, and the recycling of batteries is still an ongoing problem (U.S. DOE, 2024).

E. Limited Model Variety

Despite the number of models in the market for EVs growing steadily, the number is still less than that for traditional automobiles. There are many who express concern regarding the small number of options in the market for electric cars, especially when compared to fuel cars (Volkswagen, 2024).

Conclusion

2.1.6 Product Adoption

Adoption can be defined as the process by which customers start accepting and making frequent use of an innovative good or service. It consists of several phases starting with the awareness stage and ending with the stage of consistent use of the product. The adoption process may depend on the elements like innovation, the value of a product, and influence from peers. It is important for the process to be known by marketers and other parties when launching a product.

According to Kotler & Keller (2016), product adoption is the process in which a customer starts using a new good or service. It includes the phases associated with adoption of a product.

2.1.6.1 The Product Adoption Process

1. **Awareness:** The first stage in the adoption process is awareness. The consumer becomes aware of a new product but does not have detailed information about it yet. This awareness may come from advertisements, word-of-mouth, or media coverage (Kotler & Keller, 2016).
2. **Interest**: In this case, the consumer will begin searching for additional information about the product. The consumer can conduct research on the product's attributes, benefits, and possible application areas. Usually, the consumer's interest gets stimulated when he/she realizes that the product will satisfy his/her need (Rogers, 2003).
3. **Evaluation**: Customers assess whether the product is worth testing or not, comparing it against other available products or weighing its advantages and disadvantages. At this point, customers assess whether the product is compatible with their lifestyle and can be of benefit to them (Kotler & Keller, 2016).
4. **Trial**: During this phase, the consumer uses the product to test whether the product delivers its expected outcomes. Trial may take place through sampling, demonstrations, or trial use of the product by the consumer (Rogers, 2003).
5. **Adoption (or Rejection)**: Finally, after undergoing the process of trial, the consumer makes a choice of either adopting the product or rejecting the same. The adoption refers to incorporation into routine use while rejection will entail discontinuing or looking for alternatives (Kotler & Keller, 2016).
6. **Post-Adoption Behavior**: Once the adoption process is over, the consumer will feel satisfied or dissatisfied with his decision. Such an experience could affect future purchasing decisions, recommendations, or even product discontinuance. The marketer needs to resolve consumer issues after the adoption stage to avoid post-purchase dissonance (Rogers, 2003).

2.1.6.2 Factors Influencing Product Adoption

I. **Relative Advantage:** The degree to which a product is perceived as superior to existing alternatives influences how quickly it is adopted (Rogers, 2003).

II. **Compatibility**: How well the product fits with the consumer's existing values and lifestyle can significantly affect adoption (Kotler & Keller, 2016).

III. **Complexity**: Products that are perceived as easy to use are more likely to be adopted quickly (Rogers, 2003).

IV. **Trial ability**: The ability to try a product before committing can increase the likelihood of adoption (Kotler & Keller, 2016).

V. **Observability**: The visibility of the product and its benefits can influence others to adopt it (Rogers, 2003).

In the context of the Ethiopian automotive market, these factors transform from abstract concepts into strategic market variables. **Relative Advantage** is directly tied to economic conditions where consumers weigh high upfront costs against massive fuel cost exemptions. **Compatibility** must be evaluated through perceived applicability specifically whether an EV matches Ethiopia's rough terrains and localized power grid reliability. **Complexity** shifts from simple vehicle operation to consumer anxieties regarding the absence of localized after-sales support networks.

2.1.7 Diffusion of Innovations

The diffusion of innovations theory seeks to explain how and why new ideas and practices are adopted, including why they can be spread out over long periods. The way in which innovations are communicated to different parts of society and the subjective opinions associated with the innovations are important factors in how quickly diffusion or spreading occurs (Clay Halton, 2025). The diffusion of innovations theory was developed by E.M. Rogers, a communication theorist at the University of New Mexico, in 1962. The theory explains the passage of a new idea through stages of adoption by different people who participate in or begin using the new idea. The main people in the diffusion of innovations theory are:

1. **Innovators:** Those who are open to risks and the first to try new ideas
2. **Early adopters:** People who are interested in trying new technologies and establishing their utility in society
3. **Early majority:** Those who pave the way for the use of an innovation within mainstream society and are part of the general population
4. **Late majority:** People who follow the early majority into adopting the innovation as part of their daily life and are also part of the general population
5. **Laggards:** People who lag behind the general population in adopting innovative products and new ideas

Classical diffusion curve presumes the presence of the organic evolution of the market lifecycle in which innovators are supposed to naturally create room for the majority. The 2022 ban of the

government of Ethiopia on importing ICE vehicles creates compressed diffusion conditions in the market by forcing the majority to be without passing through the innovation phase.

2.1.8 The Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM), which was first introduced by Davis (1989), is one of the most prominent theoretical frameworks applied in determining the underlying elements of adoption of technology. While the framework initially emerged from the area of information systems, it has become a general framework applicable in studying the interactions between humans and technology across different industries. This theory operates on the assumption that the decision to adopt any innovation will depend on the benefits and the efforts of using the innovation.

As suggested by Davis (1989), two main cognitive factors influence the extent of user acceptance, namely

I. **Perceived Usefulness (PU):** Perceived usefulness is defined as the extent to which the individual perceives the use of the specific system will improve his or her job performance (Davis, 1989, p. 320). At a more general level, PU can be described as the benefit that the user expects to derive from the technology. Where there is great benefit expected from the technology, such as efficiency and improved quality of life, adoption becomes more likely.

II. **Perceived Ease of Use (PEOU):** It is the extent to which an individual believes using a specific type of system will be effortless (Davis, 1989, p. 320). Perceived ease of use measures how the users perceive the difficulty of using the technology and the external difficulties in operating it. The usefulness of a certain technology may make it more attractive; however, it may be rejected due to its complex usage process (Davis, 1993)

2.1.9 Theory of Planned Behavior (TPB)

According to TPB, people's intention to engage in a certain behavior is one of the primary determinants of their behavior (Ajzen, 1991, p. 181). People form this intention through three independent determinants:

1. **Attitude towards the Behavior:** It refers to how much a person evaluates the behavior either positively or negatively (Ajzen, 1991, p. 188).
2. **Subjective Norm:** It refers to the pressure by others to perform or refrain from performing a certain behavior (Ajzen, 1991, p. 188).

3. **Perceived Behavioral Control:** The perception of whether the performance of the behavior will be easy or difficult and "is presumed to reflect both past experience and future expectations of obstacles" (Ajzen, 1991, p. 188).

2.1.10 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) is the most inclusive theory that incorporates components of eight different theories, namely, TAM and TPB. It is constructed in such a way as to explain a greater amount of variance in intention to use technology compared to previous theories (Venkatesh et al., 2003).

As indicated by Venkatesh et al. (2003), the UTAUT model comprises four main variables that determine intention and usage of technology:

A. **Performance Expectancy:** Refers to how much confidence an individual has in the ability of the system to improve his/her performance at work (Venkatesh et al., 2003, p. 447). Performance Expectancy is a measure of the functional usefulness of the technology.
B. **Ease of Use:** Refers to the degree of ease associated with using the system (Venkatesh et al., 2003, p. 450). This is equivalent to Effort Expectancy that exists in the TAM model.
C. **Social Influence:** This can be described as the level at which a user feels that important others feel the need to adopt a particular innovation (Venkatesh et al., 2003).
D. **Facilitating Conditions:** Defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003, p. 453).

As opposed to TAM and the early iterations of the UTAUT model, which make a clear correlation between facilitating condition and adoption intention, this research brings in another dimension: that of perceived applicability as an essential intervening perspective. Within an emerging country such as Ethiopia, the assessment of behavioral control by the customer and the evaluation of the facilitating condition limited to the availability of less than 200 publicly available charging points countrywide do not function independently. Rather, these structural constraints are viewed against the backdrop of a local cognitive evaluation of whether the vehicle is actually usable for travel beyond Addis Ababa.

2.2 EMPIRICAL REVIEW

2.2.1 Global Perspective on Electric Vehicles

Adoption of electric vehicles in preference to fossil-fuel based automobiles is going to shape the future of transport all around the world, because of the need to minimize the amount of greenhouse gas emission, reduce pollution, and lessen reliance on fossil fuels for energy.

Evidence suggests that the adoption of electric vehicles has grown at an exponential pace; their global sales share grew from less than 5% in 2020 to more than 14% in 2022 (International Energy Agency [IEA], 2023).

China, Europe, and America are the leaders of such economies, thanks to their robust regulatory frameworks, including subsidies, tax breaks, and proposed timelines for the phase-out of internal combustion engines (BloombergNEF, 2023).

There are several reasons behind the increased popularity of electric vehicles (EVs) in the global automobile industry. Environmental need continues to be one of the most crucial factors because EVs provide an emission-free option compared to the traditional fuel-operated vehicles. In addition, national governments have linked their target for electrifying their transportation sectors to net-zero emissions during the middle of the 21st century to deal with climate change, all thanks to technological advancements (IEA, 2024).

In addition, the economic benefits of the use of EVs are becoming more apparent due to the competitiveness of the total cost of ownership (TCO), resulting from escalating oil prices and cheaper maintenance than internal combustion engine vehicles. Even though there remain certain limitations including expensive initial purchase prices and lack of adequate charging stations, the worldwide movement toward electric mobility is an indication that sustainability is being adopted as part of transport system practices (International Energy Agency [IEA], 2024).

2.2.2 Overview of EV adoption Globally: Key Global Trends and Growth

There was a historic moment in the global market for electric cars in the year 2025, where electric cars broke the mark of 20 million vehicles sold (a 20% increase from the previous year 2024), accounting for 25% of the total global market share of the automobile industry. There is still an indication that the market continues to remain highly geographically concentrated, as the Chinese manufacturers continue to hold 60% share of the global EV sales, followed by Europe and North America, each holding about 15%.

The development of emerging market regions in Latin America and Southeast Asia is becoming evident in their role as the newest hubs of global EV growth, with sales increasing by more than 60 percent to around 600,000 vehicles. Also, battery cost trends continue to be one of the key factors for global adoption, with prices of battery packs decreasing by another 20 percent worldwide (International Energy Agency [IEA], 2025).

Even though the underlying trends towards global electrification of transport systems are built around regulatory frameworks (e.g., subsidies and incentives to manufacturers), the broader trends in developing regions hinge primarily on overcoming their initial infrastructure financial deficit, reliance on supply chains, and consumer unaffordability (World Bank Group, 2023).

Global oil shortages and volatile fuel prices continue to sharpen the economic case for switching to electric mobility, with electric vehicles officially projected to represent half (50%) of all vehicles sold globally by 2035. While the market expansion is steady in North America and slowing slightly in China where electric options already make up more than half of all national vehicle sales—Southeast Asian countries, including Vietnam, Indonesia, and Thailand, have more than doubled their year-on-year electric car sales numbers (International Energy Agency [IEA], 2025).

As the framework for policies progressed, regional differences became apparent; while electric car sales were static in Europe because of the decline of purchase subsidies, their market share remained stable, at around 20 percent, thanks to regional emissions frameworks becoming increasingly stringent. On the other hand, the US market maintained a more stable trajectory, resulting in an annual increase in sales of 10 percent that helped push electric car market share above one in every ten cars sold (International Energy Agency [IEA], 2025).

Electric medium & heavy-duty trucks registered their third year of sales growth with an impressive increase rate of nearly 80% on an annual basis, surpassing the mark of 90,000 units sold globally. However, it is still predominantly a market phenomenon in China, with 80% of the global sales tally achieved with over 75,000 electric trucks being sold. Meanwhile, electric bus sales have crossed the mark of 70,000 units sold globally, with Europe establishing itself as the second biggest market by increasing electric bus sales by 15% (International Energy Agency [IEA], 2025).

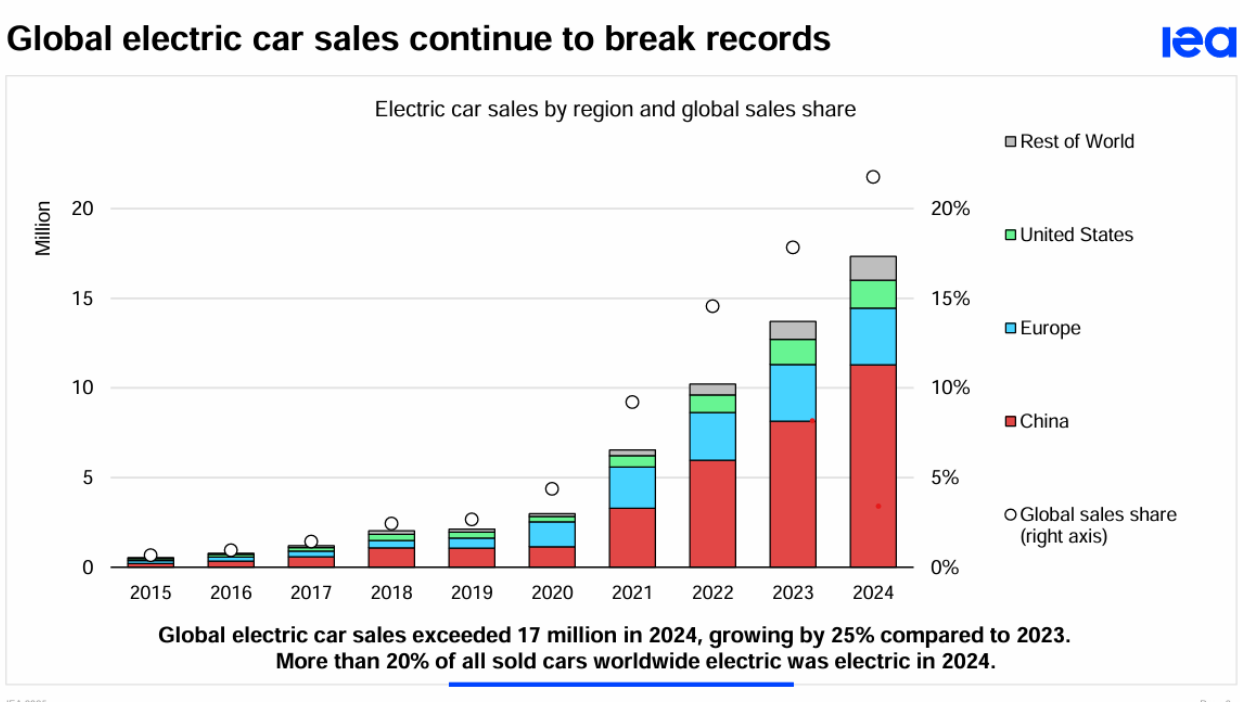


Figure 2.2.1 Global electric car sales

(Source adopted from IEA Global EV Outlook 2025)

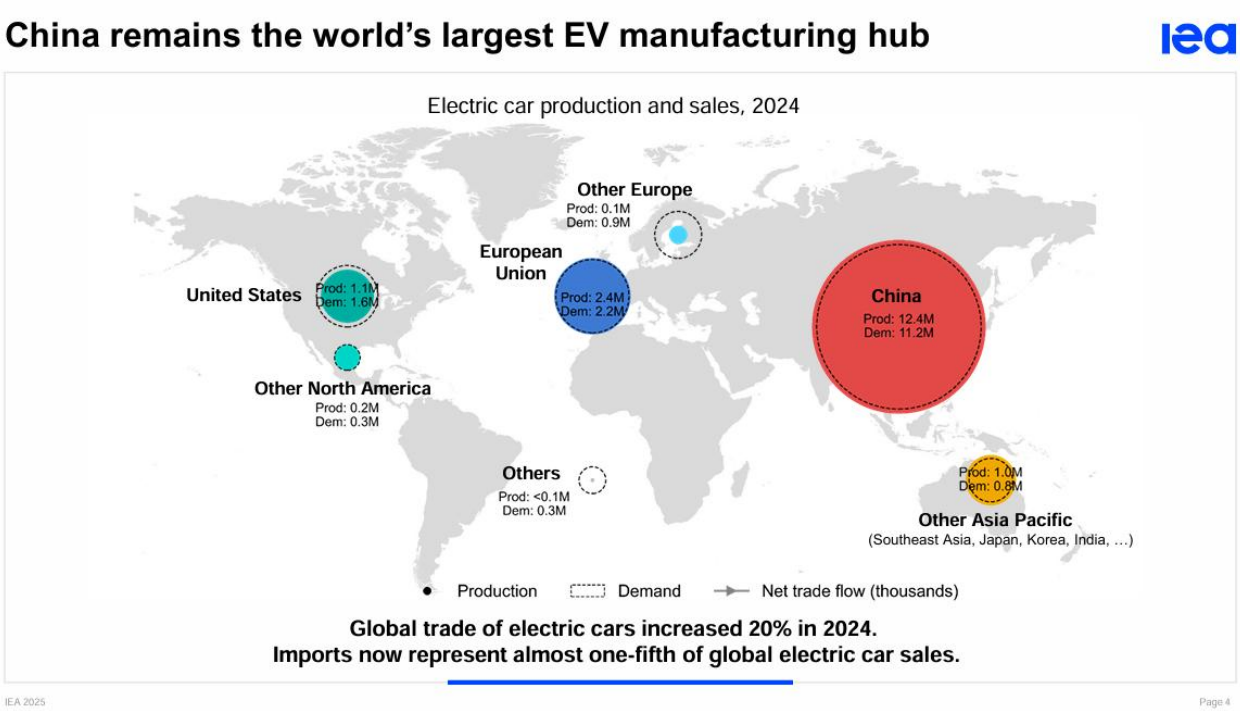


Figure 2.2.2 Electric car production

(Source adopted from IEA Global EV Outlook 2025)

According to the AFEMA E-Mobility Companies Database, there are 208 active e-mobility companies across Africa, with their distribution showing clear regional patterns. With 98 enterprises, East Africa is at the forefront, propelled by the highly active markets of Kenya, Rwanda, and Uganda. These countries have been rapidly developing their electric motorcycles and charging services industries. Southern Africa comes in second, with 46 enterprises, mainly owing to the country's automotive industry and its growing presence in other countries such as Zambia and Zimbabwe. The number of enterprises in West Africa is 39, primarily located in Nigeria and Ghana, with the majority being focused on motorcycles and logistics services. North Africa is home to 19 enterprises, most of which can be found in Egypt and Morocco (AFEMA,2025).

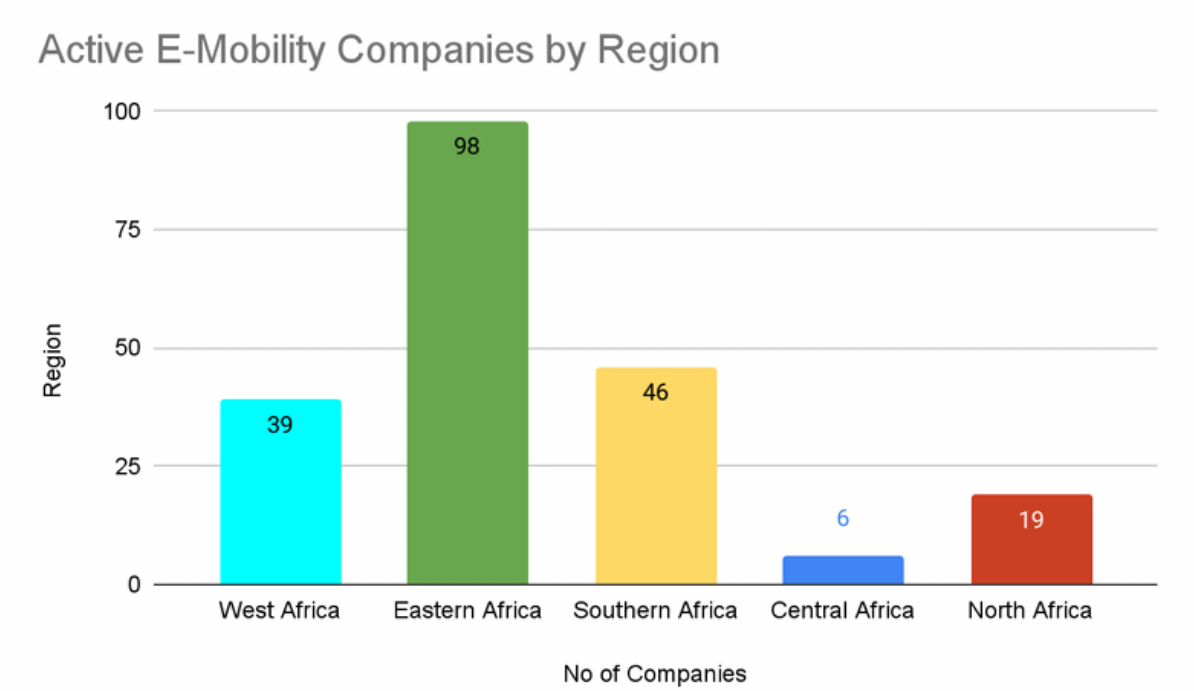


Figure 2.2.3 Active E-Mobility companies

(Source adopted from AFEMA, *2025)*

The shift towards electric mobility across Sub-Saharan Africa appears to be progressing strongly, largely spurred by the pressing issue of reducing massive fuel import costs and improving urban air quality. As indicated by statistics provided by the IEA and some of the World Bank publications, the evolution of e-mobility on the continent will be quite distinctive compared to trends in the Western world, where passenger vehicles will dominate initially, since, in Sub-Saharan Africa, two- and

three-wheelers as well as transit buses will represent the first wave of electric vehicle uptake. At present, there are 21 countries in Africa that have developed or are developing their specific policies regarding EVs (Africa E-Mobility Alliance [AFEMA], 2025).

The problem of rolling out such a change, however, comes with major systemic challenges, which are mainly related to inadequate infrastructure and unreliable electricity supply networks. Besides the few exceptional cities in the subcontinent, EVs' mainstream adoption is impeded by the absence of a robust network of public fast charging stations and low levels of continental motorization of less than 30 cars per 1,000 inhabitants. What's more, even though countries endowed with abundant renewable energy sources are perfectly suited for a transition to sustainable transportation, others in the region have to confront the possibility of using power derived from conventional energy sources, making renewable energy generation indispensable for such a switch (Africa E-Mobility Alliance [AFEMA], 2025).

One such example is that of Ethiopia in East Africa, which has become a pioneer in the field due to some of the most drastic changes ever seen in automotive policies around the world. In a bid to cut down its massive expenditure of about $4.5 billion per year on imported fuel and protect its economy against any external shock due to fluctuations in international oil prices, the government has banned the importation of ICE passenger cars in the country. To support this decision, the Ministry of Transport and Logistics has revised its entire duty policy, bringing down the import duty of fully assembled EVs to 15% and that of CKD kits to 0% (Ministry of Transport and Logistics, 2025).

The forceful implementation of the financial strategy has prompted a remarkable change in the market, with more than 100,000 electric vehicles already on the streets of Ethiopia by early 2026. In turn, the fast emergence has led to a share of nearly 8.3% in relation to the total amount of registered cars in the country – far exceeding any average number on either the continental or worldwide levels. The rapid change is based on an active industrial development in terms of assembling electric vehicles in the country, which currently has more than 17 plants producing minibuses and buses powered by electricity (Ministry of Transport and Logistics, 2025).

Despite efforts by the nation towards e-mobility, there is still a disparity between city readiness and regional inadequacies. The city of Addis Ababa has been able to capitalize on its electricity availability and efficient infrastructure, such as high-capacity and telebirr-compatible charging

facilities. Conversely, rural and regional locations face the challenge of reduced availability of electricity and instability of electricity grids. In order to meet the 500,000 electric vehicles and 2,230 charging facilities goal by 2030, the expansion of infrastructure is critical. (Ministry of Transport and Logistics, 2025).

2.2.3 Impacts of Electric Vehicles Transition & Development

The IEA indicates that the global adoption of EVs has already displaced around 1 million barrels of crude oil per day (mb/d). In light of oil price fluctuations and political instability in the Middle East, this displacement is expected to multiply by three times and reach 2.7 mb/d by 2030. With EVs accounting for 50% of global car market shares by 2035, oil demand displacement will scale aggressively to around 5 mb/d (International Energy Agency [IEA], 2026).

Operational-wise, the increased efficiency of electricity-powered systems brings about great economic advantages when operating within energy policies characterized by either high inflation rates or high tariffs. High oil prices in the international market and stringent fuel economy standards have resulted in improved cost efficiencies associated with operating a vehicle, with yearly cost savings resulting from the fuel efficiency of EVs increasing by 35% annually in highly regulated environments. In terms of fleet transportation and logistics, this margin of improvement increases the TCO significantly while insulating the transport network from local fuel shortages. (International Energy Agency [IEA], 2026).

In terms of the continent, the implementation of e-mobility in Sub-Saharan Africa brings immense economic benefits to high-demand commercial transportation systems. Research has revealed that traveling 100km using an electric car is 47%-83% cheaper compared to traveling by an ICE automobile. This immense cut in operational costs insulates commercial transporters, such as the boda boda motorcycle and delivery service providers, from unpredictable fuel prices, ultimately maximizing their profit margins (Africa E-Mobility Alliance, 2025).

As far as the effects of the development of the e-mobility industry in Africa are concerned, there has been a very fast arrival of foreign green investments, which have managed to ignore the usual mechanisms for importing vehicles. Being attracted by low levels of motorization, alongside high usage rates of shared public transport, such investments have now exceeded $100 million in each geographic sub-region other than Central Africa, in order to finance zero-emission public transport concepts. The regions, at the same time, have started focusing on adding value locally; in Kenya, VAT is now exempted for electric mid-sized buses, while South Africa has introduced a tax break

for electric vehicle/hydrogen production of up to 150% (Africa E-Mobility Alliance [AFEMA], 2025).

According to the UN Environment Program a high socio-economic and climatic payoff can be achieved by focusing on two-wheelers and three-wheelers. Given that transport accounts for 10% of the African continent's greenhouse gases and urban populations are expected to double by 2050, a shift to electric bikes will lower total global CO2 emission by 11 billion tons by 2050. Instead of applying an approach that is western-oriented, regional approaches should explore an evolutionary approach, such as battery swapping, paratransit integration, and scrappage policies. (United Nations Environment Program, 2024).

The e-mobility sector in Kenya has grown significantly, with the number of registered e-motorbikes increasing from 2,557 in 2023 to 4,862 in 2024. However, although fiscal interventions such as the zero-rating of VAT and removal of excise duty contributed significantly to the sector's growth, it currently finds itself at a crossroads due to regulatory uncertainty. According to the draft Finance Bill 2026, there is a suggestion that VAT be imposed at a rate of 16% on electric vehicles and lithium-ion batteries, which can hinder the progress the sector has made so far. In essence, even as fiscal measures remain critical to the growth of the green economy, such an ecosystem is highly vulnerable to changes in fiscal policy (Ministry of Roads and Transport, 2026; World Bank, 2025).

Regarding the Ethiopian national economy, the adoption of electric cars represents a significant fiscal safeguard for the country in response to fluctuations in international markets and the high costs of importing fuels. With the current disruptions in sea-based commerce, the national treasury is estimated to spend more than $4.2 billion yearly on importing fuels via the port of Djibouti, creating an unsustainable national subsidy requirement of 98 Birr per liter for diesel and 73 Birr per liter for gasoline. By adopting the strategy of e-mobility, the state will eliminate its need to spend millions of dollars on foreign exchange by taking advantage of its abundant domestic power potential, including the Grand Ethiopian Renaissance Dam. (Ministry of Transport and Logistics, 2026).

This effect of switching to EV technology on the macro economy is in sync with the adjustments needed for the Homegrown Economic Reform (HGER) policy and the new IMF agreements after 2024. With the abolition of the years-long fuel subsidies, fuel prices have gone above 132 Birr per liter, causing stress in the transport industry and an increase in fuel smuggling activities. It has created a very large disparity between the micro-economic benefits and utility gained by consumers of

electric vehicles, who spend just $4 a month in charging their EVs, against $27 for conventional ones in Addis Ababa (Ministry of Trade and Regional Integration, 2025).

The independent assessment of Ethiopia's climate action commitment notes that its green transport initiative qualifies as almost sufficient within global indexes for mitigation strategies, considering it the first nation to introduce legislation prohibiting the importation of vehicles with internal combustion engines. The LT-LEDS strategy seeks to ensure net zero emissions from 2035 to 2050 through a financing strategy estimated at $138 billion and $272 billion. Nevertheless, studies warn that owing to the dependence of the EV fleet on hydropower electricity by over 90 percent, the transport system is susceptible to climate change impacts related to variations in rainfall patterns. The need to manage this vulnerability involves the diversification of the renewable energy mix, in addition to adopting data reporting systems for all regional bureaus (Climate Action Tracker [CAT], 2026) (Climate Action Tracker, 2026).

2.2.4 Ethiopia’s Energy Landscape and EV Import Trends

In Ethiopia, the market was known for its dependence on imported and used cars that were fueled by fossil fuels. The automobile industry had been hindered by prohibitive taxes levied on imported cars, as high as 200%, and foreign exchange shortages that made car ownership out of reach for most people (Energy for Growth Hub, 2026). As a result, about 85% of all cars imported into the country were used ones due to the severe shortage of supply (Energy for Growth Hub, 2026; Verified Market Research, 2025).

Prior to the revolutionary governmental mandate issued in January 2024, there were structural issues limiting Ethiopia's vehicle market that led to an unusually low rate of motorization, at just about 11.2 cars per 1,000 residents in 2022 (Energy for Growth Hub, 2026). In the historical context of the Ethiopian automobile industry, there are three main features worth mentioning: Extreme Fiscal Barriers: This industry faced excessively high tariffs on imported cars, which historically stood at as much as 200%. Additional taxes and customs duties added up to drive up the cost of a relatively cheap used vehicle above $20,000 (Energy for Growth Hub, 2026; World Bank, 2017).

Given such factors, the market ended up being extremely reliant on used ICE vehicles that were imported into the country. By 2023, such imports made up around 85% of total automobile imports. They mainly came from Europe, Japan, and the Middle East (Energy for Growth Hub, 2026; Market Report Analytics, 2026).

In one unique phenomenon, owing to their extremely scarce nature and the high entry barrier, the used automobiles in Ethiopia were known to increase in value over time. The end-user would usually regard the vehicle more as a liquid financial asset or a hedge against fluctuations in the currency value than just a mode of transport ((Mordor Intelligence, 2026; Energy for Growth Hub, 2026).

Recent 2025/2026 regulatory updates have introduced stricter requirements for importers, such as mandatory after-sales service centers, English-language software interfaces, and the installation of charging stations as a condition for market entry (EV24.africa, 2025).

Government incentives and supportive policies primarily focus on tax benefits, while untapped financial and non-financial incentives hinder the accelerated adoption of EVs public skepticism and misinformation hinder trust in EV technology (Ministry of Transport and Logistics 2025).

After the imposition of the ban on the importation of ICE vehicle imports in 2022, a major reshaping of the environment took place. In order to make the transition easier, a new system of tariffs was adopted, which saw a drastic reduction in tariffs for EVs, with a tariff of 23%, 5%, and 0% imposed on fully assembled, semi-assembled, and completely knocked-down kits respectively (EV24.africa, 2026; Dealer floor, 2026).

EV adoption grew from less than 1% to approximately 8.3% of the registered vehicle stock by early 2026, driven by competitive pricing on Chinese-manufactured models (EV24.africa, 2026; International Energy Agency, 2026).

There was more attention towards assembling at home to promote industries, with 17 assembly plants for electric vehicles running as of early 2026 and aiming to have 60 assembly plants by 2030 (Dealer floor, 2026; CleanTechnica, 2026).

While the ban has been successful in promoting adoption, the market faces significant hurdles, including a concentration of charging infrastructure within Addis Ababa and the ongoing challenge of rural grid connectivity (Energy for Growth Hub, 2026; CleanTechnica, 2026).

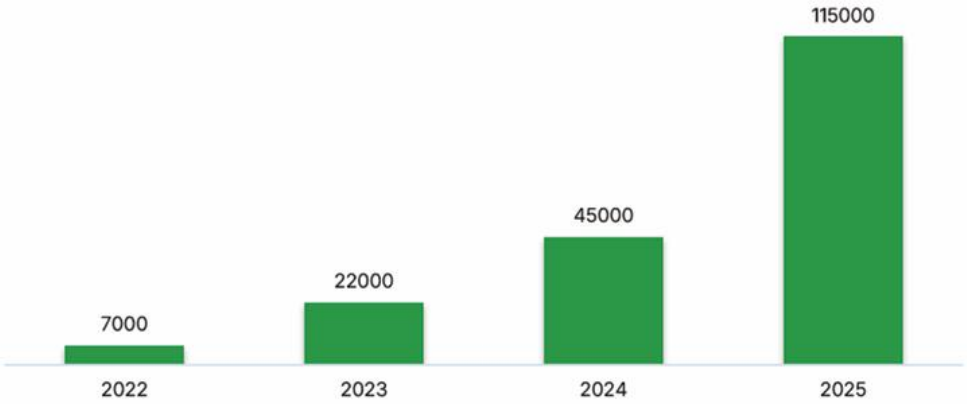


Figure 2.2.4 EV registration in Ethiopia for the past 4 years

(Source adopted from Ministry of Transport and Logistics E-mobility strategy and implementation plan ,2025)

The national production and assembly capacity for two- and three-wheeled vehicles is 63,900 units per year (pcs/yr.). Automobiles are 14,900 pcs/yr., for light trucks is 1,200 pcs/yr., and for minibuses and buses is 3,500 pcs/yr. The total annual EV manufacturing capacity is around 84,000 pieces. Despite of this, the current overall capacity utilization is only around 10%, which present a great opportunity to exponentially increase the local production. Ethiopia is now moving from SKD/CKD (the first step) to totally knock down (TKD) and up cycling (Ministry of Transport and Logistics 2025).

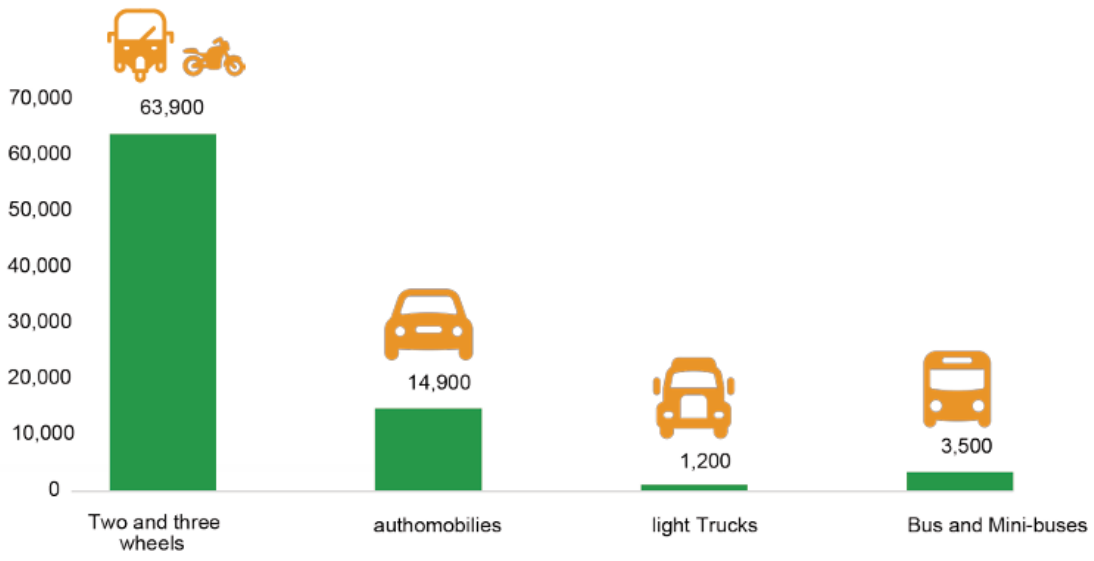


Figure 2.2.5 Ethiopian E-vehicles production capacity per year

(Source adopted from Ministry of Transport and Logistics E- mobility strategy and implementation plan 2025)

While Ethiopia's electric mobility sector is still emerging, it can potentially create thousands of jobs across various sectors. Employment opportunities in the electric mobility sector will span EV manufacturing, assembly, battery production, charging infrastructure development, and maintenance services. Ethiopia's investment in its green economy could significantly reduce its youth unemployment, which stood at 27% in urban areas in 2022 (Ministry of Transport and Logistics 2025).

2.2.5 Previous studies on EV adoption

Global research into electric vehicle adoption has undergone a significant paradigm shift, evolving from a focus on environmental idealism toward a rigorous analysis of the practical constraints inherent in a global energy transition. Canonical studies, such as those by Liao et al. (2017) and meta-analyses by Kumar and Alok (2022), underscore that consumer purchase intent is rarely a product of altruism alone; rather, it is determined by a complex cost-benefit calculus involving vehicle affordability, the density of charging infrastructure, and the perceived technical longevity of battery systems.

By mid-2026, this global transition has become notably fragmented. While markets such as Singapore and Thailand exhibit rapid adoption surges propelled largely by targeted, policy-centric industrial interventions other major economies are witnessing a period of maturation and, in some cases, growth tempering. This deceleration is primarily driven by the systemic difficulty of reconciling volatile battery manufacturing costs with the threshold of consumer affordability in a high-interest-rate environment (BloombergNEF, 2026).

The academic consensus now emphasizes that range anxiety has been joined by infrastructure anxiety as vehicle model availability continues to outpace the deployment of fast-charging grids (IEA, 2026) China continues to dominate global sales volumes remaining the only major market where electric vehicles have achieved widespread purchase price parity with conventional internal combustion engine vehicles without relying entirely on direct consumer handouts.

However western markets face a fragmented scenario due to changing regulatory targets and persistent price premiums of battery electric vehicles which remain noticeably more expensive than their fossil-fuel counterparts in regions like Europe (Kumar & Alok, 2022).

Recent research underscores that systemic convenience and visible charging density, rather than pure environmental altruism act as the primary determinants for mainstream consumer conversion (Liao et al., 2017).

In Africa the markets are not catching up but are instead pursuing a leapfrogging strategy, particularly through the electrification of two- and three-wheelers which bypass the infrastructure requirements of passenger vehicles (Shell Foundation, 2024).

The primary obstacles here are not psychological but systemic: unreliable power grids and the absence of established consumer financing models that treat vehicles as capital assets rather than simple depreciating goods (Shell Foundation, 2024).

These studies consistently identify that for Sub-Saharan Africa the success of e-mobility is linked to the emergence of localized startup ecosystems capable of managing after-sales support and micro-leasing rather than reliance on imported vehicles that lack technical back-up (Shell Foundation, 2024).

Ethiopia represents a unique global outlier. Due to an aggressive top-down regulatory mandate including a total ban on ICE vehicle imports and significant tax exemptions the country has moved from one of the world's least motorized nations to a leader in EV penetration in a remarkably short span (Energy for Growth Hub, 2026).

2.3. Literature Gaps

While global literature on electric vehicle adoption is massive, it contains some blind spots regarding developing sub-Saharan economies like Ethiopia. Standard international research assumes voluntary, well-funded market ecosystems but it fails to capture the chaotic consumer realities of countries under unique social economic circumstances.

Previous EV adoption studies does not sufficiently address how technological characteristics are perceived in unique topographies and infrastructural readiness is not sufficiently contextualized. International frameworks treat charging infrastructure as a fixed, reliable variable but they do not account for environments characterized by high power grid instability, blackouts, and a huge deficit of public charging hubs.

No existing study measures how a consumer calculates the risk of buying electric vehicle when few public stations exist nationwide

Literatures focus almost exclusively on the initial purchase price, completely overlooking the long-term asset behavior in emerging markets. For the average Ethiopian consumer, a vehicle is a major lifelong capital investment.

In addition, there is a distinct socio-cultural gap regarding behavioral drivers. Standard Western adoption models heavily rely on environmental altruism and green consciousness as primary predictors. In Ethiopian society the communal compliance, peer status, and localized social pressure operate differently.

Finally, the ultimate theoretical gap is inadequate research on how these determinants behave during a total macro-environmental shock. The Ethiopian government's 2022 ban on internal combustion engine imports created a world-first regulatory anomaly and no previous study has ever tested consumers' perception toward electric vehicles using framework to understand the general attitude towards electric vehicles in the context of Ethiopia.

2.4 Conceptual Framework of the Study

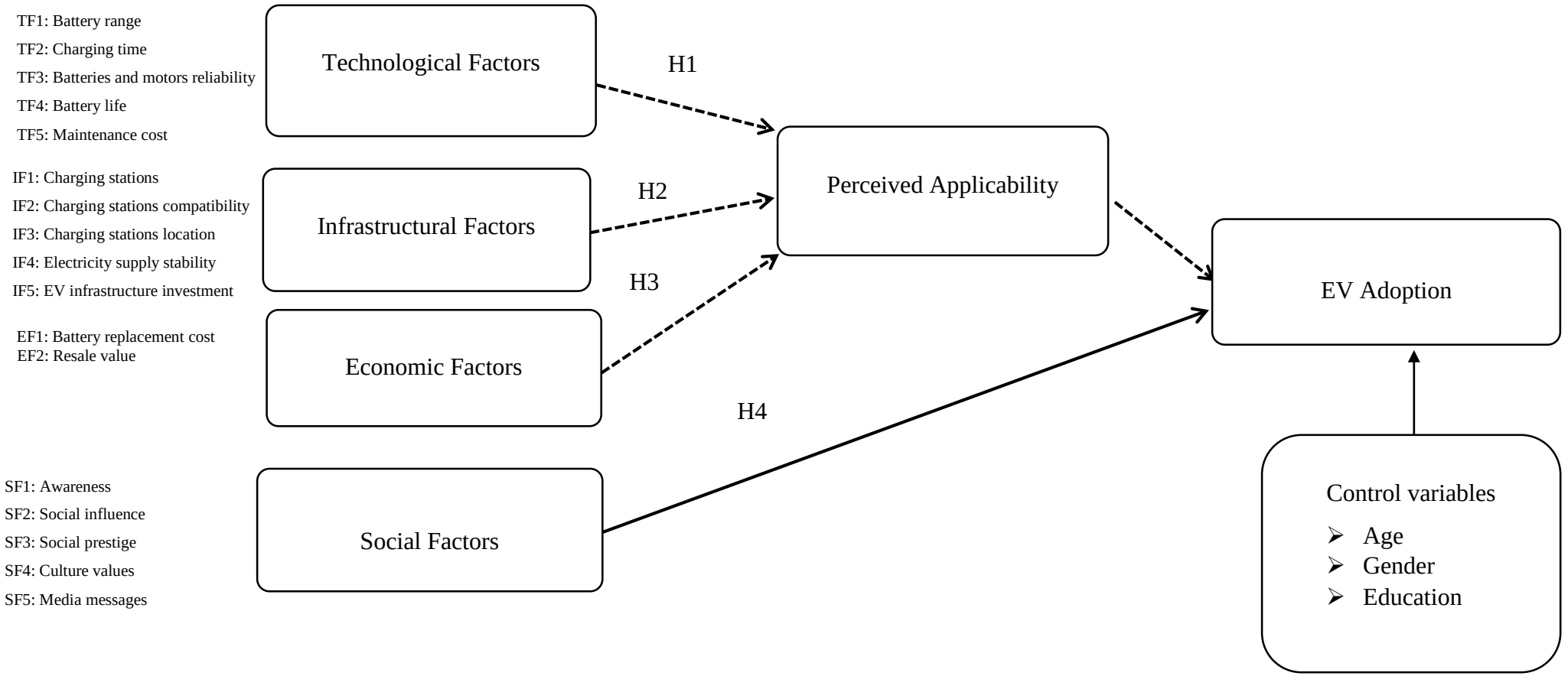


Figure 2.4 Conceptual Framework of the Study

Source: Developed by the researcher (2026) using Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003).

2.5 Research Hypothesis

In order to provide answers to the research questions empirically and theoretically; the following hypotheses were developed.

H_1: Perceived applicability acts as a significant mediator between technological aspects and EV adoption intent

H_2: Perceived applicability acts as a significant mediator between infrastructural factors and EV adoption intent

H_3: Perceived applicability acts as a significant mediator between economic conditions and EV adoption intent

H_4: Social factors exert a direct effect on EV adoption intent

Chapter Three: Research Methodology

In this chapter, the research methodology employed to find determinants of EVs adoption in Ethiopia will be discussed. The discussion entails the research design, population, sampling technique, sample size, data collection method and data analysis techniques that was employed in the study.

The methodology ensures that the findings of this research are valid and reliable. Moreover, the study will focus on analyzing the relationships among independent variables, mediator and dependent variable.

3.1 Research Design

The study used descriptive-explanatory research design which is an organized process of examining the social, economic, technological, and infrastructure factors associated with the adoption of electric vehicles in Ethiopia.

Using the descriptive-explanatory design the researcher was able to describe the present status of consumer perceptions, after which the focus shifted to structural-mediated paths using inferential statistics.

3.2 Research Approach

The study adopted a quantitative research approach to systematically investigate the factors influencing the adoption of electric vehicles in Ethiopia. It is appropriate to use quantitative approach as it allows the researcher to convert subjective views by consumers into quantifiable numerical data to detect patterns and trends in a new market environment.

3.3 Source and Type of Data

Both primary and secondary sources of data was used for conducting this research.

The primary data was systematically collected by distributing structured questionnaires to targeted individuals. Such methodology acted as the fundamental data gathering tool, enabling the researcher to collect the data about the independent variables, the mediational effects of the perceived applicability and overall behavioral attitudes of consumers towards EV adoption intent.

Secondary data was collected via a comprehensive review of reports from relevant governmental bodies of Ethiopia like the Ministry of Transport and Logistics, white papers of the international and local automotive industry, and research articles on clean energy transitions and transport policies of Ethiopia.

3.4 Data Collection Method

The data used in the research process was gathered using a structured questionnaire. In the process of answering the questionnaire, participants provided their opinions on different variables including technology, infrastructural, and economic aspects which determine perceived applicability and intention to adopt EVs. The data was gathered using Likert scale which is quantitative in nature and easy to analyze.

The secondary data was gathered to supplement primary data in order to get more insight into the EV market in Ethiopia. The secondary data includes the government report, industry report, and academic articles on EV market.

3.5 Target Population and Sampling Design

The study employed a two-stage non-probability sampling approach integrating purposive and convenience sampling techniques sequentially. In the first stage, purposive sampling was applied to filter eligible participants based on specific prerequisite traits like familiarity with vehicle market, employment within the automotive sector, and foundational knowledge of electric vehicles.

In the second stage, because a comprehensive sampling frame of potential EV buyers did not exist, convenience sampling was utilized to efficiently distribute the survey instruments to accessible individuals who successfully met the purposive criteria.

3.5.1 Sample Size Determination

In order to make sure that the results were statistically reliable, the sample size was established with the help of Cochran's Formula (1977). This method can be used for determining the appropriate sample size when the population is large or not known in its entirety.

The Cochran's formula for the ideal sample size when the population proportion is infinite or very large/unknown is:

$$n_0 = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2}$$

Step 1: Sample size for infinite population (S_0):

Where:

- n_0 = the required sample size.
- Z = the Z-score (or critical value) which corresponds to the desired confidence level.
- p = the estimated proportion of the population that possesses the attribute in question.
- e = the desired level of precision (margin of error).

Where:

n_0 = sample size for infinite population

Z = Z-score for desired confidence level (1.96 for 95% confidence)

P = estimated population proportion (0.5 for maximum variability)

d = margin of error (e.g., 0.05 for 5%)

Calculation:

$$n_0 = \frac{(1.96^2) \times 0.5 \times (1- 0.5)}{(0.05)^2} \qquad n0 = \frac{3.8416 \times 0.25}{(0.05)^2} \qquad n_0 = \frac{0.9604}{0.0025}$$

Therefore, **n_0** = 384.1 ≈ 384

3.6 Method of Data Analysis

Data analysis was conducted using a two-phased analytical approach. First, descriptive statistics were employed to summarize the dataset and identify underlying trends in consumer behavior. Second, Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized to rigorously evaluate the determinants of electric vehicle (EV) adoption in Ethiopia. This methodological combination allowed for both the characterization of the current consumer landscape and the validation of hypothesized structural pathways. Statistical computations and model estimation were performed using STATA and JASP.

3.6.1 Descriptive Statistics

Descriptive analysis involving frequency, percentage, and mean values was employed to summarize the characteristics of the respondents. Further descriptive analysis was used as a tool for understanding the perceptions associated with the main factors such as technology, infrastructure, economics, and social factors in the case of Ethiopia.

3.6.2 Structural Equation Modeling

In order to test the distinct paths of the constructed model PLS-SEM was employed. This suited study very well since PLS-SEM makes it possible to examine several relationships at once and to determine the mediating effect of perceived applicability.

Model Specification

Partial Least Square Structural Equation Modeling (PLS-SEM) was used to examine the relationship among the independent variables, mediator and the dependent variable. These models are represented by the following structural equations:

Determinants of Perceived Applicability (PA)

This equation predicts the degree to which electric vehicles are seen as feasible and easy to use

$$PA = \gamma_1(TF) + \gamma_2(IF) + \gamma_3(EF) + \zeta_1$$

Where:

PA: Perceived Applicability (Mediator)

TF: Technological Factors

IF: Infrastructural Factors

EF: Economic Factors

γ {1-3}: Path coefficients (Gamma) for the mediated paths.

ζ: Structural error term (disturbance) for the mediator.

Determinants of EV Adoption (EVA)

This equation estimates the final EV adoption, driven by the mediated influence of the factors above and the direct influence of social factors:

$$EA = \gamma_4(PA) + \gamma_5(SF) + \zeta_2$$

Where:

EA: EV Adoption (Final dependent variable)

PA: Perceived Applicability (Mediator)

SF: Social Factors

γ4: Gamma coefficient representing the effect of the mediator (PA) on adoption.

γ5: Gamma coefficient representing the direct effect of Social Factors (SF) on adoption.

ζ 2: Structural error term (error term for the final dependent variable)

3.7 Reliability and Validity Test

The validity and reliability test of a research instruments are crucial for three main reasons: understanding the phenomena studied, achieving statistical significance in data analysis, and drawing meaningful conclusions from the data.

3.7.1 Reliability

Williamson (2002) defines reliability as the consistency of research results when repeated. The reliability of the survey depends on obtaining high-quality responses and ensuring respondents understand the questionnaire.

Sample questions and a scaling mechanism were used to achieve reliability. The survey design ensures high response rates and clear understanding by respondents.

Internal consistency was determined for each construct using Cronbach's Alpha coefficient. In accordance with the academic standard, any coefficient above 0.7 is acceptable (Hair et al., 2019).

3.7.2 Validity

The structured questionnaire utilized for data collection underwent thorough verification and validation processes. The survey tool was subjected to a pilot test among some members of the population. This step proved critical for determining vague items and clarifying technical terms used in relation to the survey.

Validity assesses the accuracy of the measurement instrument in capturing the intended theoretical concepts. For this PLS-SEM based analysis, three types of validity were established:

I. **Content and Face Validity:** Survey questions have been developed based on sound theoretical constructs. This helps in making sure that the questionnaire captures the actual realities of the market.
II. **Convergent Validity:** convergent validity is tested for the purpose of ensuring that the construct has a high amount of variance in common. The verification is done by way of factor loadings and AVE.
III. **Discriminant Validity:** is the degree to which a test or measure is genuinely distinct from other unrelated constructs. It ensures that concepts that are not supposed to be related actually show no significant correlation, confirming that a measurement tool is uniquely evaluating a single idea without overlapping.

3.8 Limitations of the Study

While the study offers a comprehensive discussion of the determinants of EV adoption there are some key limitations inherent in the study:

Geographical Concentration: due to time and budget limit the data were collected only in Addis Ababa and it might miss some nuances related to people living in the countryside or other cities of Ethiopia.

Future Orientation: As EV market in Ethiopia is still in its infancy stage; response to questions regarding willingness to adopt is based on current know how of Ethiopian consumers and people might form different attitudes as soon as they become more familiar with EVs.

Temporal Limitations: This study captures a snapshot from a dynamic field that is changing fast. The ban on ICE engines and tax rebates were introduced recently, and a new set of developments in technology, infrastructure investment and governmental policies may affect the relevance of this research in the future.

Response Bias in Self-Reporting: This research uses self-reported survey responses which can be affected by the social desirability bias. The respondents might exaggerate their intention to use modern technologies due to adherence to the societal norm despite having technological or economic reasons to act otherwise.

Resource and Budgetary Limits: Constraints related to time and budget restricted the extent of the sample as well as the capability of performing cross-sectional longitudinal analysis.

However, this research still serves as an essential diagnostic base and brings significant insight into EV adoption in Ethiopian automotive landscape.

3.9 Ethical Considerations

For the protection of participants, this research strictly followed the principles of institutional ethics through three major pillars:

Informed consent and voluntary participation: The participants were properly made aware of the objectives and processes of the research. They had the freedom to refuse participation at any time.

Identity anonymity: For the protection of identity, all sorts of personal information such as names, telephone numbers, and names of companies were excluded from the questionnaire.

Confidentiality and data security: The confidentiality of all primary data was observed scrupulously. Answers to the survey questions were saved in an encrypted file which could be accessed only by the researcher

Chapter Four: Data Presentation, Analysis, and Interpretation

4.1 Introduction

In this chapter emphasis will be put on showing the data obtained from the respondents in relation to survey questionnaires. Descriptive statistics is used to describe the nature of the data. In determining the reliability and validity of the data, Cronbach's Alpha and confirmatory factor analysis will be used.

4.2. Response Rate

A total number of 384 questionnaires were sent out to the intended respondents in order to identify the determinants of EV adoption intention in Ethiopia. Out of the total questionnaires that were sent only 235 were returned and found to be suitable for analysis after data cleaning. Therefore, the response rate stands at 61.2%.

Based on Pincham's (2008) assertion a response rate of around 60% is viewed as an acceptable figure for almost all survey based academic studies. As this study attained a response rate of 61.2%, the response rate is high enough, and thus the sample size can be regarded as sufficient.

4.3 Demographics Profile of Respondents

The demographic profile of respondents provides insights into the demographic distribution of the survey participants.

4.3.1 Age Distribution of Respondents

Table 1. Age Distribution of the Respondents

Age Group	Frequency (f)	Percentage (%)	Cumulative %
18−24 years	**47**	**20.00%**	**20.00%**
25−44 years (Combined)	**162**	**68.90%**	**88.90%**
45 years and Above	**26**	**11.10%**	**100.00%**
Total	**235**	**100.00%**	

Researcher's Survey Output using STATA (2026)

The analysis was conducted in terms of the age range of the respondents to establish the generational characteristics of the possible EV users in Ethiopia. A summary of the findings is shown in Table 1. The target population comprises young professionals in active career life. A considerable proportion (68.9%, n=162) of the respondents belong to the age range of 25 to 44 years being middle-aged professionals with maximum economic means to invest in modern automotive technology. The rest

of the respondents include young adults aged 18 to 24 years (20.0%), and older people aged 45+ (11.1%).

4.3.2 Gender Distribution of Respondents (N=235)

Table 2. Gender Distribution of the Respondents

Gender	Frequency (f)	Percentage (%)	Cumulative %
Male	**160**	**68.10%**	**68.10%**
Female	**75**	**31.90%**	**100.00%**
Total	**235**	**100.00%**	

Researcher's Survey Output using STATA (2026)

The gender distribution shows that 68.1% (n=160) of the respondents were male, while 31.9% (n=75) were female. This participation rate signifies that the main respondents who participated in the study consisted of men. This is important in the sense that it gives a clearer point of view on the larger group of population that answered the question.

4.3.3 Education Level

Table 3. Education Level of the Respondents

Highest Educational Level	Frequency (f)	Percentage (%)	Cumulative %
Bachelor's Degree	**90**	**38.30%**	**38.30%**
Master's Degree	**74**	**31.50%**	**69.80%**
Diploma	**38**	**16.20%**	**86.00%**
High School	**33**	**14.00%**	**100.00%**
Total	**235**	**100.00%**	

Researcher's Survey Output using STATA (2026)

The educational qualifications of the respondents were also studied in order to establish the educational credentials of potential users of the EVs.

It can be observed from the results obtained that the respondents were educated individuals and 69.8% of the respondents possessed either a Bachelor's degree or Master's degree. Out of them 38.3% had Bachelor's degrees while 31.5% possessed a Master's degree. Others possessed a diploma (16.2%) or high school certificates (14.0%). This reveals that these respondents possessed the knowledge to understand the technology of EVs.

4.3.4 Occupation

Table 4. Occupation of the Respondents

Occupation	Frequency (f)	Percentage (%)	Cumulative %
Employed	**202**	**86.00%**	**86.00%**
Student	**24**	**10.20%**	**96.20%**
Self-Employed	**9**	**3.80%**	**100.00%**
Total	**235**	**100.00%**	

Researcher's Survey Output using STATA (2026)

The researcher looked into the educational profile of potential EV adopters and the finding shows that a large percentage of the respondents (86.0%) are employed, followed by students at 10.2% and self-employed respondents at 3.8%. This shows that participants are mostly has earnings which is a very important aspect of electric vehicle adoption.

4.3.5 Income Level

Table 5. Income Level of the Respondents

Income Level (Per Month)	Frequency (f)	Percentage (%)	Cumulative %
Below Birr 25,000	**76**	**32.30%**	**32.30%**
Birr 25,001 – 40,000	**67**	**28.50%**	**60.80%**
Birr 40,001 – 70,000	**46**	**19.60%**	**80.40%**
Birr 70,001 – 100,000	**17**	**7.20%**	**87.60%**
Above Birr 100,000	**29**	**12.40%**	**100.00%**
Total	**235**	**100.00%**	

Source: Researcher's Survey Output using STATA (2026)

From income level analysis the majority of respondents 48.1% earn between ETB 25,000-70,000 followed by those earning below ETB 25,000 32.3%.

4.3.6 Vehicle Ownership

Table 6. Vehicle ownership status of the Respondents

Vehicle Ownership	Frequency (f)	Percentage (%)	Cumulative %
No	**149**	**63.40%**	**63.40%**
Yes	**86**	**36.60%**	**100.00%**
Total	**235**	**100.00%**	

Source: Researcher's Survey Output using STATA (2026)

The existing status of vehicle ownership has been investigated in order to identify first-time buyers as opposed to potential consumers switching to EVs from ICE vehicles.

Based on the findings, it can be concluded that 63.4% (n=149) of the sampled population does not own any kind of vehicle, indicating the presence of a considerable number of first-time buyers.

36.6% who already owns a vehicle primarily consist of ICE vehicles and there exists a small group of early adopters of EVs within the target population (11 electric and 6 of hybrid vehicles).

4.3.7 Familiarity with EVs

Table 7. Respondents Familiarity with EVs

Level of Familiarity	Frequency (f)	Percentage (%)	Cumulative %
Slightly familiar	**114**	**48.50%**	**48.50%**
Moderately familiar	**76**	**32.30%**	**80.80%**
Very familiar	**37**	**15.70%**	**96.60%**
Very unfamiliar	**8**	**3.40%**	**100.00%**
Total	**235**	**100.00%**	

Source: Researcher's Survey Output using STATA (2026)

The level of awareness about electric vehicle technology was evaluated based on how much the respondents were familiar with EVs which often acts as the foundation for their intention to adopt.

According to the results, a very high percentage (96.6%) are aware of the technology and most of the respondents (70.8% - slightly + moderately familiar).

There is only a very low percentage (3.4%) of respondents who have said that they are very unfamiliar with electric vehicle technology. Thus, from the above result, we can say that the technology is not alien concept anymore in Addis Ababa since it is promoted by the government recently and there are more & more EVs on the roads.

4.4 Descriptive Analysis of Model Constructs

4.4.1 Technological Factors (TF)

This section evaluates the perceptions of the respondents concerning the technological abilities of electric vehicles. The construct of technological factor was measured using several dimensions including driving range, charging efficiency, and battery/motor reliability.

Table 8: Descriptive Statistics for Technological Factors (n=235)

Item	Survey Statement	Mean	SD	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
TF1	Electric vehicles have good driving range	3.3	1.01	4.3	15.7	38.3	29.4	12.3
TF3	EV batteries and motors are reliable	2.99	0.88	3	26.4	43	24.3	3.4
TF4	EV batteries have a long lifespan	2.82	1	10.2	24.3	45.1	14.5	6

Source: Researcher's Survey Output using STATA (2026)

For all three questions, the neutral option (Score 3) received the highest percentage, between 38.3% (TF1) and 45.1% (TF4). This implies that there exists a sizable proportion of population in Ethiopian market that still lacks adequate experience with electric vehicles in order to make a clear judgment. Awaiting a clear view is an indicator of the emerging market phase.

4.4.2 Infrastructural Factors (IF)

This section evaluates the perceived readiness of Ethiopia's physical and utility infrastructure to support the widespread adoption of electric vehicles.

Table 9: Descriptive Statistics for Infrastructural Factors (n=235)

Item	Survey Statement	Mean	SD	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
IF1	There are enough public charging stations in Ethiopia	2.09	0.98	30.6	39.2	23.4	3.8	3
IF2	Charging stations are compatible with all EV models	2.75	0.9	6.8	32.3	43	14.5	3.4
IF3	Fast-charging stations are conveniently located	2.38	1.07	25.1	28.9	32.3	9.8	3.8
IF4	Ethiopia's electricity supply is stable to support daily EV charging needs	2.53	1.18	21.7	32.8	20.4	20.9	4.3
IF5	Investment in EV infrastructure is sufficient	2.42	1.16	25.5	29.8	25.5	13.6	5.5

Source: Researcher's Survey Output using STATA (2026)

Description of infrastructural factors shows that there is a critical impediment that comes out regarding infrastructure readiness.

IF1: this question registered one of the lowest mean scores in the survey (Mean = 2.09). Almost 70% of the subjects strongly disagree that there are sufficient numbers of charging stations.

The relatively low mean score (2.53) coupled with the very high standard deviation score (1.18) reflects that there is a huge disagreement concerning the availability and reliability of energy grid network. Thus, nearly 54% of people have doubts about the availability of reliable electricity in Ethiopia.

Low mean score (2.42) for IF5 indicates that there is a belief that not enough investment both from government as well as private sector has been made to create a conducive environment for EVs.

4.4.3 Economic Factors (EF)

This part looks at financial factors and economic risks that are identified regarding EV ownership.

Table 10: Descriptive Statistics for Economic Factors (n=235)

Item	Survey Statement	Mean	SD	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
EF1	**EV battery replacement costs are high**	**4.05**	**1.05**	**3**	**5.5**	**17.9**	**31.1**	**42.6**
EF2	**EVs have lower resale value**	**3.66**	**1.07**	**4.3**	**6.8**	**32.3**	**31.9**	**24.7**

Source: Researcher's Survey Output using STATA (2026)

In terms of economic definition, there appears to be many worries when it comes to TCO for electric vehicles.

The question of EV battery replacement cost has the highest mean in the data set (Mean = 4.05). An astonishing 73.7% of the respondents agree or strongly agree that battery replacement costs are a burden. This indicates that though electric vehicles are cheaper than fuels; the expense of maintaining batteries is a primary concern.

With a Mean of 3.66, more than half of the respondents are convinced that EVs depreciate faster than ICE vehicles. Since vehicles in Ethiopia is considered to appreciate over time this is an important economic factor that can acts as a barrier to EV adoption.

4.4.4 Social Factors (SF)

This section evaluates the influence of subjective norms, social status, and cultural values on the adoption of electric vehicles in Ethiopia.

Table 11: Descriptive Statistics for Social Factors (n=235)

Item	Survey Statement	Mean	SD	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
SF1	I am aware of the benefits of electric vehicles	3.81	1.01	3.8	6	21.7	42.6	26
SF2	People close to me support EV adoption	3.22	1.07	6.9	18.9	29.2	35.2	9.9
SF3	Owning an EV would improve my social status	3.18	1.18	9.4	19.2	31.9	23	16.6
SF4	Ethiopian culture values environmental protection	3.37	1.15	7.2	15.7	26	34.9	16.2
SF5	Media messages encourage EV adoption	3.61	1.07	3	14	23.8	37	22.1

Source: Researcher's Survey Output using STATA (2026)

Descriptive analysis of social factors reveals that intention to adopt largely hinges on awareness and social encouragement. The respondents' neutral view on the technological problem was somewhat expected, however, their rating on the awareness dimension showed a relatively high mean value (Mean = 3.81). That is to say that they are aware of the advantages that electric vehicles can offer, notwithstanding the problem with batteries.

The fact that mean score of 3.61 has been reached for SF5 is an indicator of success in running campaigns through media because majority of people derive encouragement from the government policy and communication through media communications. SF2, SF4 mean scores reveal that the social environment in Ethiopia becomes EV friendly.

4.4.5 Perceived Applicability (PA)

This section measures the mediator which explains respondents believe that EVs are a practical and logical fit for the current Ethiopian context.

Table 12: Descriptive Statistics for Perceived Applicability (n=235)

Item	Survey Statement	Mean	SD	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
PA1	**EV technology is suitable for Ethiopia**	**3.08**	**1.2**	**10.6**	**23.4**	**27.7**	**24.3**	**14**
PA2	**Ethiopia's infrastructure supports EV use**	**2.64**	**1.09**	**12.8**	**40**	**26**	**13.2**	**8.1**
PA3	**EVs make economic sense in Ethiopia**	**3.14**	**1.17**	**11.5**	**15.7**	**34**	**25.1**	**13.6**

Source: Researcher's Survey Output using STATA (2026)

With a Mean of 2.64, and 52.8% of respondents disagree that the current infrastructure supports daily EV use. For both the technology (PA1) and the economy (PA3), the most frequent response is Neutral.

4.4.6 EV Adoption Intent (EA)

This section measures the respondents' willingness and desire to transition to electric vehicle ownership in the Ethiopian market.

Table 13 Descriptive Statistics for Adoption Intent (n=235)

Item	Survey Statement	Mean	SD	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
EA1	**I desire to own an electric vehicle someday**	**3.62**	**1.18**	**6.4**	**11.1**	**23.8**	**31.9**	**26.8**
EA2	**Using an EV would be a wise choice**	**3.65**	**1.07**	**3**	**11.9**	**27.2**	**33.2**	**24.7**
EA3	**I am willing to switch to an EV whenever the opportunity arises**	**3.46**	**1.13**	**4.7**	**16.2**	**27.7**	**31.5**	**20**
EA4	**I would encourage others to consider EVs**	**3.38**	**1.2**	**8.5**	**14.5**	**28.9**	**26.4**	**21.7**

EV adoption scores are always high and range between 3.38 and 3.65. It has the highest means among all other constructs under investigation. 58.7 % of the participants agreed that they wish to have an EV, while 57.9 % think it is a good decision (EA2).

The lowest score is in encouraging others. This implies that although individuals are committed to making the switch they may not be very confident about encouraging others.

4.5 Measurement model

JASP 0.95 4.0 was used in this study to test the model. The measurement model defines the relationships between observable and unobservable variables, linking the scores on measurement instruments to the underlying constructs they aim to measure (Byrne, 2010).

Tenenhaus (2005) proposed three metrics to define the overall quality of the model. These metrics involve the use of the measurement model at the first level, the structural model at the second level, and the structural regression equation independently at the third level. The measurement model was validated by evaluating individual sub-factors and scale reliability, monitored through the convergent and discriminant validity of the construct measurements. Validity tests were conducted to assess discriminant validity, convergent validity, and the dependability of the measurement model (Henderson, 2012).

4.5.1 Indicator Reliability (Factor Loadings)

The notion of indicator reliability can be defined as the consistency between the specified indicator(s) and the construct intended to be measured by them; this can be achieved using the concept of outer loadings, which reflect the common variance between the latent construct and its indicators (Hair et al., 2021).

Initial Path Model

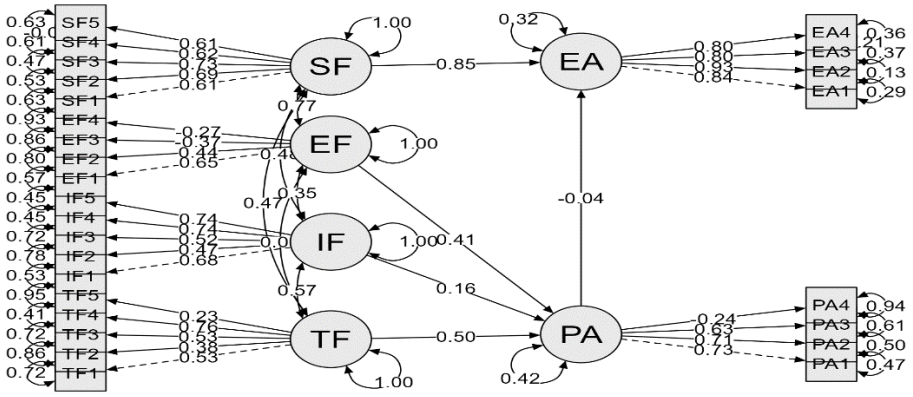


Figure 4.1 Initial Path Model

Source: Researcher's Survey Output using JASP 0.95 4.0 (2026)

Based on the recommendation by Comrey & Lee (1992), a loading cut-off of 0.45 was used in order to guarantee that all sub-factors of interest would be captured theoretically. Even though it would have been better to use the higher cut-off point of 0.67, which is the recommended value for parsimony (Peterson, 2000), the nature of the study required that all theoretically important variables to be included and factors loadings below 0.45 were omitted from the analysis.

Result after Dropping Sub-factor

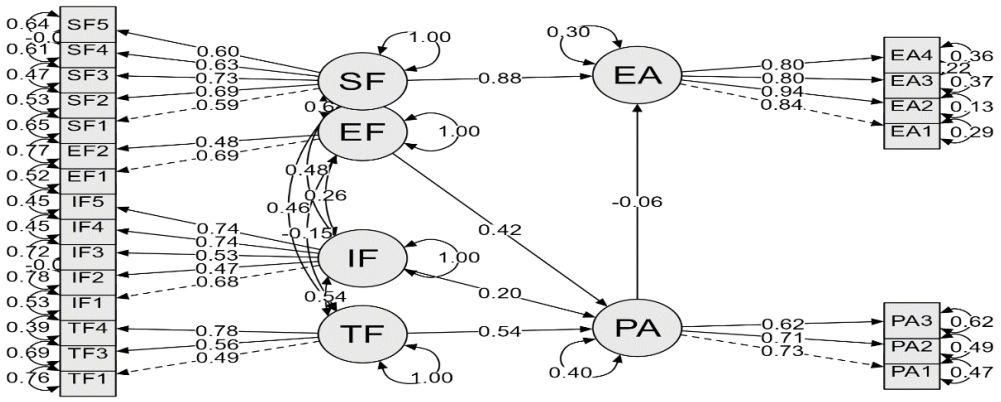


Figure 4.2 Result after Dropping Sub-factor

Source: Researcher's Survey Output using JASP 0.95 4.0 (2026)

4.5.2 Reliability Analysis

By definition, reliability is concerned with the degree of consistency and stability associated with the data collection tools and data collected by them (Saunders et al., 2009). In this particular study, the most common type of reliability measurement is internal consistency. Internal consistency involves determining how well all items in one scale measure the same construct (Zikmund et al., 2010). The major tool used for determining internal consistency in this study is Coefficient Alpha (Cronbach's alpha).

Unlike reliability, validity is concerned with measuring whether the measuring tool measures what is supposed to be measured. In this particular study, construct validity, which includes convergent and discriminant validity, was used to establish the validity of the interpretations of the raw data. Construct validity was essential in the model purification step and helped identify the latent

constructs.

Table 14: Reliability and Internal Validity

Code	Questions	Outer Loadings	Cronbach's alpha	Composite Reliability Coefficient (ω)	Average variance extracted (AVE)
	TECHNOLOGICAL FACTORS		**0.636**	**0.667**	**0.442**
TF1	Electric vehicles have good driving range	**0.493**			
TF3	EV batteries and motors are reliable	**0.558**			
TF4	EV batteries have a long lifespan	**0.78**			
	INFRASTRUCTURAL FACTORS		**0.7692**	**0.717**	**0.402**
IF1	There are enough public charging stations in Ethiopia	**0.684**			
IF2	Charging stations are compatible with all EV models	**0.472**			
IF3	Fast-charging stations are conveniently located	**0.526**			
IF4	Ethiopia's electricity supply is stable to support daily EV charging needs	**0.738**			
IF5	Investment in EV infrastructure is sufficient	**0.739**			
	ECONOMIC FACTORS				
EF1	EV battery replacement costs are high	**0.689**	**0.5567**	**0.516**	**0.354**
EF2	EVs have lower resale value	**0.484**			
	SOCIAL FACTORS		**0.7816**	**0.782**	**0.42**
SF1	I am aware of the benefits of electric vehicles	**0.594**			
SF2	People close to me support EV adoption	**0.685**			
SF3	Owning an EV would improve my social status	**0.728**			
SF4	Ethiopian culture values environmental protection	**0.627**			
SF5	Media messages encourage EV adoption	**0.597**			
	PERCEIVED APPLICABILITY		**0.7253**	**0.727**	**0.471**

PA1	EV technology is suitable for Ethiopia	**0.726**			
PA2	Ethiopia's infrastructure supports EV use	**0.712**			
PA3	EVs make economic sense in Ethiopia	**0.618**			
Code	**EV ADOPTION**		**0.9131**	**0.914**	**0.725**
EA1	I desire to own an electric vehicle someday	**0.841**			
EA2	Using an EV would be a wise choice	**0.935**			
EA3	I am willing to switch to an EV whenever the opportunity arises	**0.795**			
EA4	I would encourage others to consider EVs	**0.799**			

Source: Researcher's Survey Output

4.5.3 Validity

Validation and reliability tests were undertaken to guarantee the effectiveness of the research tool in measuring factors that affect electric vehicle adoption in Ethiopia. Internal validity was ensured by carrying out content and construct validity, according to Zikmund (2010), with measurement variables drawn from tested scales and tailored to the Ethiopian context.

Data analysis was done using the PLS-SEM technique, with reliability measured using Cronbach's alpha and composite reliability (McDonald's omega). Although coefficients greater than 0.70 are desirable, a threshold as low as 0.60 was considered acceptable as it balances the requirement for statistical rigor with the need to maintain model relevance in a data-scarce, emerging market, ensuring the instrument captures the complexity of local consumer behavior (Hair et al., 2017; Sarstedt et al., 2018).

4.5.3.1 Convergent Validity

Convergent validity examines the extent to which indicators of a specific construct share a high proportion of variance (Hair et al., 2010). In this study, convergent validity was assessed using factor loadings and the Average Variance Extracted (AVE). While the EV Adoption (EA) construct showed high convergent validity (AVE = 0.725), other constructs yielded AVE values between 0.354 and 0.471.

Although these values are below the 0.50 threshold, they are statistically sufficient under the Fornell and Larcker (1981) criterion, which allows for a lower AVE if the composite reliability is adequate. While the Economic Factor reliability (Omega = 0.51) and AVE (0.354) were the lowest in the model, the construct was retained due to inherent reliability constraints of a two-item scale and its indispensable theoretical role in the technology acceptance model.

According to Nunnally (1978) and Eisinga et al. (2013) lower cut-off values may be allowed in studies that involve new markets wherein consumer attitudes have not been solidified. By keeping these factors, the model retains its completeness from the theoretical point for subsequent path analysis.

4.5.3.2 Discriminant Validity

Discriminant validity checks whether there are differences between the measurement scales of two or more constructs and whether each construct represents a unique concept or idea. In the current study, discriminant validity is checked through the use of the Fornell-Larcker criterion; the square roots of the Average Variance Extracted (AVE) of each construct were compared to the correlations of the constructs to each other.

According to Fornell and Larcker (1981), if the square root of the AVE for any construct is higher than the correlation with any other latent construct, then there is discriminant validity. Although the electric vehicles market in Ethiopia is still emerging, the square roots of the AVE for each construct were higher than the correlations between constructs. Thus, discriminant validity is satisfied for technological, infrastructural, economic, and social factors constructs. Although some of the constructs showed low AVE scores below 0.50, the discriminant validity holds because of uniqueness of the constructs.

Table 15: Discriminant Validity

Construct	AVE	Sq. Root of AVE (Diagonal)	EA	SF	IF	EF
EV ADOPTION	**0.725**	**0.851**				
SOCIAL FACTOR	**0.42**	**0.648**	**0.35**			
INFRASTRUCTURE FACTOR	**0.402**	**0.634**	**0.42**	**0.31**		
EF	**0.354**	**0.595**	**0.28**	**0.22**	**0.4**	

Source: Researcher's survey output using JASP 0.95 4.0 (2026)

4.5.3.3 Test for Absence of Series Multi-Collinearity Assumption

Table 16: Test for Absence of Series Multi-Collinearity Assumption

	Tolerance	VIF
TF	**0.717**	**1.394**
EF	**0.861**	**1.161**
SF	**0.669**	**1.494**
IF	**0.740**	**1.352**
PA	**0.656**	**1.525**

Source: Researcher's survey output using JASP 0.95 4.0 (2026)

Before proceeding with the structural model and hypothesis testing, it is essential to ensure that the independent variables technological, infrastructural, economic, social, and perceived Applicability factors are not excessively correlated with one another. This phenomenon, known as **multi-collinearity**, occurs when predictor variables share a high degree of linear relationship, which can artificially inflate standard errors and lead to unreliable path coefficients.

Multi-collinearity has been detected through tolerance and variance inflation factor (VIF) techniques in this study. According to widely accepted thresholds defined by Hair et al. (2010), the VIF value above 5.0 or Tolerance below 0.10 implies the existence of multi-collinearity. The outcomes obtained through these two techniques, as provided in the table above, prove that the data is in accordance with the threshold for conducting reliable regression analysis.

4.6 Structural Model Analysis

The assessment of the structural model represents the secondary stage of the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis, shifting the focus from the reliability and validity of the measurement scales to the predictive relationships between the latent constructs (Hair et al., 2022).

In line with the method recommended by Hair et al. (2011), the structural model was analyzed to ascertain the significance, direction, and effect size of the proposed relationships. In this regard, a bootstrap sampling methodology with 5,000 sub-samples was employed to obtain consistent values of t-statistics and p-values, which would make the conclusions (Ramayah et al., 2018).

4.6.1 Hypothesis Testing

Table 17: Path Coefficients along with their bootstrap values and 'P' Values

					95% Confidence interval		
	Std. Estimate	**Std. Error**	**z-value**	**P**	**Lower**	**Upper**	**RESULT**
TF → PA → EA	**-0.034**	**0.051**	**-0.661**	**0.509**	**-0.134**	**0.067**	**NOT SUPPORTED**
IF → PA → EA	**-0.013**	**0.019**	**-0.675**	**0.5**	**-0.05**	**0.024**	**NOT SUPPORTED**
EF → PA → EA	**-0.026**	**0.04**	**-0.661**	**0.509**	**-0.104**	**0.052**	**NOT SUPPORTED**
EA→SF	**0.855**	**0.032**	**27.05**	**< .001**	**0.793**	**0.917**	**SUPPORTED**

4.6.1.1 Technological factor and its impact on vehicles adoption intent through meditation of perceived applicability

With regard to the effect of technological variables on adoption intentions the findings indicated a notable divergence from mediated models that are contrary to previous studies. Even though the effect of technological readiness factors such as battery power, performance, and charging was found to be highly significant (beta = 0.291, $p < .001$) when predicting intention this was not channeled through perceive applicability.

4.6.1.2 Infrastructural factors and Its impact on vehicles adoption intent through meditation of Perceived applicability

Analysis of infrastructural factors revealed that while infrastructure is a powerful determinant of adoption intent; it operates exclusively as a direct driver rather than through the mediation of perceived applicability. The statistical evidence shows a highly significant direct yet the indirect path via perceived applicability remained non-significant.

4.6.1.3 Economic factors and Its impact on vehicles adoption intent through meditation of perceived applicability

The analysis of economic factors revealed a highly significant direct impact on adoption intent yet failed to show a significant indirect path through perceived applicability.

4.6.1.4 Social Factors and Its impact on vehicles adoption

Unlike the other predictors in this study, social factors confirmed as a strictly direct determinant of adoption intent. The results show a highly significant direct relationship confirming that social influence such as social status is a primary driver of consumer behavior in Ethiopia.

4.6.1.5 Perceived applicability and Its impact on vehicles adoption intent

The mediation analysis reveals that the indirect effects of technological, infrastructural, and economic factors on adoption intent through perceived applicability are all statistically non-significant. Specifically, the path for technology (beta = -0.034, p = 0.509), Infrastructure (beta = -0.013, p = 0.500), and Economics (beta = -0.026, p = 0.509) failed to show any meaningful mediation.

4.6.2 Coefficient of Determination

The following sections analyze the degree of fit of the model using the coefficient of determination (R2) and path analysis results.

Table 18: Results of Coefficient of Determination (R^2)

Endogenous Construct	R^2 Value
Perceived Applicability (PA)	**0.603**
EV Adoption Intent (EA)	**0.701**

Source: Researcher's Survey Output using JASP 0.95 4.0 (2026)

Coefficient of determination or R2 serves as the key criteria to assess the predictive capability of the structural model (Hair et al., 2019). Coefficient of determination is the measure of variance of endogenous construct, which is predicted from independent exogenous predictor variables.

As per Hair et al. (2011), R2 value of 0.75, 0.50 and 0.25 are considered high, moderate and low levels of explanatory power respectively.

From the results shown in the table, it can be seen that the structural model has high predictive accuracy. EV adoption intent which is the main dependent variable has an R^2 value of 0.701, meaning that the predictors technological, infrastructure, economic, and social variables explain 70.1% of the variation in consumer adoption intention in Ethiopia. The mediating variable, perceived applicability has 60.3% of its variations explained by the predictors.

4.6.3 Assessment of Path Coefficients (Direct Effects)

Table 19 Results of Direct Path Analysis

						95% Confidence interval	
Outcome	**Predictor**	**Std. estimate**	**Std. Error**	**z-value**	**P**	**Lower**	**Upper**
EA	EF	0.378	0.108	3.493	< .001	0.166	0.591
EA	IF	0.348	0.072	4.837	< .001	0.207	0.49
EA	TF	0.291	0.073	3.999	< .001	0.148	0.433
EA	SF	0.855	0.032	27.05	< .001	0.793	0.917

Source: Researcher's Survey Output using JASP 0.95 4.0 (2026)

After establishing the validity of the measurement model the researcher proceeded to the analysis of structural relationships where the direct effects were identified to assess the effect of the latent constructs. In assessing the direct effect, the researcher employed a direct effect model measuring the specific effect of the independent variables on EV adoption intent.

By focusing on standardized path coefficients (Beta), the analysis identifies the magnitude and statistical significance of individual predictors. The results detailed in Table 18 provide the empirical evidence for the structural linkages defined in the research framework.

Unlike the non-significant mediation; direct effects tests produced overwhelmingly good results. As can be seen from the table provided, Economic Factors (EF) (beta = 0.378, $p < .001$), Infrastructural Factors (IF) (beta = 0.348, $p < .001$), and Technological Factors (TF) (beta = 0.291, $p < .001$) all demonstrated high statistical significance as direct influences on adoption intent

4.6.3 Assessment of Indirect Effects (Mediation Analysis)

Table 20: Assessment of Indirect Effects (Mediation Analysis)

					95% Confidence interval		
	Std. Estimate	**Std. Error**	**z-value**	**P**	**Lower**	**Upper**	**RESULT**
TF → PA → EA	**-0.034**	**0.051**	**-0.661**	**0.509**	**-0.134**	**0.067**	**NOT SUPPORTED**
IF → PA → EA	**-0.013**	**0.019**	**-0.675**	**0.5**	**-0.05**	**0.024**	**NOT SUPPORTED**
EF → PA → EA	**-0.026**	**0.04**	**-0.661**	**0.509**	**-0.104**	**0.052**	**NOT SUPPORTED**

Source: Researcher's Survey Output using JASP 0.95 4.0 (2026)

To explore further the internal workings within the structural framework the mediation analysis was employed for testing the indirect effects on EV adoption intention. The core objective of performing such an analysis would be to establish whether perceived applicability is a crucial element of mediation through which perceptions concerning technology, infrastructure, and economics can influence adoption behavior.

4.7 Discussion of Results

The empirical outcomes of this study specifically the lack of statistical significance for the perceived applicability highlight a unique reality that simultaneously conforms to and challenges the established norms of conventional technology adoption literature.

According to foundational frameworks like the technology acceptance model and unified theory of acceptance and use of technology an innovation must be perceived as functionally beneficial and practically useful before an intention to adopt can be formed.

These findings in this suggests that consumers in Addis Ababa shows significant technological, infrastructural and financial skepticism. Respondents explicitly have concerns regarding the inadequacy of public charging networks, unreliability of electric supply, insufficient infrastructure investment, and financial risks associated with rapid depreciation and battery replacement costs. Under conventional market such conditions would logically suppress adoption intent. Paradoxically,

however the structural model demonstrates that purchase intentions remain high and this suggests that rather than transition driven by individual lifestyle readiness the Ethiopian consumers are operating within a state of institutionalized forced adoption.

The reason behind this behavior change lies in the coming together of very strong domestic pressures, specifically the very serious fuel shortage within the country coupled with extremely high fuel prices due to the ongoing phasing out of government subsidies. This domestic pressure was strengthened through Ethiopia's groundbreaking October 2022 policy introduced by the Ethiopian Ministry of Finance, which prohibits the use of forex to import internal combustion engine vehicles.

The second factor for the deviation from perceived applicability is that this regulatory void has been exploited by numerous low cost Chinese electric vehicles including BYD, Neta, and Changan. This has ensured electric vehicles are the only practical option available for purchasing a car in Addis Ababa.

Third, there is a structural coercion through economic means using radical fiscal engineering from the Ministry of Finance. Given the comprehensive network of tariffs, conventional fuel-powered vehicles have to endure heavy rates of taxation which have reached as much as 142% while EV taxes remain low with 23%, 5%, and 0% respectively for CBU, SKD & CKD units respectively. This coupled with low Chinese EV enabled Ethiopian consumers' preference towards EVs. However, although the consumer expresses their concern about the impracticality of the automobile due to infrastructural deficiencies and prevalence of electric gridlocks the actual situation in terms of economics forces the consumer to focus on EVs.

This structural decoupling and non-significant role of perceived applicability are further explained by a powerful mechanism of statistical variance competition, where social factors emerge as a dominant overriding force that effectively crowds out individual pragmatic concerns. In a deeply rooted collectivist society like Ethiopia, consumer behavior is inherently guided by communal alignment, institutional signaling, and peer network validation rather than isolated individual calculations.

Traditionally owning a car in Ethiopia has been extremely significant socially and economically speaking; thus being behind the wheel of a highly conspicuous, modern Chinese EV represents a

powerful means of conveying status and prestige in the socio-cultural city of Addis Ababa. Once the first-movers in a particular social or professional network affirmatively support the purchase of such cars, the resulting social phenomenon will carry considerable authority.

Chapter Five: Summary of results, Conclusion, and Recommendation

The core objectives of the research undertaken was a prospective study of the adoption of electric vehicles in Ethiopia. The exact scope of the research is related to determining the factors that determine the intention of the consumer regarding the adoption of EV in Addis Ababa. The study was guided by the necessity to reveal the influence of technology, infrastructure, and economic aspects on the adoption of electric vehicles as mediated by perceived applicability and direct influence of social aspects.

Based on the analysis of collected data this chapter aims to provide an interpretation of the findings obtained and provide a recommendations based on these findings.

5.1 Summary of Descriptive Analysis

5.1.1 Summary of Demographic Analysis

The demographic analysis indicates that the survey participants represent the most active and economically viable segment of Ethiopia.

The majority of respondents (68.9%) were between 25 and 44 years of age. As mid-career professionals, this group represents the primary working-age population in Addis Ababa with the long-term economic capacity and professional need for modern transportation solutions.

Approximately 69.8% of the sample holding a Bachelor's or Master's degree, the respondents possess a high level of academic training. This suggests a strong capacity for understanding the technical specifications and operational complexities associated with electric vehicle technology.

A significant 63.4% of respondents do not currently own a vehicle. This identifies a large potential first time buyer segment.

96.6% of respondents reporting familiarity with EVs the technology is clearly a recognized concept in Addis Ababa.

5.1.2 Summary of Descriptive Analysis on Constructs

The descriptive analysis provides a multi-dimensional perspective on respondent perceptions, revealing a complex psychological landscape where high behavioral intent exists despite perceived systemic and technical constraints.

5.1.2.1 Technological uncertainty and cognitive gap: The analysis of technological factors reveals a distinct pattern of cautious neutrality and informational ambiguity. While respondents lean slightly toward agreement regarding driving range (Mean = 3.30), there is a more pronounced skepticism regarding battery longevity (Mean = 2.82) and general motor reliability (Mean = 2.99). This

transition from moderate confidence in immediate utility (driving range) to skepticism regarding long-term durability (lifespan) identifies a significant cognitive gap.

Respondents appear to acknowledge the functionality of EVs for daily use but remain deeply uncertain about the enduring reliability of the technology in the Ethiopian context.

5.1.2.2 Systemic infrastructure barriers and contextual dissonance: Infrastructural readiness is perceived as the primary physical barrier. The mean score for public charging station sufficiency was the most suppressed in the study (2.09) with nearly 70% of respondents expressing categorical disagreement.

5.1.2.3 Economic risk assessment and asset value anxiety: Financial considerations are dominated by anxiety regarding the total cost of ownership. The highest mean in the entire dataset pertains to the perceived burden of battery replacement costs. Given that 73.7% of respondents viewed this as a significant deterrent.

Furthermore, with a mean of 3.66 regarding lower resale value, the data reflects a fear that EVs may not serve as stable stores of value; a critical factor in the Ethiopian market where vehicles are traditionally viewed as appreciating financial assets.

5.1.2.4 Socio-regulatory alignment and paradox of intent: In contrast to technical and economic skepticism, social factors demonstrate a robust positive trend. High general awareness and effective media messaging suggest that state-led promotional efforts have successfully cultivated a pro-EV social norm.

This creates a unique statistical paradox: high adoption intent persists despite the fact that these same respondents expressed deep mistrust in the infrastructure and significant fear regarding maintenance costs. This suggests that adoption intent in Addis Ababa is not a product of perceived situational fit but is rather driven by the combined force of social signaling and necessity imposed by the current regulatory mandate.

5.1.3 Summary of PLS-SEM Analysis

The measurement model was rigorously validated to ensure the empirical data provided a sound foundation for structural analysis. Through a process of model purification, an indicator loading threshold of 0.45 was applied, retaining theoretically vital sub-factors while optimizing structural integrity.

Internal consistency was confirmed with the EV adoption construct demonstrating exceptional reliability (alpha = 0.913), while other constructs remained within acceptable limits for a nascent market.

Convergent and discriminant validity were established under the Fornell and Larcker (1981) criteria. Although some average variance extracted values fell below 0.50, they were statistically validated by adequate composite reliability and the fact that each construct's square root of AVE exceeded its inter construct correlations.

Furthermore, the absence of multi-collinearity confirms that the predictors are empirically distinct. Collectively, these results verify that the measurement instrument was both stable and reliable, providing a robust basis for the subsequent hypothesis testing.

The structural model was evaluated to determine the significance, direction, and magnitude of the hypothesized relationships to ensure statistical robustness. The results indicate a model with high explanatory power and significant predictive accuracy.

5.1.3.1 Explanatory Power (R^2): The model demonstrated substantial predictive strength, explaining **70.1%** of the variance in EV adoption intent. This high R^2 value confirms that the combination of technological, infrastructural, economic, and social factors provides a comprehensive framework for understanding consumer behavior in the Ethiopian context.

Additionally, the model explained **60.3%** of the variance in **perceived applicability,** indicating a moderate-to-strong effect size.

A primary contribution of this study is the empirical documentation of what may be termed the mediation paradox; the total absence of a mediating effect through perceived applicability.

Contrary to initial hypotheses, all proposed indirect paths yielded non-significant results ($p > .05$), with confidence intervals crossing zero.

This indicates that within Ethiopia’s unique regulatory landscape defined by the moratorium on internal combustion engine vehicles the traditional psychological bridge of applicability is bypassed. Consumers are no longer engaged in a subjective evaluation on whether electric vehicle technology applies to their specific lifestyle; instead they move directly from perception of external environmental factors to the formation of adoption intent.

The direct action phenomenon represents a distinct departure from classical technology acceptance theories suggesting that state-led mandates can effectively compress the consumer decision-making process by shifting the focus from perceived utility to mandatory practical acquisition.

5.2 Conclusion

The case of Ethiopia moving towards electric mobility is a perfect demonstration of how such a model of structural compression from above can be used to overcome any possible barriers stemming from a consumer's perception of risks. Indeed, through imposing tough regulatory requirements like putting a moratorium on importing internal combustion engine vehicles; the authorities effectively bypass any psychological constraints and avoid going through the standard process of a consumer's cognitive evaluation. Instead, based predominantly on social signals and regulation, the citizens of Addis Ababa demonstrate a high level of behavioral intention for the adoption of electric cars.

This raises an issue of contextual dissonance, as people show such intention even though they doubt the reliability of the electricity grid and charging facilities as well as the durability of the vehicles.

5.3 Recommendations

Based on the empirical evidence of a direct action model and documented infrastructural-feasibility deficit, the following multi stakeholder interventions are proposed to transition Ethiopia from policy-mandated intent to a sustainable reality.

- **Green Mobility Investment Zones:** Copying Shenzhen success, Addis Ababa administration should give private developers a land subsidies and tax breaks for setting up rapid-charging stations. This tackles concerns about lacking infrastructure and directly correlate with privatization policy adopted by the government.
- **Grid Resilience and Priority-Feeder Protocols:** To address grid instability, the government should create special priority lines for EV charging hubs. These charging stations need power, even during outages to facilitate smooth mobility.
- **Battery Swapping Stations for Public Transport:** To fix infrastructure issues and meet the needs of busy transport areas like public buses it is recommended for government to set up battery swapping stations.
- **Standardized Battery Health Certification:** Copying from the South Korean; the government should put a policy mandating all used car dealers and stakeholders to have a standard State of Health certificate. This way battery wear can be objectively measured and help ease worries about low resale values which was found in this research. Further this enables financial firms to objectively evaluate and accurately use EVs as loan.

- **Identity-Based Branding and Prestige Signaling:** Since social factors heavily predict adoption intent marketing for electric vehicles needs to focus more on fitting into the culture rather than just highlighting tech specs. Local dealerships are recommended to do adverting based on identity and use influencers that represent modern Ethiopian success.
- **Mandatory Service-to-Vehicle Ratios:** To address tech issues government should make it a rule that every importer must have one certified service bay for every 50 cars sold. This would ensure the right amount of support infrastructure grows along with car sales.
- **Second-Life Deployment for Grid Support:** After retiring, EV batteries can be reused in stationary energy storage. This creates a circular economy loop where batteries can be utilized to provide backup power and stabilize priority-feeder charging networks recommended above.
- **Modernization of TVET Curricula:** To hit the 500,000 EV goal, the automotive industry needs trained technicians. Therefore, it is recommended to standardize trainings provided on safety, diagnosing issues, and power across all TVET levels.
- **Dual-Training Apprenticeships:** Copying from the German model local automotive dealers should work with vocational schools and training centers to offer mandatory on the job apprenticeships. This makes sure the workforce is expert in EV models flooding the Ethiopian market.

5.4 Suggestions for Future Research

This study offers a basic look at EV adoption intentions in Addis Ababa, but since the Ethiopian electric vehicle market is new there is a lot more for academicians to explore. Possible research could delve deeper into;

- **Temporal Re-testing of the Mediation Paradox:** Re-evaluate the mediation paradox sometime in the future to understand if the bypassed bridge of perceived applicability represents a permanent structural shift in technology acceptance for emerging markets or a temporary situation of regulatory shock phase.
- **Qualitative inquiry into the mediation paradox:** To complement the quantitative SEM findings future researchers can focus on phenomenological interviews or focus groups. This would give a deeper narrative insight.
- **Deconstruction of Structural Causal Mechanisms:** Move toward disaggregated, construct-specific inquiries to isolate the individual drivers within the Technological, Infrastructural,

Economic, and Social domains. Future researchers can focus on specific variables to allow a deeper investigation.

- **Market-Driven Financial Innovation & Beyond Fiscal Subsidies**: Beyond initial tax exemptions long-term EV adoption requires institutional financial innovation. Future research van focus on market specific credit framework such as green loans and asset-backed financing to de-risk lending for commercial banks. By addressing collateral concerns and battery-related volatility this research will provide a blueprint for shifting the e-mobility transition from temporary state subsidies to a robust, private-sector-led financial ecosystem.
- **Longitudinal TCO Research for Ethiopian Electrification:** To accelerate enterprise EV adoption research can shift focus from upfront sticker prices to comprehensive, longitudinal total cost of ownership modeling tailored for local commercial fleets. By comparing multi-year operational expenditures of ICE vehicles versus EVs the research will provide the empirical framework managers need to justify electric transitions and de-risk long-term capital investments.
- **Evaluating Commercial Viability for Charging-as-a-Service Models:** To move beyond technical deployment research can validate the commercial viability of charging-as-a-service models where private entrepreneurs operate independent, profit-driven charging units.

  By analyzing revenue architectures, dynamic tariff optimization, and synergy with multi-use commercial hubs the study will provide a roadmap for financial sustainability, effectively de-risking private sector participation in the Ethiopian e-mobility market.
- **Institutional and Fleet Diffusion Dynamics:** Shift focus from individual consumers to corporate and government fleets. Research can examine how organizational mandates, fiscal write-offs, and corporate social responsibility goals influence large-scale transitions differently than household-level factors.

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Appendix

DETERMINANTS OF ELECTRIC VEHICLE ADOPTION IN ETHIOPIA: ASSESSING THE MEDIATING ROLE OF PERCEIVED APPLICABILITY

I would like to thank you for taking the time to participate in this survey. My name is Ismail Fedlu, and I am an MBA candidate at Addis Ababa University. As part of my academic research, I am conducting a study titled "Determinants of electric vehicle adoption in Ethiopia".

The objective of this research is to investigate the various economic, social, and technological factors that influence EV adoption in Ethiopia, as well as to identify the key challenges and opportunities within the industry and the role of national policy in shaping its future.

Please be assured that all information provided will be treated with the strictest confidentiality and used solely for the purpose of this academic research. Your personal information will be protected, and all responses will be analyzed and presented only in aggregate form in the final report.

Your contribution is highly valuable to this study.

Thank you very much for your time and participation.

SECTION I: DEMOGRAPHIC AND BACKGROUND INFORMATION

The following questions gather basic background information about participant. Please read each question carefully and select the single option that best describes you. All responses are strictly confidential and will be used only for statistical purposes within this research project.

1. **Age:** ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ Above 55
2. **Gender**: ☐ Male ☐ Female
3. **Highest Educational level**:

   ☐ High school ☐ Diploma ☐ Bachelor's Degree

   ☐ Master's Degree ☐ Ph.D. Degree or above
4. **Occupation**

   ☐ Student ☐ Employed ☐ Self Employed

   ☐ Unemployed
5. **Income Level**:

   ☐ Below Birr 25,000 ☐ Birr 25,001 – 40,000 ☐ Birr 40,001 – 70,000

   ☐ Birr 70,001 – 100,000 ☐ Above Birr 100,000
6. **Do you currently own a vehicle?**

   ☐ Yes ☐ No
7. **If yes, what type of vehicle do you own?**

   ☐ Petrol ☐ Diesel ☐ Hybrid ☐ Electric ☐ Other:
8. **How familiar are you with electric vehicle technology?**

   ☐ Very unfamiliar ☐ Slightly familiar ☐ Moderately familiar ☐ Very familiar

SECTION II: FACTORS AFFECTING THE ADOPTION OF EVs

For each statement below, please indicate your level of agreement using the following scale:

1. **Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree**

Code	TECHNOLOGICAL FACTORS	1	2	3	4	5
TF**1**	Electric vehicles have good driving range					
TF**2**	Electric vehicles have short charging times					
TF3	EV batteries and motors are reliable					
TF**4**	EV batteries have a long lifespan					
TF5	EVs require less maintenance than conventional vehicles					
Code	**INFRASTRUCTURAL FACTORS**	**1**	**2**	**3**	**4**	**5**
IF1	There are enough public charging stations in Ethiopia					
IF2	Charging stations are compatible with all EV models					
IF3	Fast-charging stations are conveniently located					
IF4	Ethiopia's electricity supply is stable to support daily EV charging needs					
IF5	Investment in EV infrastructure is sufficient					
Code	**ECONOMIC FACTORS**	**1**	**2**	**3**	**4**	**5**
ER1	EV battery replacement costs are high					
ER2	EVs have lower resale value					
Code	**SOCIAL FACTORS**	**1**	**2**	**3**	**4**	**5**
SF1	I am aware of the benefits of electric vehicles					
SF2	People close to me support EV adoption					
SF3	Owning an EV would improve my social status					
SF4	Ethiopian culture values environmental protection					
SF5	Media messages encourage EV adoption					
Code	**PERCEIVED APPLICABILITY**	**1**	**2**	**3**	**4**	**5**

PA1	EV technology is suitable for Ethiopia					
PA2	Ethiopia's infrastructure supports EV use					
PA3	EVs make economic sense in Ethiopia					
PA4	EV adoption is required by law, not enabled by policy					

SECTION II: FACTORS AFFECTING THE ADOPTION OF EVs

For each statement below, please indicate your level of agreement using the following scale:

1. **Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree**

Code	EV ADOPTION	1	2	3	4	5
EA1	I desire to own an electric vehicle someday					
EA2	Using an EV would be a wise choice					
EA3	I am willing to switch to an EV whenever the opportunity arises					
EA4	I would encourage others to consider EVs					