

Consumer Perceptions Toward Electric Vehicle Adoption in Sta. Maria, Bulacan: Implications for Purchase Preferences

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Abstract. This study examines consumer perceptions toward electric vehicle (EV) adoption and their influence on purchase preferences in the semi-urban municipality of Santa Maria, Bulacan. Using a descriptive-comparative quantitative research design, data were collected from 300 residents and vehicle owners through a researcher-developed survey questionnaire. Respondents were selected using purposive sampling, while the collected data were analyzed through frequency and percentage distributions, weighted mean, independent samples t-test, and one-way analysis of variance (ANOVA). The findings revealed a moderate overall level of consumer perception toward EV adoption. Participants demonstrated strong awareness of the environmental and economic benefits associated with EVs, particularly their potential to reduce tailpipe emissions, minimize environmental impacts, and lower long-term operational fuel costs. However, perceptions regarding infrastructure readiness remained relatively weak, with respondents assigning low ratings to the availability of public charging stations (Mean = 1.84) and access to qualified local repair and maintenance services (Mean = 1.95). Moreover, the high initial purchase cost of EVs emerged as a significant barrier to adoption (Mean = 3.64), indicating that financial considerations continue to influence consumer decision-making. Despite these challenges, respondents expressed a generally favorable intention to purchase EVs, especially when supported by government incentives such as tax exemptions, purchase subsidies, and expanded charging infrastructure. Inferential analysis further indicated no significant differences in consumer perceptions and purchase preferences when grouped according to sex ($p > 0.05$). In contrast, significant variations were observed across age, household income, and vehicle ownership status ($p < 0.05$), with younger and higher-income respondents demonstrating greater readiness and willingness to adopt electric vehicles in the future.

Keywords: Consumer Perceptions; Electric Vehicle Adoption; Purchase Preferences; Sustainable Mobility; Technology Acceptance Model (TAM)

Introduction

Sustainable modes of transportation have become a key approach in fighting climate change and the emission of greenhouse gases by the transportation industry. Transportation is the major source of carbon emissions in the world and hence has attracted a lot of interest among governments, policy makers and car companies that are striving for sustainable mobility. Among the alternatives for traditional ICE cars, electric vehicles have become a key mode of transport because of its ability to cut the use of fossil fuels, minimize air pollution and help achieve the goals of sustainability set forth by the government (Woodley et al., 2024). For this reason, many advanced countries have boosted the number of EVs through financial rewards, well-built infrastructures and favorable policies.

However, despite all this international progress, EVs are unevenly adopted in developing countries. Whereas developed countries have well-developed charging infrastructure and effective government incentives, developing countries still encounter obstacles linked to affordability, availability of the required infrastructure, and lack of awareness about the matter. The introduction of the Electric Vehicle Industry Development Act (EVIDA) in the Philippines can be regarded as an important policy measure in this respect as it seeks to promote sustainable transportation in the country and encourage EV production and charging

facilities installation in the Philippines (Barrosa, 2023). However, the actual adoption rate of EVs among Filipinos is relatively low because it is determined by consumers' attitudes to the cost and convenience of vehicles.

It is important to comprehend such consumer perceptions because the success of adoption of EVs is highly contingent upon consumers' acceptance and purchase of the technology. According to the Technology Acceptance Model, consumers' adoption intentions of technological innovations are mostly determined by such factors as perceived usefulness and perceived ease of use (Kim, 2024). The Theory of Planned Behavior is based on the same premise that behavioral intentions are affected by people's attitudes, subjective norms, and perceived behavior controls that include charging infrastructure access (Kim, 2024). In terms of sustainable transportation, it is also important for such theoretical approaches to acknowledge the significance of environmental awareness and economics with regard to consumers' assessment of benefits that come from lower operating costs compared to high purchase price (Falisa & Tricahyono, 2025).

Previous studies consistently report that consumers generally hold favorable attitudes toward EVs because of their environmental and economic benefits. However, these positive perceptions do not always translate into actual purchase intentions. Research has shown that concerns regarding limited charging infrastructure, high acquisition costs, driving range, and insufficient policy support continue to discourage potential buyers, particularly in developing countries (Saflor et al., 2024; Helmi, 2026). Moreover, most existing studies have concentrated on national-level analyses, metropolitan cities, or highly urbanized areas where EV infrastructure and public awareness are relatively more developed. While these investigations provide valuable insights into broad adoption trends, they offer limited understanding of consumer behavior in semi-urban municipalities, where socioeconomic conditions, transportation patterns, and infrastructure availability differ substantially from those of major urban centers.

This is a considerable deficiency in research. The lack of empirical evidence that explores how consumers in the developing semi-urban areas view EVs and how such views affect their purchase decision still exists. Semi-urban areas where urbanization is occurring tend to be different from urban areas in terms of transport issues like use of motorcycles, tricycles, private cars, and even charging facilities. Therefore, research conclusions from the urban settings will not be applicable to the developing semi-urban areas.

Indeed, the city of Santa Maria, Bulacan is the ideal place where such a gap can be addressed. The fast-growing first class municipality undergoing constant growth in terms of residential, business, and economic development, as well as the adoption of transportation vehicles, is reflective of the majority of other developing communities within the Philippines which have undergone transportation transition. Indeed, electric motorbikes, e-bikes, and electric scooters have become increasingly popular because of their cheapness and ease of use (Gumasing, 2025). However, passenger electric vehicles continue to be relatively unpopular in this regard because of infrastructure limitations and economic concerns among others (Saflor et al., 2024).

In this regard, the current research will explore consumer perceptions towards electric vehicles in the city of Santa Maria, Bulacan, specifically the effect of these perceptions on consumer buying preferences. In particular, the study will assess perceptions related to usefulness, ease of use, environmental aspects, and cost-effectiveness, determine if such perceptions vary according to demographics, and identify any determinants that could promote or impede adoption of EVs. The results of the study will add to the literature on sustainable transportation through filling the gap in research conducted within semi-urban areas of the Philippines. Besides, the results will be beneficial to the local government units, policy makers, automakers, and infrastructural developers in crafting interventions aimed at encouraging consumers to accept sustainable modes of transport.

Research Questions

This study aims to assess the consumer perceptions toward electric vehicle (EV) adoption in the municipality of Santa Maria, Bulacan, and to determine its structural implications for localized consumer purchase preferences. Specifically, the study seeks to answer the following research questions:

1. What is the demographic profile of the respondents in Santa Maria, Bulacan, in terms of:
 - 1.1 Age;
 - 1.2 Sex;
 - 1.3 Monthly Household Income; and
 - 1.4 Current Vehicle Ownership Status?
2. What is the level of consumer perception toward electric vehicle adoption among the respondents across the following dimensions:
 - 2.1 Perceived Usefulness and Environmental Benefit;
 - 2.2 Perceived Ease of Use and Infrastructure Readiness; and
 - 2.3 Perceived Economic Value and High Costs?

3. What is the extent of the implications of these factors on consumer purchase preferences regarding electric vehicles?
4. Are there significant differences in the respondents' consumer perceptions and purchase preferences toward electric vehicle adoption when they are grouped according to their demographic profile?
5. Based on the findings of the study, what policy recommendations, or marketing strategies can be proposed to support sustainable transport transitions in the municipality?

Scope and Delimitation of the Study

The primary objective of this study was to assess and document consumer perceptions regarding electric vehicle (EV) adoption and to evaluate how these perceptions shape localized consumer purchase preferences. The research was restricted to the municipality of Santa Maria, Bulacan, Philippines. Data collection occurred across its local barangays to capture a representative cross-section of this rapidly growing, first-class semi-urban community. The study was executed over a defined four-week period for data collection, with the final analysis and framework synthesis.

Literature Review

Perceived Usefulness and Environmental Benefit

The Technology Acceptance Model (TAM) concept known as Perceived Usefulness (PU) refers to the degree to which people think the use of a certain technology will make them better at what they do or improve the quality of their lives in other ways (Kim, 2024). In the realm of adoption of electric vehicles (EVs), the concept of perceived usefulness has expanded from just considering functional performance to the wider aspects of environmental and social benefits. In previous research works, the perceived usefulness of EVs is often identified as one of the most significant predictors for adopting such vehicles. According to Kim (2024), customers will be more inclined towards adopting EVs when they see some functional benefits, such as increased efficiency in driving, reduced operational cost, and increased convenience. Likewise, according to Nida (2026), knowledge about sustainability concerns increases the perceived usefulness of EVs by relating technology with environmental benefits. Benefits to the environment represent yet another aspect of perceived usefulness, which is attracting considerable academic interest. According to Woodley et al. (2024), for example, the fact that EVs do not emit any tailpipe emissions means that the use of such vehicles can be considered an efficient way of cutting down greenhouse gas emissions and ensuring better air quality in cities. In turn, Saflor et al. (2024) note that consumers who strongly adhere to biospheric values see environmental protection as a valuable functional benefit of owning an EV. In spite of the above-mentioned agreement, the literature on the matter reveals some differences in the way previous researchers have attributed significance to the role of environmental benefits in their models. Whereas the study conducted by Woodley et al. (2024) found that the impact of environmental performance was enough to foster EV adoption among individuals, Kim (2024) found that consumers tended to focus more on practical and immediate benefits from using EVs than on environmental issues. The same is true about the results revealed by Nida (2026). In addition, another point of difference is the contextual elements affecting the perception of the usefulness of the technology. Research undertaken within developed economies tend to show that there is an increased environmental motivation because of increased environmental consciousness. On the other hand, as highlighted in the work by Saflor et al. (2024), while the Filipinos have started to realize the environment benefits of using EVs, it continues to be hindered by socio-economic reasons such as infrastructure, cost, and accessibility. In addition to this, past studies have connected the utility of electric vehicles with energy security goals. Decreasing dependence on imported oil and ensuring sustainable energy usage have also been recognized as the social utilities that enhance the importance of electric mobility. However, all prior researches have focused on these macro level benefits conceptually without studying whether people take these factors into account when buying electric vehicles. There is clear consensus within the literature concerning the importance of usefulness perception as a vital factor influencing EV adoption and that environmental benefits play a major role in enhancing consumers' perception of EV technology. However, ambiguity still surrounds the extent to which environmental and practical benefits differ from each other and how these perceptions vary based on the social and economic setting being considered. More importantly, very little research exists concerning how consumers in semi-urban Philippine towns perceive personal usefulness, environmental responsibility, and broader societal benefits at the same time when forming their purchasing preferences. Hence, this paper seeks to explore the effects of perceived usefulness, especially practical and environmental usefulness, on EV purchase preferences of consumers in Santa Maria, Bulacan.

Perceived Ease of Use and Infrastructure Readiness

Although perceived usefulness can create positive attitudes towards electric vehicles (EVs), their actual usage will be possible only due to the Perceived Ease of Use (PEOU) of customers and infrastructural facilities available. According to the Technology Acceptance Model (TAM), Perceived Ease of Use is defined as the perception that the use of certain technologies entails minimal effort for users (Kim, 2024). In terms of EVs, it is not limited to the process of driving but covers such factors as the ease of charging, maintenance, and technical assistance. In accordance with the Theory of Planned Behavior, they are determined by the presence of facilitating conditions, such as charging facilities and repair services. Ease of use is another variable that has been shown in prior research to be a key factor affecting the uptake of EVs. According to Kim (2024), it is easier for consumers to embrace EVs when they see that EVs are easy to use. In the same vein, Nida (2026) asserts that facilitators increase consumer confidence by making the process of owning an EV less effortful and less uncertain. From the above arguments, it can be seen that positive attitudes alone are not enough. Though the necessity of infrastructure is generally agreed upon, scholars have differing opinions on how it affects the adoption process. Gumasing (2025) states that the extensive use of electric bikes and scooters in the Philippines is due to their ease of recharging at home, thus putting more value on convenience than the novelty of technology. On the other hand, Saflor et al. (2024) point out that the major problem with passenger electric vehicles is not complicated technology but "range anxiety," which is associated with limited opportunities for charging the car. In other words, both works acknowledge the significance of infrastructure; however, they are not united in whether physical accessibility or consumer perception is the major barrier. Moreover, the link between infrastructure preparedness and consumer adoption of electric vehicles is compounded by systemic issues. According to Barrosa (2023), the presence of coordination issues in the market was evident after the passage of the Electric Vehicle Industry Development Act (EVIDA) in which the infrastructures delayed their investment due to low rates of EVs, whereas the consumers delayed the purchase of EVs because there were no adequate charging infrastructures. Likewise, Helmi (2026) found out that low level of infrastructures reduce the positive impact of environmental and perceived usefulness of electric vehicles on the decision-making process due to increased efforts and uncertainty involved. Nonetheless, past researches also show inconsistency when it comes to how infrastructure restrictions impact customers. Research done in developed countries with fairly established infrastructure shows that consumers focus more on car performance and economic aspects rather than the infrastructure convenience. In the case of emerging economies like the Philippines, on the other hand, past researches have continuously found infrastructure restriction as one of the key barriers. The contrast in results suggests that the impact of ease of use perceptions is highly dependent on contextual factors like the development level of the electric vehicles ecosystem and policy framework of the country. Although numerous amounts of empirical work have been conducted in this area, there still exist some knowledge gaps in the literature. Specifically, most of the prior research is limited to the analysis of infrastructure readiness at the national or metropolitan levels, and not many insights into how consumers living in semi-urban areas assess the ease of using electric vehicles. Also, existing studies mostly investigate perceived ease of use, charging infrastructure, and facilitating conditions as individual concepts, without focusing on how these elements jointly impact purchase preference. To address the abovementioned knowledge gaps, the current research will attempt to investigate how perceived ease of use and infrastructure readiness affect consumer purchase preference towards electric vehicles in Santa Maria, Bulacan.

Perceived Economic Value and High Costs

Economic value perception plays an essential role when it comes to adopting electric vehicles since the consumer needs to estimate the ratio between the financial benefits received from using the vehicle in the long run and the high up-front cost. Using Price-Value theory, it can be argued that consumers are supposed to make an analysis of the costs and benefits of purchasing a good where the decision will depend on the relation between the costs of acquiring the product and its future financial benefits (Falisa & Tricahyono, 2025). When talking about the EV, it should be noted that it is characterized by lower costs compared to ICE cars. Earlier researches always found that economic factors have been amongst the most influencing aspects towards purchase of EVs. Falisa and Tricahyono (2025) mentioned that people understand the long-run financial benefits of using EVs, like less fuel cost and low maintenance cost, which help to increase their perception about its value. Similarly, Barrosa (2023) appreciated the long-run financial saving that can be made through EVs as compared to traditional cars. However, there is a disagreement on the adequacy of long-term savings in motivating adoption among scholars. According to Falisa and Tricahyono (2025), individuals who have financial strength tend to be inclined towards lifetime costs of owning something than the cost of purchasing it. On the other hand, Barrosa (2023) opines that in underdeveloped countries, the high cost of investment often becomes the dominant factor in discouraging the adoption of the innovation even when one understands its economic benefits. Socioeconomic factors provide further clarity into these conflicting studies. In affluent markets, studies show that buyers tend to be more willing to spend on electric vehicles since they are able to

incur such costs initially and recover their investments later on. On the other hand, in underdeveloped countries, affordability has been identified as the main challenge. According to Falisa and Tricahyono (2025), middle-class buyers recognize EVs as being expensive to buy even though they are cheaper to operate, and thus, the economic benefit has its limitations due to buyers' economic challenges. This problem of affordability can be solved through government policy according to previous literature. In their paper, Promphat and Deebhijarn (2019) state that incentives including tax exemptions, purchase incentives, and rebates make it easier for people to afford EVs by lowering the cost of purchasing EVs. Barrosa (2023), on the other hand, is of the opinion that in order to increase the use of EVs among middle-class and low-income individuals, policies that encourage EV usage are crucial. These studies concur that incentives are helpful in increasing the financial value of EVs by reducing the disparity between the purchase cost and the financial value. Affordability has been considered by all available literature as one of the critical determinants for EV ownership. However, there is still much to be known in terms of its effect on EV adoption. The current literature mostly focuses on the national market or highly urbanized communities, offering no sufficient data as to how consumers in semi-urban municipalities would weigh the cost against the benefit. In addition, previous works have not looked into the effects of these economic determinants collectively on EV adoption. Hence, this study looks into the relationship of economic perception and purchasing preferences of electric vehicles in Santa Maria, Bulacan.

Methodology

Research Design

This study employed a descriptive-comparative quantitative research design to assess the current levels of consumer perceptions and purchase preferences regarding electric vehicle (EV) adoption. According to Creswell (2014), "descriptive research seeks to describe phenomena in their natural setting, with the goal of enhancing understanding of them". This approach involves systematic data collection and analysis to identify patterns and themes. The descriptive-comparative quantitative research design is beneficial for providing a deep understanding of the research problem, particularly when the phenomenon is not well understood. It uses data collection methods such as surveys and document analysis to develop a nuanced comprehension of the subject. This design is appropriate for this study as it examines the relationship between these identified perceptions and the subsequent strategic purchase preferences of the target consumers, exploring whether variations in demographic indicators result in statistically significant differences across the core variables.

Sampling Design

The study employed a non-probability purposive sampling technique, complemented by a quota allocation strategy. Purposive sampling facilitated the selection of respondents from specific categories, particularly residents and vehicle owners across the municipality of Santa Maria, Bulacan. Purposive sampling was selected because it allows the researcher to filter out passive respondents and instead target specific individuals who possess the direct economic capacity, licensing, or explicit intent to make personal vehicle purchasing decisions. This approach ensures that the quantitative dataset contains meaningful, actionable insights regarding consumer purchase preferences. The total sample size was fixed at 300 respondents. To prevent geographical bias and ensure that data captured a balanced cross-section of the local population, the municipality was stratified into three primary operational zones based on local commercial activity and urban density. Zone 1. The Urban Commercial Core (Poblacion, Bagbaguin, and Guyong). Selected due to high concentrations of daily commuters, commercial businesses, and expanding private vehicle use. Zone 2. Transit Hub Corridors (Santa Clara and Cay Pombo). Selected because they serve as major connecting points with high volumes of tricycle networks, motorcycles, and public utility traffic. Zone 3. Expanding Residential Peripheries (Pulong Buhangin and Catmon). Selected to capture suburban homeowners and long-distance commuters who rely heavily on personal mobility to travel to work.

Research Locale

The study was conducted in Santa Maria, Bulacan, Philippines. Santa Maria is classified as a highly urbanized, first-class municipality characterized by rapid population growth, expanding commercial hubs, and an active local transport network relying heavily on tricycles, motorcycles, and private vehicles. This specific locale offers a critical context for assessing local transitions from traditional internal combustion engine (ICE) vehicles to sustainable electric alternatives.

Research Participants

This study included 300 residents and vehicle owners residing across the different barangays of Santa Maria, Bulacan. A purposive sampling technique was executed based on the following inclusion criteria, must be at least 18 years old, must be a resident of Santa Maria, Bulacan; and must be a licensed driver, current

vehicle owner, or an individual intending to purchase a personal utility vehicle within the next 24 months. The sample size was deemed statistically sufficient to capture localized socio-economic variances and diverse consumer profiles.

Research Instrument

The researcher employed a researcher-made structured survey questionnaire administered via digital and physical formats. The instrument was partitioned into three primary sections. Part I: Demographic Profile: Covered age, biological sex, monthly household income, and primary vehicle ownership status. Part II: Consumer Perceptions Toward EV Adoption: Structured around 15 indicators evaluating Perceived Usefulness, Perceived Ease of Use, Cost Value, and Environmental Concern using a 4-point Likert Scale (4 = Strongly Agree; 3 = Agree; 2 = Disagree; 1 = Strongly Disagree). Part III: Implications for Consumer Purchase Preferences: Consisted of indicators assessing the respondents' likelihood to prefer EVs based on infrastructure support, operational efficiency, and localized economic incentives, evaluated on a matching 4-point Likert Scale.

Data Gathering Procedure

The researcher first secured an approved letter from the authorities, data collection commenced. The survey was rolled out over a four-week period utilizing a hybrid deployment strategy. Digital questionnaires were distributed via localized social media platforms and community groups using Google Forms, while printed questionnaires were handed out to accessible transport points and residential areas to capture demographics with limited internet access. A brief explanatory letter accompanied the survey to explain the objective of the study. Completed physical questionnaires were systematically filed, and digital responses were downloaded into a password-protected master database for processing.

Results and Discussions

Research Question 1: What is the demographic profile of the respondents in Santa Maria, Bulacan in terms of Age, Sex, Monthly Household Income, and Current Vehicle Ownership Status?

Table 1. Demographic Profile of the Respondents (N = 300)

Demographic Variable	Category	Frequency (f)	Percentage (%)
Age	18–25 years old	75	25.0%
	26–35 years old	110	36.7%
	36–45 years old	65	21.7%
	46 years old and above	50	16.6%
Sex	Male	162	54.0%
	Female	138	46.0%
Monthly Household Income	Below ₱20,000	45	15.0%
	₱20,000–₱49,999	135	45.0%
	₱50,000–₱99,999	90	30.0%
	₱100,000 and above	30	10.0%
Current Vehicle Ownership	Do not own a vehicle	36	12.0%
	Motorcycle / E-Scooter	144	48.0%
	4-Wheel Private Vehicle	120	40.0%

The demographic profile of the respondents provides important insights into the characteristics of consumers who are most likely to shape the future market for electric vehicles (EVs) in Santa Maria, Bulacan. The predominance of individuals aged 26–35 years suggests that EV adoption may be largely influenced by younger working adults who are generally more receptive to technological innovations and environmental sustainability initiatives. This age group is often in the stage of establishing financial stability while making long-term purchasing decisions, making them more inclined to evaluate vehicles not only based on purchase price but also on long-term operating efficiency. Their familiarity with digital technologies and greater exposure to sustainability campaigns further increase the likelihood of considering EVs as viable

transportation alternatives. Consequently, marketing strategies targeting this demographic should emphasize the integration of advanced technology, environmental benefits, and long-term cost savings to strengthen purchase intentions. The relatively balanced distribution of male and female respondents indicates that interest in transportation technologies is no longer confined to a single gender. This finding implies that EV adoption strategies should avoid gender-specific assumptions and instead focus on factors valued by both groups, such as safety, reliability, affordability, and convenience. The balanced representation also suggests that future promotional campaigns and policy interventions can be designed to appeal broadly to households rather than targeting predominantly male vehicle buyers, thereby expanding the potential consumer base for EVs in semi-urban communities. Income distribution offers a clearer explanation of one of the major barriers to EV adoption. Although most respondents belong to the middle-income sector, their purchasing decisions are likely influenced by financial practicality rather than environmental considerations alone. Middle-income households may recognize the long-term economic advantages of lower fuel and maintenance costs, yet the substantial initial investment required for EV ownership remains a significant deterrent. This finding reinforces the importance of policies that reduce the financial burden of acquisition, such as subsidized financing, tax incentives, flexible payment schemes, and government-supported loan programs. Without these interventions, positive perceptions of EV benefits may not necessarily translate into actual purchasing behavior. The respondents' current transportation patterns further illustrate the practical realities of mobility in Santa Maria. The predominance of motorcycle and electric scooter users suggests that affordability, accessibility, and ease of maneuverability remain the primary considerations when choosing transportation. This indicates that consumers are already accustomed to economical and efficient modes of travel, which could facilitate the acceptance of electric mobility if products are offered at affordable price points. Rather than focusing exclusively on electric cars, manufacturers and policymakers may achieve faster market penetration by expanding the availability of electric motorcycles and scooters, which better match existing transportation preferences and purchasing capacities within semi-urban communities. Such an approach may serve as a practical transition toward broader EV adoption while gradually familiarizing consumers with electric transportation technologies. The demographic characteristics indicate that EV adoption in Santa Maria is shaped by a combination of technological openness, economic capability, and existing mobility practices. The findings suggest that increasing adoption requires more than raising environmental awareness; it necessitates targeted financial support, affordable vehicle options, and consumer education tailored to the needs of young, middle-income households. These practical implications provide valuable guidance for government agencies, automotive manufacturers, and local stakeholders seeking to accelerate the transition toward sustainable transportation in similar semi-urban municipalities.

Research Question 2: What is the level of consumer perception toward electric vehicle adoption among the respondents across the following dimensions Perceived Usefulness and Environmental Benefit, Perceived Ease of Use and Infrastructure Readiness, and Perceived Economic Value and High Costs?

Table 2. Consumer Perceptions Toward Electric Vehicle Adoption

Perceptual Dimension / Indicator Variable	Mean	SD	Interpretation
Perceived Usefulness & Environmental Benefit			
1. EVs significantly lower tailpipe emissions and protect the local environment.	3.68	0.47	Strongly Agree
2. Adopting an EV reduces long-term personal dependence on volatile fossil fuels.	3.52	0.51	Strongly Agree
3. EVs provide comparable mechanical performance to traditional combustion vehicles.	2.85	0.64	Agree
Sub-composite Mean	3.35	0.54	Agree
Perceived Ease of Use & Infrastructure Readiness			
4. Charging an electric vehicle daily is simple and easy to perform at home.	3.12	0.59	Agree
5. Public charging infrastructure in Santa Maria, Bulacan is sufficient and accessible.	1.84	0.68	Disagree
6. Finding certified local repair shops or parts for EVs is straightforward.	1.95	0.72	Disagree
Sub-composite Mean	2.30	0.66	Disagree
Perceived Economic Value & High Costs			
7. The initial acquisition or purchase price of an electric vehicle is too expensive.	3.64	0.49	Strongly Agree
8. The operating and electricity costs of running an EV are cheaper than gasoline.	3.28	0.55	Agree
9. Maintenance expenses for EVs are lower than traditional combustion engine cars.	2.94	0.61	Agree
Sub-composite Mean	3.29	0.55	Agree
Overall Perception Mean	2.98	0.58	Agree

The findings indicate that consumers in Santa Maria, Bulacan generally hold favorable but cautious perceptions toward electric vehicle (EV) adoption. The overall moderate level of agreement suggests that respondents recognize the potential benefits of EVs but are not yet fully convinced that they are a practical alternative to conventional vehicles under current local conditions. This reflects a common pattern in emerging EV markets, where awareness and acceptance of the technology are increasing, yet actual adoption is constrained by external factors beyond consumers' personal attitudes. The results imply that improving public perception alone will not be sufficient to accelerate EV adoption unless structural barriers are addressed simultaneously. The respondents' strong agreement that EVs contribute to reducing environmental pollution demonstrates that environmental awareness has become an important factor influencing transportation preferences. This suggests that sustainability campaigns and climate change initiatives have successfully increased public recognition of the environmental advantages of electric mobility. However, environmental concern alone is unlikely to motivate purchasing decisions. Vehicle purchases represent substantial financial commitments, and consumers tend to prioritize practical considerations such as affordability, convenience, and reliability over environmental benefits when making final purchase decisions. This finding highlights the need for policymakers and manufacturers to complement environmental messaging with clear demonstrations of the practical value of EV ownership. Similarly, respondents acknowledged the long-term economic benefits associated with lower fuel and operating costs, indicating that consumers understand the financial advantages of transitioning from gasoline-powered vehicles to electric mobility. This awareness provides a strong foundation for future market growth because consumers already perceive the long-term value proposition of EVs. Nevertheless, the findings reveal that long-term savings are insufficient to offset concerns about the substantial upfront investment required. This illustrates the gap between recognizing economic benefits and possessing the financial capacity to act on them. For many middle-income households, immediate affordability remains more influential than future cost savings, emphasizing the importance of accessible financing options, purchase subsidies, tax incentives, and installment programs that reduce initial acquisition costs.

The lowest-rated indicators concerning charging infrastructure and repair services reveal that infrastructure readiness remains one of the most significant barriers to EV adoption. Consumers appear reluctant to invest in a technology when they are uncertain whether adequate charging facilities and maintenance services are available within their community. These concerns extend beyond convenience and directly influence consumers' confidence in the reliability and usability of EVs for everyday transportation. The findings suggest that perceived infrastructure inadequacies contribute to range anxiety and increase the perceived risk of ownership, discouraging potential buyers despite their generally positive attitudes toward electric mobility. Therefore, expanding charging networks and strengthening local maintenance capabilities should be prioritized alongside vehicle promotion initiatives. From a practical standpoint, the findings underscore that successful EV adoption requires coordinated efforts from multiple stakeholders. Government agencies should prioritize investments in public charging infrastructure, provide financial incentives, and establish supportive policies that reduce purchase costs. Local government units can facilitate partnerships with private investors to expand charging stations in strategic locations such as commercial centers, transportation hubs, and residential communities. Meanwhile, automotive manufacturers and dealerships should strengthen after-sales support by increasing the availability of certified service centers and trained technicians to improve consumer confidence. Public education campaigns should also communicate not only the environmental benefits of EVs but also provide accurate information regarding charging options, maintenance requirements, and total cost of ownership. The findings suggest that consumer willingness to adopt EVs already exists, but this willingness has not yet translated into strong purchase intentions because practical concerns outweigh perceived benefits. Addressing affordability, infrastructure availability, and service accessibility is therefore essential for transforming favorable perceptions into actual consumer adoption. These results emphasize that the transition to electric mobility in semi-urban municipalities such as Santa Maria depends as much on institutional readiness and policy support as it does on consumer awareness and environmental attitudes.

Research Question 3: What is the extent of the implications of these factors on consumer purchase preferences regarding electric vehicles?

Table 3. Implications for Consumer Purchase Preferences

Strategic Preference Indicators	Mean	SD	Interpretation
1. I prefer to buy an EV if the government provides immediate tax exemptions or rebates.	3.62	0.49	Strongly Agree
2. I would prioritize an EV for my next purchase if public charging docks are visible in town.	3.55	0.52	Strongly Agree
3. I prefer to switch to an EV primarily to avoid rising commercial gasoline and diesel prices.	3.48	0.56	Agree
4. I would choose an EV over an ICE vehicle if local dealers offer long battery warranties.	3.51	0.50	Strongly Agree
5. I prefer to wait for more vehicle models to launch locally before finalizing an EV purchase.	3.58	0.48	Strongly Agree
Overall Purchase Preference Mean	3.55	0.51	Highly Favorable

The findings demonstrate that consumers in Santa Maria, Bulacan exhibit a generally strong willingness to purchase electric vehicles (EVs), indicating that the local market has considerable potential for future growth. However, this willingness appears to be conditional rather than absolute. Consumers are interested in adopting EVs, but their purchase decisions depend on the availability of supportive policies, adequate infrastructure, and assurances that reduce the financial and functional risks associated with ownership. This suggests that demand for EVs already exists, yet the transition from intention to actual purchase requires a more favorable market environment. The strong preference for government subsidies and tax incentives highlights the importance of public policy in accelerating EV adoption. While consumers recognize the environmental and economic benefits of EVs, the high purchase price remains a significant obstacle. Financial incentives therefore serve not only to improve affordability but also to signal government commitment to sustainable transportation. Such support can increase consumer confidence by reducing the perceived financial burden of switching to a relatively new technology. For policymakers, this finding emphasizes that incentive programs should be viewed as strategic investments that encourage market development rather than merely financial assistance for individual buyers. The respondents' emphasis on the availability of public charging stations further reinforces the critical role of infrastructure in shaping purchase preferences. Consumers are more likely to invest in EVs when they are confident that charging facilities are accessible, reliable, and convenient. This finding suggests that infrastructure functions as both a practical necessity and a psychological source of reassurance. Even consumers who primarily charge vehicles at home may perceive a well-developed public charging network as evidence that EV technology is supported and sustainable in the long term. Consequently, expanding charging infrastructure in commercial establishments, residential communities, transport terminals, and public spaces can significantly strengthen consumer confidence and encourage wider adoption. Battery warranty and manufacturer support also emerged as important determinants of purchase preference, indicating that consumers are concerned about the long-term reliability and maintenance costs of EVs. Since the battery is widely perceived as the most expensive component of an electric vehicle, buyers seek assurance that unexpected replacement costs will not become a future financial burden. Extended warranties, transparent maintenance programs, and accessible after-sales services can therefore reduce uncertainty and improve trust in EV technology. For automotive manufacturers and dealerships, strengthening warranty coverage and customer support services may be as influential as introducing new vehicle models in attracting potential buyers. The respondents' preference to postpone purchasing until more vehicle options become available reflects a cautious approach toward adopting emerging technologies. Rather than indicating a lack of interest, this behavior suggests that consumers are waiting for the EV market to mature before making a substantial financial commitment. Greater product diversity allows consumers to compare features, prices, performance, and financing options that better suit their individual needs and budgets. This finding implies that increasing the availability of affordable EV models across different market segments could encourage earlier adoption and reduce consumers' tendency to delay purchases. From a practical perspective, the findings indicate that stimulating EV adoption requires coordinated efforts among government agencies, local government units, automotive manufacturers, and private investors. Policymakers should continue developing financial incentive programs while prioritizing investments in charging infrastructure. Manufacturers should expand model availability, strengthen warranty coverage, and enhance after-sales service networks to reduce consumer uncertainty. Local governments can further support adoption by facilitating partnerships for charging station deployment and promoting public awareness of EV ownership benefits. The findings suggest that consumers are prepared to embrace electric mobility, provided that the necessary economic, technological, and institutional conditions are established. The challenge is therefore not generating consumer interest but creating an environment where purchasing an EV becomes both financially

attainable and practically convenient. Addressing these enabling conditions will be essential for converting favorable purchase preferences into actual market adoption and supporting the long-term transition toward sustainable transportation in semi-urban communities.

Research Question: 5 Are there significant differences in the respondents' consumer perceptions and purchase preferences toward electric vehicle adoption when they are grouped according to their demographic profile?

Table 4. Significant Differences in Consumer Perceptions and Purchase Preference
Inferential Analysis of Differences Across Demographic Groups

Demographic Groupings	Test Variable	Statistical Value	p-value
Biological Sex (t-test)	Consumer Perceptions	t = 1.142	0.254
	Purchase Preferences	t = 0.845	0.399
Age (ANOVA)	Consumer Perceptions	F = 4.126	0.007
	Purchase Preferences	F = 3.841	0.010
Monthly Income (ANOVA)	Consumer Perceptions	F = 8.654	< 0.001
	Purchase Preferences	F = 9.112	< 0.001
Vehicle Ownership (ANOVA)	Consumer Perceptions	F = 5.231	0.006
	Purchase Preferences	F = 4.965	0.008

The findings indicate that consumer perceptions and purchase preferences toward electric vehicles (EVs) are not influenced by biological sex, suggesting that interest in electric mobility is shared relatively equally by both male and female consumers. This reflects the growing mainstream acceptance of EVs, where purchasing decisions are increasingly shaped by practical considerations such as affordability, convenience, environmental benefits, and technological features rather than traditional gender roles. The absence of gender differences implies that promotional campaigns and public awareness programs do not need to target one gender more than the other. Instead, marketing efforts can emphasize universal consumer concerns, including cost savings, environmental sustainability, vehicle performance, and ease of ownership, to reach a broader audience. In contrast, significant differences across age groups indicate that generational characteristics play an important role in shaping attitudes toward EV adoption. Younger respondents demonstrated more favorable perceptions and stronger purchase intentions, suggesting that they are more receptive to emerging transportation technologies and more willing to adapt to changes in mobility patterns. This finding may be attributed to younger consumers' greater exposure to digital technologies, environmental awareness campaigns, and innovation-oriented lifestyles. Their willingness to adopt new technologies also reflects greater confidence in learning and using unfamiliar systems, such as charging infrastructure and smart vehicle features. Conversely, older consumers may place greater emphasis on proven reliability, familiarity, and long-term performance before considering a transition to electric mobility. These differences suggest that awareness campaigns should be tailored according to age, with younger consumers engaged through digital platforms and innovation-focused messaging, while older consumers may benefit from practical demonstrations, testimonials, and educational programs that reduce uncertainty and build trust in EV technology. Household income emerged as another significant factor influencing purchase preferences, highlighting the critical role of financial capacity in EV adoption. Although respondents generally recognized the benefits of EVs, individuals with higher monthly incomes expressed stronger purchase intentions because they are better positioned to absorb the higher initial costs associated with EV ownership. This finding reinforces the idea that positive attitudes alone are insufficient when consumers lack the financial resources to act on those attitudes. For middle- and lower-income households, affordability remains a substantial barrier despite recognizing the long-term savings associated with lower fuel and maintenance costs. Therefore, expanding financial assistance through government subsidies, low-interest financing, tax incentives, and flexible payment schemes remains essential for making EV ownership accessible to a broader segment of the population. The significant differences based on current vehicle ownership also provide valuable insights into consumer readiness for electric mobility. Respondents who currently use motorcycles and electric scooters appeared more willing to adopt electric transportation than owners of conventional four-wheel vehicles. This may reflect the practical similarities between existing two-wheel transportation and electric micro-mobility solutions, including lower operating costs, simpler maintenance, and suitability for daily commuting in semi-urban environments. Motorcycle users may also perceive fewer lifestyle adjustments when transitioning to electric alternatives than automobile owners, who often have greater concerns regarding driving range, charging convenience, and vehicle performance. These findings suggest that electric motorcycles and scooters could serve as an effective entry point for expanding EV adoption, particularly in municipalities where two-wheel vehicles remain the

dominant mode of transportation. From a practical perspective, the results emphasize the importance of market segmentation when designing strategies to promote EV adoption. Government agencies and manufacturers should recognize that consumers differ in their readiness to adopt EVs based on age, income, and current transportation habits. Financial incentives should prioritize middle-income households that remain interested in EVs but face affordability constraints. Marketing efforts can focus on younger consumers as early adopters who may accelerate market acceptance through social influence, while educational initiatives should address the concerns of older consumers by emphasizing reliability, safety, and long-term value. Likewise, expanding the availability and affordability of electric motorcycles and scooters may generate quicker adoption rates and create familiarity with electric mobility before consumers transition to larger electric vehicles. The findings demonstrate that EV adoption is influenced more by socioeconomic and behavioral factors than by demographic characteristics such as sex. Age, financial capability, and existing transportation practices shape consumers' readiness to adopt electric mobility, highlighting the need for targeted policies and market strategies rather than uniform promotional approaches. By addressing the specific needs of different consumer groups, stakeholders can more effectively transform positive perceptions into actual EV adoption and support the broader transition toward sustainable transportation in semi-urban communities.

Research Question 5: Based on the findings of the study, what policy recommendations, or marketing strategies can be proposed to support sustainable transport transitions in the municipality?

For public policy and fiscal incentives, the local government unit should establish localized incentives to complement national EVIDA mandates. This can include offering partial discounts on local regulatory permits, providing business tax reductions for green transport operators, and creating localized subsidy programs for the transport sector such as low-interest financing or down-payment assistance for tricycle drivers transitioning to electric alternatives. For urban planning and infrastructure deployment LGUs can deploy visible charging stations at high-traffic transit nodes, including public markets, municipal halls, and major transport terminals. Partnering with commercial developers to mandate dedicated EV parking spaces with charging access in new commercial centers will improve visibility and directly reduce range anxiety. For strategic marketing and technical security automotive distributors and manufacturers must adapt their retail strategies to address local consumer caution. Dealerships should actively promote extended, comprehensive battery warranties to address long-term maintenance concerns. Furthermore, setting up certified localized service centers with trained mechanics within Bulacan will improve consumer confidence by assuring buyers that technical support and spare parts are readily available.

Ethical Considerations

The study adhered strictly to the ethical standards prescribed by national data privacy laws and institutional research boards. Formal informed consent was obtained from each participant prior to their involvement. Respondents were explicitly notified that participation was entirely voluntary and that they reserved the right to withdraw from the survey at any given stage without penalty. To ensure anonymity, no personally identifiable information (such as full names or home addresses) was collected. All dataset entries were assigned unique alphanumeric codes. In strict compliance with the Philippine Data Privacy Act of 2012, all gathered data were treated with utmost confidentiality and stored in an encrypted database accessible only to the principal researchers.

Conclusion

The study concluded there is a clear structural mismatch between pro-environmental intentions and practical market realities. While consumers understand and highly value the ecological utility of EVs and acknowledge their long-term fuel savings, their willingness to adopt is heavily restricted by low infrastructure readiness. The severe lack of visible public charging grids and local technical repair options creates high operational risk, leaving consumers reluctant to transition. Second, economic barriers remain a primary obstacle for the general public. While long-term operation is seen as cost-effective, the steep upfront retail acquisition price prevents immediate adoption for middle-income households, who make up the largest segment of the local population. Consequently, current consumer intent is highly conditional, meaning buyers are holding off on purchases until external policy support, manufacturer warranties, and infrastructure networks mature. Third, the local market is highly segmented by demographic characteristics. Inferential testing confirmed that younger consumers (18–35 years old) and individuals with higher monthly household income levels (₱50,000 and above) display significantly higher readiness and financial capacity to navigate the risks of early-stage EV adoption. Conversely, the broader middle-to-low-income market

remains highly price-sensitive, indicating that mass adoption cannot occur without targeted external interventions to make the technology accessible.

Recommendations

Based on the findings of the study, several recommendations are proposed for key stakeholders to enhance electric vehicle (EV) adoption. The Local Government Unit (LGU) of Santa Maria, Bulacan is encouraged to collaborate with private charging network providers and local electric cooperatives to establish visible and accessible public EV charging stations in strategic areas such as public markets, transport terminals, and commercial parking spaces, thereby reducing range anxiety and improving convenience. Additionally, the LGU may introduce localized incentives, including discounted municipal registration fees, priority parking for EV users, and tax incentives for businesses and transport groups transitioning to electric fleets. Integrating EV infrastructure requirements into land-use and development policies is also recommended, ensuring that new commercial and residential developments allocate designated EV charging spaces. Policymakers, both national and local, should strengthen support for EV adoption by expanding financial incentives, fostering public-private partnerships, and aligning development plans with long-term electric mobility goals to create a more supportive and sustainable transportation ecosystem. Meanwhile, the automotive industry—including manufacturers, distributors, and dealerships—should address cost-related concerns by offering extended battery warranties, flexible financing schemes, and comprehensive insurance packages, while also establishing certified EV maintenance centers, training local technicians, and ensuring the availability of spare parts to improve reliability and consumer confidence. Marketing efforts should further highlight affordable electric mobility options such as e-bikes, e-scooters, and compact EVs, particularly targeting younger consumers. Finally, future researchers are encouraged to explore additional factors affecting EV adoption, including environmental awareness, social influence, policy effectiveness, and technological readiness, and to utilize longitudinal or mixed-method approaches, as well as comparative studies across different community settings, to generate deeper and more comprehensive insights.

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