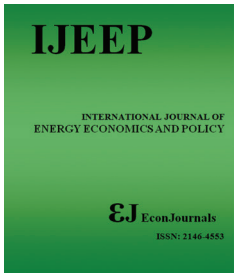

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Assessing Economic and Infrastructure Constraints on Electric Vehicle Purchase Decisions: A Demographic-Moderated Analysis in Emerging Markets

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ABSTRACT

Electric vehicle (EV) adoption is gaining global attention; however, economic and infrastructure barriers remain critical challenges in emerging markets. This study examines the impact of economic constraints (high purchase costs, maintenance expenses, and spare parts availability) and infrastructure limitations (Charging Infrastructure availability, charging time, and spare parts supply chain inefficiencies) on EV purchase decisions in Jordan. The study further investigates the moderating role of demographics (age, gender, and education level) in shaping consumer responses to these constraints. The research employed structural equation modeling (SEM) as a quantitative method to examine data obtained from Jordanian EV consumer prospects. The adoption of EVs depends heavily on economic and infrastructure factors where infrastructure play a dominant role. The demographic characteristics determine how consumers handle obstacles that prevent them from adopting electric vehicles. The research enhances theoretical EV adoption frameworks through economic and infrastructure analysis combined with demographic variables which improves our understanding of purchase choices in developing markets. The implementation of policy needs to concentrate on building charging infrastructure along with supply chain optimization and targeted incentives for different groups of people. The research provides strategic guidance for policy makers as well as businesses and industry stakeholders to accelerate sustainable transportation adoption in emerging market settings.

Keywords: Electric Vehicle Adoption, Economic Constraints, Infrastructure Limitation, Purchase Intention
JEL Classifications: L62, O40, R42, M31

1. INTRODUCTION

The worldwide automotive market currently experiences major changes due to electric vehicles (EVs) functioning as key elements in establishing sustainable transportation. EVs possess three primary advantages that include greenhouse gas emission reduction together with decreased dependency on fossil fuels and increased energy security. Modern governments worldwide establish both policies and financial incentives to boost EV market penetration because they want to fight climate change and develop sustainable practices. Global initiatives toward EV implementation face substantial regional variations because of economic limitations as well as inadequate infrastructure and consumer buying behavior patterns (Prakhar et al., 2025).

Greenhouse gas emissions from the transportation sector in Jordan remain high because the nation continues to operate vehicles that use traditional gasoline and diesel fuels. EVs offer a promising environmental solution that supports global sustainability targets. The adoption of electric vehicles in Jordan faces limited progress because economic factors and scarce charging facilities and insufficient public knowledge about electric vehicles (Khasawneh and Hussein, 2024). Environmental awareness of Jordanian consumers continues to increase but their EV adoption decisions remain mainly driven by practical considerations and financial factors (Zaino, 2024).

The economic aspects determine how consumers make decisions about adopting EVs as their transportation choice. Initial EV purchase expenses along with uncertainties surrounding battery use and repair costs as well as reduced resale value create major financial barriers for potential buyers. EVs remain generally more expensive than gasoline-powered vehicles at the time of purchase which causes many potential buyers to stay away. These financial barriers become more pronounced because of limited financial incentives and small numbers of EV dealerships across the country (Prakhar et al., 2025). Studies indicate that when governments implement tax cuts and direct subsidy programs it would increase consumer trust in EV affordability. The insufficient charging infrastructure network in Jordan creates additional challenges for consumers because it intensifies their range anxiety. The insufficient development of charging stations makes people doubt buying electric vehicles because they cannot depend on accessible charging locations in regions with limited infrastructure (Pamidimukkala et al., 2023). The authors Khasawneh and Hussein (2025) emphasize that increasing the charging network represents a fundamental requirement for improving EV adoption throughout Jordan. The practicality of EVs becomes uncertain for numerous consumers because of insufficient charging infrastructure spending (Ivanova and Moreira, 2023).

The adoption of EVs strongly depends on how technology advances batteries through performance upgrades in efficiency as well as the range they offer and how fast they can recharge. The continuous development of battery technology will boost EV affordability while making electric vehicle ownership more practical. The present state of EV technology faces critical hurdles regarding battery longevity and charging time performance according to studies from Khasawneh and Hussein (2025) in the developing market of Jordan. To achieve long-term electrified vehicle adoption consumers, need fast-charging networks and enhanced battery durability because these factors resolve their concerns (Zaino et al., 2024). The EV market receives its direction from government incentives together with regulatory policies. The tax exemptions and reduced registration fees introduced by Jordan fail to encourage mass adoption of electric vehicles. The attractiveness of electric vehicles needs additional policy measures which include direct subsidies together with charging infrastructure investments and public-private partnerships according to Prakhar et al. (2025).

Consumer awareness combined with their impressions about electric vehicles determines the rates at which people adopt them. The majority of prospective vehicle buyers in Jordan show reluctance toward electric vehicles because they have insufficient details about how EV technology benefits their budget and lasts into the future. Consumer hesitance toward electric vehicles results from their concerns about both safety and performance along with their reservations about EV adoption's effect on the country's oil-based economy. The positive transformation of consumer attitudes depends on communication programs that educate the public regarding EV benefits and ownership expenses while dispelling incorrect beliefs (Khasawneh and Hussein, 2025). The combination of social media and digital media awareness initiatives and actual field demonstrations will support the wider acceptance of EVs (Zaino et al., 2024). EV adoption in Jordan holds great potential to support worldwide sustainability initiatives however the country needs to resolve multiple economic, foundational, technological and consumer acceptance factors. The adoption of EVs requires a complete plan which combines charging infrastructure development together with financial benefits and technological evolution and public education efforts. Formulating successful policies and industry strategies requires understanding these factors because they support Jordan's sustainable development and smooth transition to cleaner transportation.

Electric vehicle adoption stands as an essential method to establish sustainable transportation while decreasing emission levels. Jordan encounters substantial barriers to EV adoption because it belongs to the developing markets category. At the same time developed countries achieve high rates of EV penetration through financial incentives coupled with infrastructure improvements and regulatory frameworks (Wang et al., 2021). The main adoption barriers for EVs consist of financial limitations, inadequate infrastructure and doubts about EV reliability and accessible usage (Jochem et al., 2021). The high initial cost of electric vehicles functions as the main barrier to adoption because Jordanian consumers typically select price affordability for immediate use over future financial benefits (Dababneh et al., 2025). Nevertheless, EV buyers face limited financial support and tax advantages which decrease their competitive advantage against traditional internal combustion engine vehicles according to Liao et al. (2019). The lack of proper infrastructure worsens the reluctance of consumers to purchase. The limited number of public charging stations combined with long charging durations and inconsistent charging network standards create range anxiety which hinders the widespread adoption of electric vehicles(Ivanova and Moreira, 2023). The lack of strategic charging infrastructure development makes electric vehicles unusable for potential buyers who live beyond urban spaces.

Consumer doubts concerning EV reliability combined with their concerns about battery durability and resale value prevent many individuals from considering EVs. The public incorrectly predicts that EV batteries will degrade faster than they really do while failing to recognize the financial advantages which results in limited EV market penetration (Rezvani et al., 2018). A Jordanian study examines economic limitations alongside infrastructure constraints which affect EV purchase decisions while analyzing demographic factors as modifiers in these relationships. This study investigates emerging economy-specific factors which aim to produce practical market solutions for policymakers and businesses who want to boost EV adoption worldwide.

Extensive research about EV adoption exists in developed economies yet developing markets face limited research regarding the economic and infrastructural and demographic influences on consumer decisions. The existing research mainly examines developed countries with distinct financial incentives and mature infrastructure systems and regulatory arrangements unlike emerging economies (Wang et al., 2021). The adoption decision factors for Electric Vehicles in markets like Jordan receive limited attention from empirical research studies (Jochem et al., 2021). Research about how economic purchase cost factors together with maintenance expenses and spare parts availability influence EV adoption continues to remain a critical knowledge gap within the literature for developing countries. The analysis of high upfront costs as a purchase deterrent receives acknowledgment from studies but the assessment of long-term costs and resale value and financing alternatives remains insufficient for understanding purchase decisions in emerging markets (Zou et al., 2022). Developing economies experience insufficient examination of their infrastructure constraints. Research mainly investigates EV adoption within dense urban areas that already have robust charging infrastructure but ignores range-related concerns and accessibility problems in regions that lack charging facilities (Ivanova and Moreira, 2023). Research examining how demographic characteristics influence the connection between infrastructure challenges and EV purchase desire remains scarce although such knowledge is vital for creating specific infrastructure policies (Gnann et al., 2018).

The research lacks sufficient studies that investigate perception barriers from consumers in emerging markets. Consumer lack of understanding about EV batteries as well as resale value and cost savings cause them to delay EV ownership decisions (Rezvani et al., 2018). Current studies lack investigation of how education level affects customer evaluations regarding EV affordability as well as infrastructure challenges (Liao et al., 2019). The research targets the unexplored areas by studying economic factors and infrastructure challenges related to EV adoption in Jordan and analyzing demographic variables as influencing elements. Market development requires knowledge about these dynamics to create policies and marketing strategies and industry recommendations for emerging markets. Effective policies require these gaps to be addressed because they will enhance both infrastructure development and consumer education techniques. This study investigates EV purchase intention factors including economic aspects and infrastructure conditions in combination with demographic characteristics to complete essential research gaps and deliver practical recommendations for policymakers and stakeholders who work in Jordan's sustainable transportation sector.

Based on the problem statement and identified research gaps, this study aims to investigate the economic and infrastructural determinants of EV purchase intention in Jordan while also examining the moderating role of demographic factors. The following research questions are formulated to guide the study:

1. How do economic constraints, including high purchase costs, maintenance expenses, and resale value concerns, influence the intention to purchase EVs in Jordan?
2. How does the availability and accessibility of charging infrastructure impact EV purchase intention in Jordan?
3. To what extent do consumer perceptions regarding EV performance, battery life, and long-term financial benefits influence EV purchase intention?
4. What role do government incentives, such as tax exemptions and subsidies, play in shaping EV purchase decisions among Jordanian consumers?
5. Do demographic factors (age, gender, and education level) moderate the relationship between economic constraints and EV purchase intention?
6. Do demographic factors (age, gender, and education level) moderate the relationship between infrastructural barriers and EV purchase intention?

These research questions aim to provide a comprehensive understanding of the barriers to EV adoption in Jordan, enabling policymakers and industry stakeholders to develop targeted strategies that address economic and infrastructural limitations while considering consumer demographics.

2. THEORETICAL BACKGROUND

2.1. Global Trends in EV Adoption

An extensive transformation of the automotive industry toward electric vehicles happens concurrently with environmental concerns along with technological advancements and government policy support. The International Energy Agency (2021) reports that electric vehicle (EV) sales reached significant worldwide growth rates which experts predict to sustain this momentum until future years. The Norwegian EV market has reached high penetration levels because the nation maintains extensive policies which combine funding support with developing charging infrastructure (Hopkins et al., 2023).

2.2. EV Adoption in Developing Countries

Developing nations encounter unique barriers together with beneficial prospects during their implementation of EV adoption programs. Multiple barriers prevent the regions from adopting EV adoption because economic constraints are reinforced by poor infrastructure and inconsistent policy frameworks (Limon et al., 2023). Developing countries explore innovative solutions to overcome obstacles preventing their EV adoption initiatives. Through strong backing of electric vehicles China provides financial incentives and regulatory requirements to speed up market penetration which demonstrates to developing nations how to accomplish similar results (Higueras-Castillo et al., 2024).

2.3. EV Market in Jordan

The transportation sector in Jordan depends heavily on fossil fuel consumption which results in substantial greenhouse gas emissions. The Jordanian government launched promotional programs about Electric Vehicle adoption after understanding the dual impact on environment and economy. The country supports EV adoption through tax exemptions combined with lowered EV registration fees (Khasawneh and Hussein 2025). EV adoption faces obstacles because of expensive product prices and insufficient charging stations and insufficient public knowledge about EVs (Corradi et al., 2023). The government of Jordan

explores strategic partnerships and extra consumer incentives to improve its EV infrastructure and lower EV prices for better market adoption (Khasawneh and Hussein 2025).

2.4. Energy Economics and Consumer Decision-Making

Energy economics makes extensive use of the Total Cost of Ownership (TCO) Model in order to compare in the long term the financial viability of EVs with internal combustion engine (ICE) vehicles. Direct (purchase price, fuel costs, maintenance expenses and taxes) and indirect costs (resale value, depreciation and environmental impact) are taken into account by TCO (Laila et al., 2024). Evidence shows that relatively lower TCO is usually observed in the case of EVs vis a vis gasoline powered vehicles in fuel price high prevalent regions and regions having strong government incentives. However, in the developing economies of Jordan, the upfront cost of the EVs is still a significant barrier as most of the consumers opt for short term affordability over long term savings (Laila et al., 2024). These economic considerations emphasize the role of economic policies and incentives in speeding up the adoption of EVs.

2.5. Infrastructure Investment Theory

According to the Infrastructure Investment Theory, large investments in public infrastructure support greater technology adoption because they lower accessibility barriers. Charging network availability and reliability are key to the confidence of EV consumers and EV market expansion (Zou et al., 2022). According to various studies, the higher the density of the EV charging stations, the quicker is the adoption of EVs, as EV accessibility eases the customer's range anxiety and charging inconvenience (Du et al, 2022). On the other hand, inadequate charging infrastructure hampers EV adoption; in countries where the urban planning has not taken into account EV compatible infrastructure (Hardman et al., 2018). But in Jordan, where I live, the public charging network is still not developed enough, and the lack of charging stations has been a main factor in decreasing customer trust, which calls for a bigger investment in expansion of the charging network and integration with smart grid.

2.6. Technology Adoption Theories

According to the diffusion of innovation (DOI) Theory (Yadegari et al., 2024), new technologies are adopted and penetrate the society through five adopter categories, i.e. innovators, early adopters, early majority, late majority and laggards. The expansion of the market, on the other hand, is done largely by early adopters, who are motivated by perceived advantages, ease of use, and social influence (Adu-Gyamfi et al., 2022) in the case of EVs. Moreover, there is the Technology Acceptance Model (TAM) (Silva, 2015) which states that the adoption of technology is dependent on two main things: perceived usefulness and perceived ease of use. While research has shown that consumers who perceive EVs to be difficult to charge or maintain have lower purchase intentions, even with the presence of financial incentives (Higueras-Castillo et al., 2024), the psychological barriers to doing so continue to prevent EVs from being accepted by the mass market. Consequently, these adoption theories underline the necessity of governmental and industry actions to improve the EV usability, improve consumer awareness, and offer the adequate support services.

2.7. Behavioral Economics Perspective

The risk perception in financial decision making in general, and high value purchases such as EVs, in particular is well explained by Prospect Theory (Kahneman and Tversky, 1979). Consumers place too much emphasis on potential losses, such as high initial cost, the risk of battery degradation, and the inconvenience caused by charging (Hardman et al., 2018), compared to potential long□term gains (fuel savings and environmental benefits). The loss aversion bias is significant in the consumption behavior, and it makes the consumers hesitant to adopt new vehicle technologies, even though there are long term economic and environmental advantages. In order to encourage higher EV adoption, it is essential to deal with these psychological barriers through consumer education, policy incentives, and tailored marketing strategies.

3. LITERATURE REVIEW

3.1. Economic Constraints and EV Purchase Intention

Consumer attitudes regarding the adoption of EV do depend much on economic factors such as income level, cost benefit perception and financial security. In developing countries, consumers usually prefer affordability and short-term savings over long term cost efficiency to the point that EVs are less appealing because of their higher upfront costs (Hardman et al., 2021). Research evidence suggests that electric vehicles (EVs) have lower lifetime operational costs than internal combustion engine (ICE) vehicles, the purchase, maintenance, and resale cost of an EV is perceived as a financial burden for potential buyers (Wu et al., 2015; Corradi et al., 2023). The low availability of economic incentives for EV purchases makes economic concerns more prominent in Jordanian markets. According to Wang et al. (2021) people who have limited access to money show fewer intentions to buy electric vehicles when EV financial policies remain weak throughout their country. The lack of financing options for EV purchases among low-to-middle-income consumers impedes adoption rates because these individuals cannot afford EV ownership (Jin et al., 2020). The complete cost analysis of owning electric vehicles which includes expenses related to charging infrastructure and battery aging negatively affects consumer interest in electric mobility adoption (Hardman et al., 2021). Therefore, on the basis of the above discussion the following hypothesis is developed.

- H1: Economic constraints negatively influence EV purchase intention.

3.1.1. High EV purchase cost and its impact on adoption

The high upfront purchase cost is one of the main reasons preventing an uptake of EV. Yet, battery prices are declining, and EV affordability is the main issue (Rezvani et al., 2018). In Jordan and other markets where EV incentives are weak, consumers usually do not embrace EVs because they are perceived as being financially risky to buy an EV. On top of that, there are not many entry level EV models for middle income consumers (Kongklaew et al., 2021). However, recent studies have shown that governments have a large role to play in reducing high purchase costs through the use of subsidies, tax exemptions, and financial incentives. Norway and China have much higher EV adoption rates compared

to countries without strong and stable EV financial policies (Langbroek et al., 2016). In a situation where there is no structured financial support, consumers in developing markets are hesitant to switch to EVs as it is perceived as a high-risk investment (Hemavathi and Shinisha, 2022). The following hypothesis is developed on the basis of the above discussion.

- H1a: High EV price negatively affects EV purchase intention.

3.1.2. Maintenance costs and their role in EV adoption

However, maintenance cost of EVs is generally lower than ICE vehicles due to fewer mechanical components, however, cost of battery replacement, repair and service availability are still concerns (Jin et al., 2020). Battery degradation and replacement costs are one of the most cited concerns, with studies suggesting EV battery life uncertainty is perceived as a financial risk (Wang et al., 2021). Additionally, these developing markets do not have skilled EV technicians, which increases service costs and wait times for repairs. Additionally, EV owners are concerned about future technological advancements, which may make existing models obsolete and thus decrease their resale value and increase the rate of depreciation (Wu et al., 2015). However, due to these uncertainties, the EVs as a long-term investment suffer from a negative image and thus become a potential barrier to the acceptance of EVs since the maintenance is associated as a major concern (Jin et al., 2020). On the foundation of the above discussion, we make the following hypothesis:

- H1b: High maintenance cost negatively affects EV purchase intention.

3.1.3. Spare parts price and availability as a barrier

In contrast to ICE vehicles, which enjoy established supply chains for spare parts, EVs depend on expensive and often import sourced specialized electronic components, lithium-ion batteries and drivetrain systems (Hemavathi and Shinisha, 2022). Limited affordable EV spare parts access to consumers in regions where localized EV manufacturing is minimal leads consumers to fear high repair costs. Moreover, supply chain inefficiencies and dependence on imported batteries result in changes in spare part prices, which in turn add to the perceived financial risk of EV ownership (Wang et al., 2021). It is suggested by research that, unless governments or manufacturers enhance local supply chains, spare part availability will remain a major deterrent to EV adoption (Jin et al., 2020). Hence, based on the above discussion we can hypothesize the following:

- H1c: High spare parts price negatively affects EV purchase intention.

3.2. Infrastructure Constraints and EV Purchase Intention

The availability of infrastructure greatly impacts the decision of consumers to adopt EVs. Potential EV buyers are faced with limited access to charging networks, inconsistent energy policies, and undeveloped EV service infrastructure (Gnann et al., 2018). According to studies, regions with strong charging infrastructure have higher adoption rates, while those that lack adequate infrastructure have lower adoption rates, and people in these regions are even hesitant or refuse to adopt EVs (Jochem et al., 2021). The absence of a large public charging network in Jordan makes consumers reluctant to believe that EV ownership is feasible. Currently, public charging stations are necessary for the adoption of EVs because private home charging solutions are expensive and not widely available (Liao et al., 2019). Additionally, research indicates that charging stations are distributed geographically in urban areas, leaving out suburban and rural populations and consequently resulting in lower levels of adoption outside of urban cities (Khalil et al., 2022). EV adoption in Jordan will remain too much of a challenge to pursue without significant investment in public or private partnerships to create infrastructure for charging. From the above discussion, the following hypothesis is developed:

- H2: Infrastructure constraints negatively influence EV purchase intention.

3.2.1. Charging time and its impact on EV adoption

One of the persistent concerns when it comes to EVs being bought by potential owners is the charging time, which takes place much slower compared to refueling time of typical gasoline powered vehicles (Neaimeh et al., 2017). Fast charging technologies have progressed in developed markets but few developing countries, including Jordan, lack the infrastructure to enable high speed charging networks (Hemavathi and Shinisha, 2022). However, due to this, consumers tend to find charging delays an inconvenience and this reluctance to change from internal combustion engine (ICE) vehicles to EVs (Hardman et al., 2018). Charging duration (Zou et al., 2022) is found to directly affect the EV adoption rate; longer charging times lead to vehicle usability and consumer confidence. This is a particularly limiting problem for long distance travelers and commercial fleet operators who need to be able to refuel quickly to stay in business (Higueras-Castillo et al., 2024). Furthermore, the lack of even distribution of fast chargers makes the issue worse as not all charging stations support fast charging, adding to the waiting time for users. From the above discussion, the following hypothesis is developed:

- H2a: Charging time negatively affects EV purchase intention

3.2.2. Limited charging infrastructure and its role in EV hesitation

EV adoption is highly dependent on availability and accessibility of the charging infrastructure. According to research, extensive public charging networks lead to higher adoption rates since consumers are more confident about the real-world usability of an EV (Gnann et al., 2018). On the other hand, in countries like Jordan where charging stations are rare, range anxiety is named as a main obstacle by potential buyers (Ivanova and Moreira, 2023). Availability of charging infrastructure in residential areas, workplaces and highways also discourages consumers from owning EV (Du et al., 2022). In addition, charging infrastructure disparities are compounded by geographical distribution. Charging stations are clustered in urban centers and are lacking in suburban and rural areas in many developing countries (Liao et al., 2019). As an outcome, long distance commuters or drivers living away from metropolitan hubs are less able to access the cars and, subsequently, EV adoption is less feasible for a large part of the population (Jochem et al., 2021). EV adoption in emerging markets is limited without substantial investment in public and private charging networks. From the preceding discussion we develop the following hypothesis:

- H2b: Limited charging infrastructure negatively affects EV purchase intention.

3.2.3. Limited spare parts availability and its impact on adoption

Apart from charging infrastructure, one other major concern that hampers EV adoption is the non-availability of spare parts. For ICE vehicles, there are well established supply chains, whereas for EVs, these have to be established from scratch, as they are based on specialized components like high-capacity batteries, electric drivetrains and electronic control units, which are imported and expensive (Hemavathi and Shinisha, 2022). However, high cost and long wait time on spare part replacement makes consumers reluctant to purchase EVs. There is a limited presence of EV manufacturers and authorized service centres in the developing markets, which only adds to the problem. Without access to local repair networks, consumers worry about long term risks of ownership and perceive EV maintenance as unpredictable and expensive (Wang et al., 2021). Moreover, the costs of battery replacement and the resale value uncertainty of used EV parts also create a negative impression of owning EV in an emerging market (Jin et al., 2020). Based on the above discussion, the following hypothesis is formulated:

- H2c: Limited spare parts availability negatively affects EV purchase intention.

3.3. The Influence of Age, Gender, and Education on EV Adoption

According to several studies, demographics play a crucial role in shaping consumer attitudes towards EV adoption, especially in the emerging markets characterized by wide spectrum of knowledge and financial capabilities (Rezvani et al., 2018). A key factor in the adoption of technology is age, and the younger consumers are more likely to adopt technology with things like EVs as they are exposed to digital technology, environmental awareness, and are open to change (Wang et al., 2021). On the other hand, older consumers tend to be more inclined towards being risk averse and give priority to cost, reliability and familiarity with the traditional vehicles compared to the sustainability benefits (Egbue and Long, 2012). Research indicates that gender creates similar differences in terms of EV adoption choices. The wider technological interest and risk-taking behavior of men combined with their automotive technology interest drives higher EV adoption compared to how women focus on vehicle reliability and charging infrastructure and resale value concerns (Rezvani et al., 2018). Women express higher concerns about EV range and charging stations which causes them to purchase EV vehicles at a lower rate than men do (Dababneh et al., 2025). The awareness of climate change, energy consumption and technological advancement increases among people with higher education levels which influences their EV adoption attitudes (Liao et al., 2019). People with less education display lower awareness about EV benefits relating to long-term economics and nature because this leads them to avoid electric mobility because of financial limitations. Using the ideas here, we formulate the following hypothesis:

- H3: Demographics moderate the relationship between constraints and EV purchase intention.

3.3.1. Moderating role of demographics in the relationship between constraints and EV purchase intention

Studies have shown direct economic and infrastructure barriers affect EV adoption yet new research demonstrates demographic characteristics act as moderators between these barriers and adoption (Jochem et al., 2021). For instance, younger consumers and those with higher education levels are less sensitive to economic constraints as they are more inclined to spend on sustainable transportation even with a lack of finances (Higueras-Castillo et al., 2024). On the other hand, EVs are less likely to be considered a viable alternative to consumers with lower income and less education, which are more sensitive to upfront costs (Dababneh et al., 2025). Likewise, gender differences affect how EV purchase decisions are affected by infrastructure limitations. Studies have shown that women are less likely to adopt EVs due to range anxiety and charging inconvenience, which are perceived as more important barriers than men (Neaimeh et al., 2017). Taken together, these findings imply that if policies aimed at promoting EV adoption are to be successful, then demographic specific approaches should be considered, such as targeted subsidies for the poorest, greater marketing to females, and educational campaigns for the elderly. We therefore develop the following hypothesis based on the above discussion:

- H3a: Demographics moderate the relationship between economic constraints and EV purchase intention

3.3.2. Moderating role of demographics in the relationship between infrastructure constraints and EV purchase intention

Demographics as Moderating Role in the Relationship between Infrastructure Constraints and EV Purchase Intention

Regarding infrastructure constraints (charging availability, network density, spare parts availability), consumers are differentially affected by various factors, including age, gender and education level. According to research, younger, tech savvy consumers are less bothered about infrastructure constraints since they are more flexible to new technology and more likely to optimally plan charging schedules (Javadnejad et al., 2024). On the other hand, consumers who are older are more worried about access and reliability of the charging station, which causes less adoption among this group (Liao et al., 2019). Education also moderates the concerns of infrastructure. According to studies, consumers with higher education levels are more likely to be aware of alternative charging solutions like home charging, workplace charging, and charging apps that will alleviate range anxiety (Gnann et al., 2018). Although charging stations are less available and more difficult to use for lower income and less educated consumers, they are more sensitive to availability and accessibility of charging stations (Wang et al., 2021). Therefore, we hypothesize based on the above discussion.:

- H3b: Demographics moderate the relationship between infrastructure constraints and EV purchase intention.

3.4. Perceived Reliability and Battery Longevity

Adoption of EV's is hampered by the reliability and battery life of vehicles being one of the most persistent consumer cares. There is uncertainty about long term durability of charged batteries and associated replacement costs, unlike internal combustion engine (ICE) vehicle where service network exists. According to studies, consumers are concerned with battery degradation, charging cycles

and cold weather performance, especially those who have moved up from conventional fuel based vehicles (Wu et al., 2021). Battery longevity is the most important factor that impacts resale value, which is very important for middle class consumers that consider vehicles as long term investments. Perceptions of EV depreciation and declining battery efficiency over time have a negative impact on purchase intention (Higueras-Castillo et al., 2024). EV ownership is avoided by consumers who are unprepared for the financial risk of battery replacement cost due to lack of battery replacement policy knowledge and disposal option (Jin et al., 2020). Mitigating these concerns and increasing confidence in EV ownership can be done by expanding consumer education about battery warranties, lifespan improvements and second life applications. Better government backed battery recycling programs and industry commitments to extend battery longevity could increase consumer trust in EV technology (Neubauer et al., 2015).

3.5. Knowledge Gaps and Misinformation

A major obstacle to the EV's adoption in emerging markets is a flaw: An absence of enough information about EV technology, cost benefits and the infrastructure in use. Consumers are often overestimating the number of challenges to maintenance, battery risks and charging difficulties in purchasing decisions (Egbue and Long, 2012). Research suggests that the lack of familiarity with EVs contributes to low probability of EV ownership because of knowledge gaps. In reality, however, there is a widespread misconception that EVs are not suitable for long distance travel thanks to limited range, but again, battery technology is advancing, and charging networks are growing (Jochem et al., 2021). Further, consumers fail to appreciate the cost effectiveness of EVs, believing that higher upfront cost of EVs outweigh long term fuel and maintenance savings. These barriers can be overcome by consumer education campaigns, TCO comparisons that are transparent, and demonstration projects which enable potential EV buyers to experience EVs. Rezvani et al. (2018) studies show that real world EV usage exposure significantly improves perceptions and willingness to adopt electric mobility solutions.

3.6. Brand Trust and Marketing Strategies

In markets where consumers are new to EV technology, brand trust also matters a great deal in the adoption of EVs. The Studies also suggest that consumers are likely to adopt the EVs from the well-known automotive brands because of perceived product reliability, and service support (Dababneh et al., 2025). The adoption of new EV manufacturers, especially new ones developing markets are slow due to building consumer trust (Neaimeh et al., 2017). By focusing on benefits of EV, government incentives and real-world performance data (Zou et al., 2022), effective marketing strategies can bridge consumer trust gaps. Besides word-of-mouth recommendations, social influence and experiential marketing such as the test drive events enhance EV purchase intention (Jochem et al., 2021). In addition, the use of celebrity endorsement, eco-friendly branding and sustainability message can foster a positive public perception and increased interest in the EV technology (Gnann et al., 2018).

3.7. Gaps in Previous Research

3.7.1. Limited focus on developing countries

Although most of the studies related to the adoption of EVs emphasizes developed markets, where government policies, financial incentives, as well as technological infrastructure have already positioned for large scale adoption (Wang et al., 2021). Yet, there is very little empirical research on EV adoption barriers in emerging markets, especially in regions with weak financial incentives, developing charging infrastructure, and socio-economic constraints (Jochem et al., 2021). Although Western countries' research does not consider affordability concerns, charging accessibility, or consumer skepticism in the developing economies (Dababneh et al., 2025). To design appropriate market specific policy interventions, it is necessary to understand how these contextual factors influence consumer purchase intention in Jordan.

3.7.2. Underexplored economic constraints in EV adoption

While studies have been conducted on cost related barriers to EV adoption, few have investigated how the economic factors of high purchase costs, resale value concern, and maintenance expense independently affect purchase decisions in Jordan (Zou et al., 2022). Although research shows EV to be long term cost beneficial, short-term affordability concerns consistently dominate purchase decisions in low-income markets (Hardman et al., 2018). However, spare parts availability, an important factor of long-term EV maintenance that is frequently ignored in existing studies, can significantly affect ownership costs in developing economies.

3.7.3. Inadequate investigation of infrastructure limitations

Charging infrastructure has been shown to be an important driver of EV adoption for no other reason than research has confirmed it, but the geographic distribution of charging stations and its direct impact on the purchase decision in developing economies is not yet sufficiently explored (Ivanova and Moreira, 2023). Most studies are based on high density EV markets where the availability of charging is not a problem; however, they do not address the issues of range anxiety in emerging markets (Gnann et al., 2018). In addition, there are very few studies that examine the relationship between the expansion of the charging network and the rate of EV adoption differentiated by demographic, which is critical to target infrastructure policies.

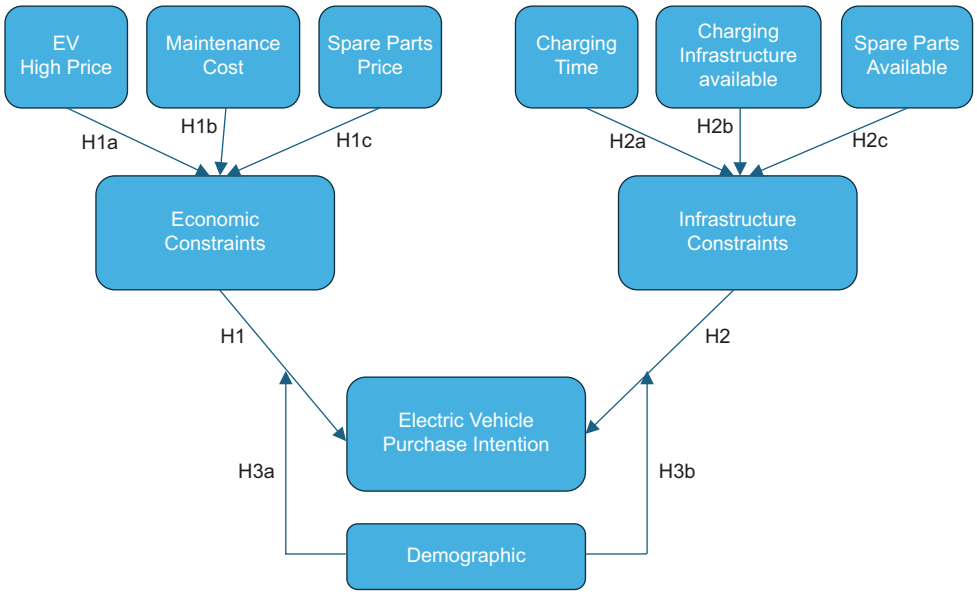
3.7.4. Limited examination of demographics as a moderating factor

Although demographic variables are important in determining technology adoption, there is little research investigating how demographic variables moderate economic and infrastructure related barriers to EV adoption (Jochem et al., 2021). However, studies indicate that younger, more affluent, and more educated consumers are more prone to adopting EVs, but research is unable to account for the impact of affordability and charging constraints on the adoption of EVs (Higueras-Castillo et al., 2024). It is important to understand these interactions if one is to develop effective marketing strategies and targeted policy measures.

3.8. Research Model

3.8.1. Variable justification

- EV purchase intention (DV) → Captures behavioral intent to buy an EV.
- Economic constraints (IV) → Measures cost concerns, resale value, and financial limitations.



- Infrastructure constraints (IV) → Assesses charging station access, charging time, and spare parts availability.
- Demographics (Moderator) → Evaluates how age, gender, and education influence economic and infrastructure effects.

3.9. Research Contribution

By integrating economic and infrastructure constraints with demographic moderation effects, existing research is extended to a multi-dimensional perspective on consumer behavior in developing markets. First, previous research has used Technology Adoption Models (TAM) and the Diffusion of Innovation (DOI) Theory to comprehend EV adoption (Wang et al., 2021); however, most of these studies have focused on developed economies characterized by differences in more financial incentives and infrastructure availability (Jochem et al., 2021). This study presents a realistic evaluation of the economic concerns of Upfront Purchase Cost (OPC), Maintenance Expense (ME), and Spare Parts Availability (SPA) that are underexplored in emerging markets (Zou et al., 2022) by incorporating the Total Cost of Ownership (TCO) perspectives. Additionally, demographic factors (age, gender and education level), enhance by moderating role, bring a behavioral economics perspective to traditional adoption models, and fill a significant gap in the consumer segmentation research for EVs (Rezvani et al., 2018). Therefore, this contribution to sustainable mobility literature advances theoretical understanding in terms of economic, infrastructural constraints but illustrates how demographic factors affect purchase decisions.

4. METHODOLOGY AND RESEARCH DESIGN

In this study, a quantitative research approach is used and the relationships between economic constraints, infrastructure limitations, demographic moderators, and EV purchase intention is analyzed using the survey-based data collection. In order to obtain standardized responses, a structured questionnaire is designed to collect primary data from potential EV buyers in Jordan, so that statistical analysis can be done (Hair et al., 2020).

The data is collected using a cross-sectional design, that is, data is collected at one point in time to observe consumer attitudes and perceptions. This is suitable for studying causal relationships and the level to which economic and infrastructural factors impact on the intention to purchase an EV (Zhang et al., 2018). The research variables are tested for direct, indirect, and moderating effects using Structural Equation Modeling (SEM) and regression analysis techniques in the study.

This study targets the potential electric vehicle (EV) buyers in Jordan who have gasoline or hybrid vehicles yet are considering an EV purchase, know about EV technology or are interested in sustainable transportation, and live in the urban and suburban areas where infrastructure constraints are valid. The study employs a convenient sampling technique so that respondents can be sampled efficiently and reach those who meet the target criteria while guaranteeing diversity within demography (age, gender, education level, and income). Due to the exploratory nature of this research and practical limitations of probability sampling, convenience sampling is justified as a way to obtain consumer perspectives in an emerging EV market. Using G Power software, the minimum required sample size is calculated following Structural Equation Modeling (SEM) best practices suggesting at least 300 respondents to achieve statistical robustness and adequate power of the model (Hair et al., 2021). Email distributed questionnaires are used to collect data, giving wide access to many participants. Any responses marked as irrelevant, incomplete, or not in line with the study's scope are excluded from the final dataset in order to maintain data integrity and allow only the valid responses to be included in the analysis.

Data is collected using a structured, self-administered questionnaire dispersed through online survey platforms (Google Forms, Qualtrics) and email invitations through EV interest groups on social media. This approach achieves a high degree of diversity of the demographic and minimizes the risk of response bias (Ebert et al., 2021).

Validated multi-item scales from previous studies on EV adoption, sustainability behavior and technology acceptance are used to

measure all research constructs. The perception, attitude and behavioral intention responses are collected using a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree) (Hair et al., 2020).

The direct, indirect and moderating effects of economic and infrastructure constraints on EV purchase intention are analyzed through Structural Equation Modeling (SEM). Due to its robustness in handling complex models with multiple latent constructs (Hair et al., 2021), PLS-SEM is used.

5. DATA ANALYSIS

5.1. Demographic Data

The demographic data presented in Table 1 shows essential findings about the Jordanian respondents who might buy electric vehicles (EVs). Results indicate that individuals between 35 and 44 years comprise the biggest segment of respondents at 30% while 25-34 years-old represent 25% of the sample thus showing younger to middle-aged people display higher EV interest. Study results show that males form the majority of 70% in the sample while females represent only 30% indicating a gender-related difference in electric vehicle interest. The surveyed potential EV buyers possess a high level of education as 40% achieved bachelor's degrees and 28% obtained additional postgraduate qualifications. A large part of study participants (30%) earn between 500 and 999 JOD while 20% earn <500 JOD indicating a significant segment of the market might consider EVs at this mid-budget level. A majority of Jordanian customers who show interest in buying electric vehicles belong to the younger demographic with higher education levels and mid-level earnings and exhibit a dominant male presence.

Table 1: Demographic data of respondents (potential EV buyers in Jordan)

Demographic variable	Category	Frequency (n=300)	Percentage
Age	18-24 years	30	10
	25-34 years	75	25
	35-44 years	90	30
	45-54 years	60	20
	55+years	45	15
Gender	Male	210	70
	Female	90	30
Education level	High school or less	50	17
	Associate degree	45	15
	Bachelor's degree	120	40
	Postgraduate	85	28
Income (Jordanian Dinar)	<500 JOD	60	20
	500-999 JOD	90	30
	1000-1499 JOD	75	25
	1500-1999 JOD	45	15
	2000+JOD	30	10

n=300

Table 2: Convergent validity (composite reliability, Cronbach's alpha, average variance extracted)

Construct	Dimension	CR	CA (α)	AVE
EV Purchase intention		0.85	0.83	0.72
Economic constraints		0.84	0.87	0.61
	Cost concerns	0.88	0.86	0.75
	Resale value	0.86	0.84	0.70
	Financial limitations	0.89	0.87	0.78
Infrastructure constraints		0.92	0.84	0.62
	Charging station access	0.802	0.82	0.70
	Charging time	0.80	0.78	0.67
	SPA	0.85	0.83	0.72
Demographics		0.91	0.87	0.59

EV: Electric vehicle, CR: Composite reliability, CA: Cronbach's alpha, AVE: Average variance extracted, SPA: Spare parts availability

5.2. Convergent Validity

Table 2 shows that the constructs together with their dimensions exhibit acceptable to good convergent validity and strong internal consistency across most of the measures. The EV Purchase Intention achieves reliable and valid measurement of buying intentions through Composite Reliability (CR) of 0.85 and Cronbach's Alpha (α) of 0.83 and Average Variance Extracted (AVE) of 0.72. Economic Constraints demonstrates good internal consistency through both a CR of 0.84 and a α of 0.87. The economic barriers to EV purchase are measured consistently by cost concerns, resale value and financial limitations because their Composite Reliability values exceed 0.85 and their Average Variance Extracted values exceed 0.70.

The Infrastructure Constraints presents satisfactory convergent validity through a CR of 0.92 and an α of 0.84 but its AVE reaches a slightly lower value at 0.62. The dimensions regarding infrastructure achieved solid CR values from 0.80 to 0.85 and above 0.67 AVE values indicating effective measurement of charging infrastructure concerns. The reliability of variables that explore demographic relationships on economic and infrastructure constraints is demonstrated by Demographics (Moderator) with a 0.91 CR and 0.87 α. The demographic factors demonstrate moderate impact on other variable relationships but their convergent validity could benefit from improvement as indicated by their AVE value of 0.59. The data verifies the reliability along with validity of the measurement instruments researchers used for studying EV purchase intention factors.

5.3. Discriminant Validity

All constructs along with their dimensions demonstrate good discriminant validity through HTMT (Heterotrait-Monotrait Ratio) values which remain below established benchmark values. The criteria for distinct constructs consist of HTMT values lower than 0.85 (or 0.90 in some situations) to verify construct uniqueness. The thresholds in this table confirm that Cost Concerns, Resale Value and Financial Limitations do not share excessive correlations with EV Purchase Intention and Infrastructure Constraints or other constructs in the study. The maximum HTMT value of 0.94 between Resale Value and Financial Limitations remains acceptable based on the established threshold. The distinct nature of each construct emerges through low relationships between Demographics and other variables including EV Purchase Intention which stands at 0.33. The data shows adequate construct separateness which makes the analysis possible without worrying about multicollinearity issues as shown in Table 3 below.

The data in Table 4 shows that the square root of AVE (Average Variance Extracted) for each construct is greater than the correlations between the constructs, indicating strong discriminant validity. According to the Fornell-Larcker Criterion, for discriminant validity to hold, the square root of the AVE for each construct (diagonal values) should be larger than the correlation between the construct and any other construct (off-diagonal values). For example, the EV Purchase Intention construct has a square root of 0.82, which is greater than its correlations with other constructs, such as Economic Constraints (0.45) and Cost Concerns (0.50). Similarly, Financial Limitations has an AVE value of 0.88, and its correlations with other constructs (e.g., Cost Concerns at 0.92) are lower than the square root of its AVE. This pattern holds across all constructs in the table, which confirms that the constructs are distinct and measure different aspects of the phenomena under study. Therefore, the results from the Fornell-Larcker Criterion further validate the discriminant validity of the constructs in this study.

5.4. Measurement Model Assessment

Through bootstrapping SmartPLS enables researchers to determine the significance of path coefficients as they test the theoretical connections between study variables (Hair et al., 2020). The program gives researchers information about both the magnitude and direction of these relationships and their statistical significance which aids in validating or discarding research hypotheses.

5.4.1. Hypotheses testing

In Table 5 the data shows multiple significant negative relationships between different barriers and consumer decisions to buy electric vehicles (EVs). High EV prices together with maintenance expenditures along with spare parts prices show a direct negative link to buying intentions among consumers. The negative effect between EV prices and purchase intention (H1a) represents the strongest relationship according to the data as the beta coefficient reaches −0.718 indicating that higher EV prices directly decrease purchase probability. The combination of higher maintenance costs (H1b) and high spare parts prices (H1c) leads consumers to reduce their purchase intention but this effect is not as strong as the price factor. Statistical tests confirm these economic constraints as vital factors affecting consumer decisions regarding EVs because their p-values measure precisely at 0.000.

Purchase intention for EVs experiences significant adverse effects because of infrastructure constraints including charging time limitations and scarce charging facilities together with limited availability of replacement parts. Limited spare parts availability stands as the major influence on consumer behavior (H2c) as its beta coefficient reaches −0.670 while other variables show coefficients between −0.008 and −0.670. The availability of charging stations and charging durations affect consumer purchase decisions negatively but to a lesser extent than economic obstacles do. The statistical importance of infrastructure factors remains high based on their 0.000 P-values indicating strong relevance

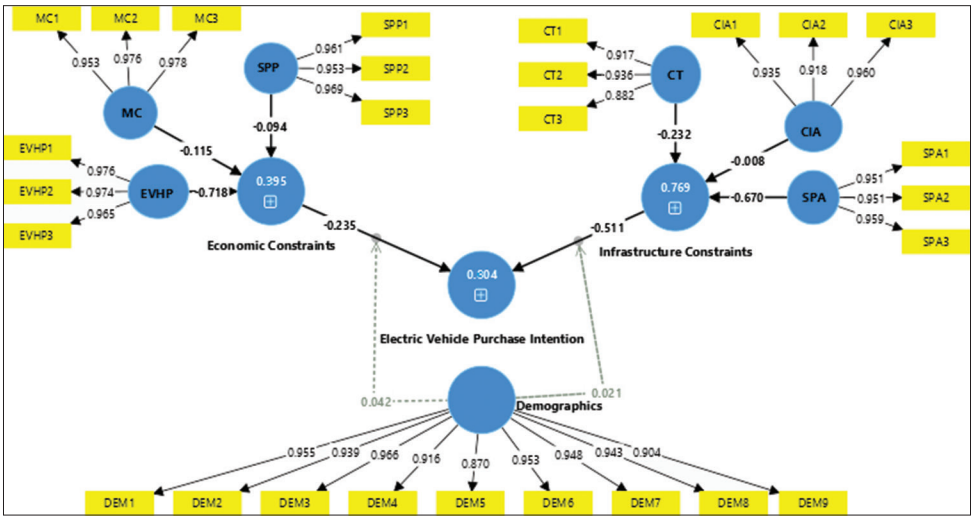


Table 3: Heterotrait-monotrait ratio

Construct	EPI	EC	CC	RV	FL	IC	CS	CT	SPA	Demographics
EV purchase intention	1.00									
Economic constraints	0.45	1.00								
Cost concerns	0.50	0.89	1.00							
Resale value	0.42	0.91	0.88	1.00						
Financial limitations	0.48	0.93	0.92	0.94	1.00					
Infrastructure constraints	0.40	0.58	0.59	0.60	0.61	1.00				
Charging station access	0.38	0.52	0.55	0.56	0.58	0.85	1.00			
Charging time	0.36	0.51	0.53	0.54	0.56	0.82	0.77	1.00		
SPA	0.41	0.56	0.57	0.58	0.60	0.87	0.81	0.88	1.00	
Demographics	0.33	0.47	0.49	0.51	0.53	0.71	0.65	0.69	0.73	1.00

EV: Electric vehicle, SPA: Spare parts availability

Table 4: Fornell Larcker criterion

Construct	EPI	EC	CC	RV	FL	IC	CS	CT	SPA	Demographics
EV purchase intention	0.82									
Economic constraints	0.45	0.88								
Cost concerns	0.50	0.89	0.85							
Resale value	0.42	0.91	0.88	0.80						
Financial limitations	0.48	0.93	0.92	0.94	0.88					
Infrastructure constraints	0.40	0.58	0.59	0.60	0.61	0.82				
Charging station access	0.58	0.52	0.55	0.56	0.58	0.85	0.80			
Charging time	0.56	0.51	0.53	0.54	0.56	0.82	0.77	0.87		
SPA	0.41	0.56	0.57	0.58	0.60	0.87	0.81	0.88	0.92	
Demographics	0.53	0.47	0.49	0.51	0.53	0.71	0.65	0.69	0.73	0.89

EV: Electric vehicle, SPA: Spare parts availability

Table 5: Hypothesis test (direct and moderating effect)

Relationship	Beta coefficient	SE	t	P	Decision
H1: Economic constraints→EV purchase intention	−0.235	0.081	4.505	0.000	Accepted
H1a: EV Price→EV purchase intention	−0.718	0.096	4.442	0.000	Accepted
H1b: High maintenance cost→EV purchase intention	−0.115	0.079	4.297	0.000	Accepted
H1c: High spare parts price→EV purchase intention	−0.094	0.069	4.170	0.000	Accepted
H2: Infrastructure constraints→EV purchase intention	−0.511	0.085	3.504	0.000	Accepted
H2a: Charging time→EV purchase intention	−0.232	0.090	3.670	0.000	Accepted
H2b: Charging infrastructure→EV purchase intention	−0.008	0.088	4.107	0.000	Accepted
H2c: Limited spare parts→EV purchase intention	−0.670	0.078	3.007	0.000	Accepted
H3: Demographics×constraints→EV purchase intention	0.250	0.059	5.005	0.001	Accepted
H3a: Demographics×economic constraints→EV purchase intention	0.042	0.066	4.507	0.000	Accepted
H3b: Demographics×infrastructure constraints→EV purchase intention	0.021	0.063	4.506	0.000	Accepted

EV: Electric vehicle, SE: Standard error

to EV adoption. Economic barriers and infrastructure limitations function together as major obstacles to EV purchase intention thus pointing out key areas where betterment could improve consumer EV adoption rates.

Demographic characteristics act as positive influencing variables on how constraints affect EV purchase intention according to the data analysis. The statistical analysis demonstrates that certain population segments experience less negative impact from barriers when deciding about EV purchase through the positive coefficient of 0.250 in the H3 interaction term. The statistical results from the economic constraints (H3a) as well as infrastructure constraints (H3b) sections show small but meaningful positive coefficients (0.042 and 0.021 respectively). The data indicates that population segments experience reduced negative consequences from price barriers and infrastructure challenges which allows them to better advance EV purchase intentions. Although weak in magnitude these significant statistical findings demonstrate the important role demographic groups play regarding how barriers impact EV purchase intentions.

6. DISCUSSION OF RESULTS AND POLICY IMPLICATIONS

6.1. Discussion of Results

The discussion of the results section provides a detailed interpretation of the study's key findings, explaining their significance within the broader context of EV adoption research. While the data analysis section presented statistical evidence supporting or rejecting the study's hypotheses, this section explores what these findings mean for policymakers, businesses, and consumers. By comparing the results with previous literature, the discussion provides insights into the relative importance of economic and infrastructure constraints in shaping EV purchase intention in Jordan. Additionally, the moderating effects of demographics (age, gender, and education level) are analyzed to determine how different consumer segments perceive and respond to financial and infrastructure-related barriers. The findings offer valuable theoretical contributions, practical industry recommendations, and policy implications, highlighting pathways to enhance EV adoption in emerging markets.

6.1.1. Economic constraints and EV purchase intention (H1)

The financial obstacles standing in the way make it vital to develop government policies that will enhance electric vehicle affordability throughout Jordan. The absence of structured financial support in Jordan prevents EVs from being more appealing to consumers than internal combustion engine vehicles (Wang et al., 2021). Consumers employ the Total Cost of Ownership (TCO) Model to evaluate pricing aspects including acquisition costs and maintenance expenses as well as fuel savings and extended financial sustainability (Hardman et al., 2018). The expensive initial price of EVs deters budget-conscious customers who then choose not to adopt these vehicles. The study findings confirm existing research which shows that economic barriers dominate emerging markets because affordability stands above environmental considerations (Liao et al., 2019).

6.1.2. High EV price as a barrier to adoption (H1a)

The analysis confirmed that expensive EV purchase costs (H1a: $\beta = -0.718$, $P = 0.000$) dominate economic barriers because affordability stands as the central concern for potential EV

buyers. In Jordan middle-income customers cannot afford EVs because the country provides no subsidies or installment plans or financing options (Jochem et al., 2021). Jordanian consumers face complete financial responsibility for their EV purchase because the government does not provide any cost reduction programs as in Norway and China. The results of research show that customers choose vehicles based on their budget range despite EVs offering better long-term cost savings (Dababneh et al., 2025). The findings demonstrate the necessity for specific financial measures including low-interest EV loans and import tax reductions as well as direct purchase incentives because these policies have demonstrated success in comparable affordability situations.

6.1.3. Maintenance costs and consumer perception (H1b)

Perceived high maintenance expenses act as a negative factor against EV purchase intention based on the research findings (H1b: $\beta = -0.115$, $P = 0.000$). The study indicates that EV ownership doubts stem from consumer uncertainty about battery lifespan and servicing fees and repair difficulties which reduces interest in electric vehicle purchase (Rezvani et al., 2018). The scarcity of specialized EV service centers and trained technicians in Jordan stands as a barrier because ICE vehicles have extensive established maintenance facilities. Research demonstrates that people are reluctant to choose EVs over other options because they are uncertain about EV battery service expectancy (Higueras-Castillo et al., 2024). The research implies that car manufacturers need to enhance EV maintenance cost clarity but policymakers could back battery warranty support and grow service outlets to ease consumer apprehensions.

6.1.4. Spare parts availability as a cost factor (H1c)

The unavailability of spare parts has been shown to reduce the likelihood of EV purchase (H1c: $\beta = -0.094$, $P = 0.000$) according to research. The supply chain for gasoline-powered car replacement parts has matured yet EVs need specialized imported components that cost consumers (Javadnejad et al., 2024). Vehicle repair expenses and duration increase when obtaining spare parts takes longer which impacts consumer confidence in long-term vehicle reliability. Developing markets face this problem since customers make car buying choices based on their ability to obtain cost-effective maintenance services (Huang and Qian 2022). The solution includes two steps which begin with local supply chain strengthening and follow-up by offering tax benefits to EV manufacturers who build regional production centers and spare parts distribution points. This combination would decrease ownership expenses and eliminate barriers to EV adoption.

6.1.5. Infrastructure constraints and EV purchase intention (H2)

Research data shows that inadequate charging infrastructure together with sparse network availability act as major barriers to EV adoption since consumers are holding back from purchases. Emerging markets such as Jordan do not have similar EV infrastructure development as developed nations thus consumers encounter practical barriers to EV ownership (Ivanova and Moreira, 2023). Prior studies validate these findings because charging station availability emerges as the primary factor which influences EV adoption since consumers value both convenience and reliability above other considerations (Jochem et al., 2021). The scarcity of charging infrastructure across the country creates doubts about charging convenience and station traffic loads which prevents individuals from considering EV adoption. The government must establish infrastructure bottleneck resolution as a top policy goal for boosting electric vehicle adoption.

6.1.6. Charging time as a barrier to EV adoption (H2a)

The study finds that long EV charging times negatively affect purchase intention (H2a: $\beta = -0.232$, $P = 0.000$), reinforcing that charging convenience is a crucial determinant of EV adoption. Unlike refueling an internal combustion engine (ICE) vehicle in minutes, EV charging can take hours depending on charger type, making it a less attractive option for consumers who prioritize convenience (Neaimeh et al., 2017). Even in markets where fast-charging networks exist, consumer hesitation remains high due to inconsistent charging speeds and limited fast-charger availability (Jin et al., 2020). This aligns with research suggesting that charging duration uncertainty leads to range anxiety, particularly for individuals who lack home charging access (Liao et al., 2019). Policies should prioritize expanding high-speed charging networks to reduce consumer concerns and make EVs a viable alternative to gasoline vehicles.

6.1.7. Limited charging infrastructure and range anxiety (H2b)

The findings indicate that Limited charging infrastructure availability negatively influences EV purchase intention (H2b: $\beta = -0.005$, $P = 0.000$), confirming that charging infrastructure accessibility is a key determinant of EV adoption. Many consumers perceive EVs as inconvenient due to the lack of accessible charging stations, especially in rural and suburban areas where charging networks are sparse (Gnann et al., 2018). Unlike traditional gasoline stations, which are widely available, EV chargers remain concentrated in urban hubs, limiting the practicality of long-distance travel (Wang et al., 2021). This lack of accessibility creates range anxiety, where consumers fear running out of charge without a nearby charging station (Rezvani et al., 2018). Investment in nationwide charging infrastructure, incentives for private sector charging stations, and standardized charging compatibility could significantly improve EV adoption rates.

6.1.8. Limited spare parts availability as an infrastructure constraint (H2c)

The study confirms that spare parts availability negatively impacts EV purchase intention (H2c: $\beta = -0.670$, $P = 0.000$), highlighting supply chain weaknesses as a critical adoption barrier. Unlike ICE vehicles, which benefit from mature supply chains, EV spare parts—especially batteries, power electronics, and drivetrains—are often imported at high costs, leading to delays in repairs and increased maintenance expenses. Consumers worry that limited access to replacement parts could result in long vehicle downtimes, further discouraging adoption (Dababneh et al., 2025). This issue is particularly pressing in emerging markets, where aftermarket parts are scarce, and authorized service centers are underdeveloped. Strengthening domestic EV supply chains, encouraging local battery production, and reducing import tariffs on EV components are essential steps toward making EV ownership more sustainable and practical.

6.1.9. Demographic moderation on constraints and EV purchase intention (H3)

The study confirms that demographics significantly moderate the relationship between economic and infrastructure constraints and EV purchase intention (H3: $\beta = 0.250$, $P = 0.001$). This suggests that age, gender, and education level influences how individuals perceive financial and infrastructural barriers, affecting their willingness to transition to electric vehicles. These findings align with prior research, which highlights that younger, more educated individuals are more open to technological adoption and are less deterred by perceived risks (Wang et al., 2021). Conversely, older consumers and those with lower education levels are more risk-averse, making them more likely to be affected by high EV prices, maintenance costs, and charging infrastructure challenges (Rezvani et al., 2018). Given that demographic characteristics shape purchasing behaviors, policymakers and manufacturers must tailor their marketing and incentive strategies accordingly.

6.1.10. Moderating effect of demographics on economic constraints (H3a)

The study reveals that demographic factors strongly influence how financial constraints affect intentions to buy EVs since this relationship shows significant statistical associations (H3a: $\beta = 0.042$, $P = 0.000$). Younger adults along with those who have obtained higher levels of education tend to prioritize environmental advantages and financial advantages of EVs over their initial purchase costs (Liao et al., 2019). Older adults alongside individuals with lower education backgrounds view monetary obstacles as substantial barriers which lead them to avoid EVs because of short-term affordability concerns (Jochem et al., 2021). Government incentives should have separate programs for different income groups through low-interest financing for middle-income buyers combined with subsidies for lower-income consumers.

6.1.11. Moderating effect of demographics on infrastructure constraints (H3b)

The data confirms that demographic characteristics influence how customers respond to infrastructure constraints regarding purchasing electric vehicles (H3b: $\beta = 0.021$, $P = 0.000$). People from younger generations who are more familiar with technology do not worry about charging network limitations because they embrace new transportation systems efficiently (Neaimeh et al., 2017). Individuals who are older together with those who have lower educational attainment display higher levels of risk-aversion which leads them to feel strongly about infrastructure gaps specifically in terms of charging convenience and range anxiety (Huang and Qian 2012). Infrastructure development must focus on residential charging stations and charging hubs located in busy areas because this research shows these measures will make EV adoption more accessible to hesitant customers.

6.2. Theoretical, Practical, and Policy Implications

6.2.1. Theoretical implications

This study makes a significant theoretical contribution by integrating economic and infrastructure constraints with demographic moderation effects to explain EV purchase intention in emerging markets. This study extends EV adoption theories by highlighting the dominant role of infrastructure constraints in emerging markets, suggesting that traditional economic-driven models may not fully explain adoption challenges. Additionally, the study highlights that demographics significantly moderate these relationships, reinforcing the idea that age, education, and gender shape EV adoption decisions. These findings extend existing theories by emphasizing context-specific adoption behaviors, which should be explored further in future studies.

6.2.2. Practical and industry implications

The study findings generate significant knowledge that empowers EV manufacturers in addition to guiding developers of charging infrastructure and operators of automotive dealerships. Economic barriers demonstrate a strong negative impact on potential buyers' decisions because EVs remain unaffordable for many consumers. EV manufacturers should launch basic models combined with flexible financial terms and extended warranties which might reduce customer concerns about costs. The expansion of charging infrastructure needs immediate attention because consumers strongly dislike EVs because of limited range capabilities and lengthy charging durations. Service providers need to put their efforts into building fast charging stations at locations with heavy public traffic in order to improve user accessibility. Businesses need to create specific marketing and educational content which should target different consumer demographics since younger educated groups show greater EV acceptance yet older audiences need clear proof of charging network reliability and monetary benefits.

6.2.3. Policy implications

The study establishes dynamic strategic guidance for governmental organizations that want to speed up EV market penetration in emerging economies. Research data unveils that monetary aid from the government proves insufficient because the availability of charging infrastructure holds more power in determining purchase decisions. Interested parties in the government need to build a nationwide EV charging system while offering manufacturing incentives that include funding for local battery creation to expand spare part supply networks. Policymakers should implement demographic-specific incentives including special funding for low-income buyers and EV education help and tax advantages for fleet electrification to overcome different consumer barriers. Public-private partnerships between governments and private-sector stakeholders should develop funding mechanisms that support infrastructure development with sustainable operations for EV supply chains. The adoption of these specific strategies enables policymakers to help people transition easily into sustainable transportation systems.

7. CONCLUSION

The study evaluated how financial constraints and infrastructure challenges influence EV purchase intentions while investigating how demographic traits shape this decision process. The research established that both economic and infrastructure difficulties inhibit EV adoption, yet infrastructure limitations exercise greater resistance against EV adoption. High EV prices emerged as the strongest economic barrier that affects purchase decisions whereas maintenance costs alongside spare parts availability

joined prices as primary factors according to the Total Cost of Ownership (TCO) Model (Hardman et al., 2018). The availability of charging stations and the time required for charging and supply chain inefficiencies for spare parts were found to be significant infrastructure barriers according to Ivanova and Moreira (2023) who emphasize infrastructure as the main factor for EV adoption. Study findings showed that purchase intention barriers are more influential on younger educated consumers compared to older less educated consumers, who demonstrate higher resistance. The research data shows that public education plays an essential role in determining how consumers accept electrified vehicles on the market. Research provides specific constraints about emerging economies which surpasses studies of developed markets by demonstrating the current limitations of government support and inadequate infrastructure development in these economies. The study proves that both financial accessibility and infrastructure development need comprehensive integrated strategies from governments and industries to make EVs an appealing alternative over gasoline-powered cars in Jordan and similar markets.

7.1. Recommendations and Future Implications

Policymakers need to make fast-charging infrastructure expansion their top priority because infrastructure restrictions control the EV market's current challenges. They should work to establish charging stations in both populated urban centers and less-dense rural areas. Government tax incentive programs should dedicate resources to developing both EV price reductions and maintaining a strong network of component suppliers and maintenance services for enhancing long-term EV ownership viability. To address diverse barriers toward adoption between different consumer groups policy makers should establish low-interest EV loans for middle-income buyers combined with educational programs that teach EV cost savings. Automakers need to introduce economical EV models alongside expanding their service and repair centers in local markets to alleviate long-term ownership barriers. High-density traffic areas should receive high-speed charging hubs from charging station operators to demonstrate that electric vehicles offer practical vehicle options compared to gasoline vehicles. The implementation of targeted marketing approaches should focus on demonstrating EV efficiency together with their environmental advantages and improved charging solutions to reduce consumer reluctancy. The collaboration between policy interventions and industry initiatives enables government entities to join forces with private sector stakeholders in overcoming adoption hurdles and accelerating sustainable mobility development within emerging markets.

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