

## Article

# Actions for Sustainable Development Goals: Integrating the Theory of Planned Behavior to Predict Electric Vehicle Purchase Intentions in an Emerging Market Context

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## Abstract

The transition to electromobility and the intention to purchase electric vehicles have attracted growing interest amid concerns about the environmental impacts of the transport sector. Although consumer behavior toward electric vehicles is widely examined through psychosocial factors, the literature highlights a gap in integrating individual determinants with broader macro-normative dimensions, particularly in emerging markets. Therefore, the objective of this study is to empirically analyze the influence of the Theory of Planned Behavior (TPB) and the Sustainable Development Goals (SDG 11, 12, and 13) on consumers' intention to purchase electric vehicles in Northeast Brazil. The findings demonstrate that all TPB constructs, including attitude, Subjective Norm (SN), and Perceived Behavioral Control (PBC), positively influence adoption intention, with a strong emphasis on Pro-environmental Attitude. Furthermore, the SDGs function as complementary normative motivators, indicating that recognizing electric vehicles as solutions for sustainable cities, responsible consumption, and climate action also increases purchase intention. As its main theoretical contribution, the study demonstrates that the constructs of the Theory of Planned Behavior and sustainability-related perceptions associated with SDG 11, SDG 12, and SDG 13 are all significant predictors of consumers' intention to purchase electric vehicles. In practical terms, the study provides actionable insights for public policy and management strategies aimed at accelerating the transition to low-carbon mobility.

**Keywords:** electric vehicles; theory of planned behavior; sustainable development goals; purchase intention; consumer behavior



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## 1. Introduction

Growing concern about the environmental impacts of the transportation sector has increased interest in electromobility, particularly regarding consumers' intentions to purchase electric vehicles (EVs). Although EVs are often presented as a solution to reduce emissions and improve urban air quality, their adoption depends not only on technological advances but also on psychosocial factors and values associated with sustainable consumption [1,2]. In this context, the Theory of Planned Behavior (TPB) has become a well-established framework for explaining behavioral intentions by identifying attitude, Subjective Norm (SN),

and Perceived Behavioral Control (PBC) as direct antecedents of intention [3]. Recent empirical evidence indicates these constructs significantly explain intentions to purchase EVs across different contexts, including emerging markets characterized by structural barriers, such as Brazil [4].

In addition, the literature has linked electric mobility to global sustainability agendas (UN's SDGs for the 2030 Agenda), particularly the Sustainable Development Goals (SDGs). SDGs 11, 12, and 13 provide a normative framework that helps explain how perceptions related to urban sustainability, responsible consumption, and climate action influence attitudes favorable to electromobility [2,5,6]. However, systematic reviews indicate that most studies examine behavioral determinants and macro normative dimensions separately, highlighting gaps in the integration of TPB and the SDGs within unified explanatory models of EV purchase intention [1,2]. Empirical studies conducted in Brazil and other contexts also tend to analyze psychosocial and structural factors in isolation, reinforcing the need for more integrative approaches [4,7].

Beyond environmental and climate objectives, the global transition toward electric mobility has increasingly become a strategic priority for industrial and economic development. Governments in both developed and emerging economies have implemented policies to promote electric vehicles not only to reduce greenhouse gas emissions and improve urban air quality, but also to strengthen domestic automotive industries, foster technological innovation, enhance international competitiveness, and secure strategic positions within global automotive value chains [8–10]. Nevertheless, recent evidence indicates that the success of these policies depends on balancing environmental objectives with fiscal cost-effectiveness while simultaneously addressing persistent consumer barriers, including vehicle affordability, charging infrastructure availability, and range anxiety [11]. Furthermore, cross-national evidence demonstrates that electric vehicle adoption and discontinuance vary substantially across countries according to differences in public policy design, industrial strategies, infrastructure development, and consumer behavior [12]. Consequently, understanding consumers' Purchase Intentions (PI) in emerging markets such as Northeast Brazil requires considering this broader international context, in which environmental sustainability, industrial competitiveness, public policy, and market development jointly shape the transition toward electromobility.

To identify gaps in the literature, a systematic search was conducted in the Scopus database on 15 October 2025, due to its extensive coverage of peer-reviewed academic literature. The initial search used the following criteria: "Theory of Planned Behavior" AND "electric vehicle" AND "purchase intention" AND "Sustainable Development Goals" AND "SDG 11" OR "SDG 12" OR "SDG 13." The search strategy was applied to titles, abstracts, and keywords, but no articles were identified. This result highlights the theoretical gap addressed by the present study and supports its contribution to advancing scientific knowledge. Next, separate searches were conducted using the following combinations of terms: (i) "Theory of Planned Behavior" AND "electric vehicle" AND "purchase intention"; (ii) "electric vehicle" AND "Sustainable Development Goals"; (iii) "Theory of Planned Behavior" AND "Sustainable Development Goals"; (iv) "electric vehicle" AND "SDG 11" OR "SDG 12" OR "SDG 13". To increase the sensitivity of the search, the titles, abstracts, and keywords strategy was maintained. Search (i) returned 62 articles; search (ii) returned 210 articles; search (iii) returned 190 articles; and search (iv) returned 29 articles, several of which were used to support the theoretical framework of this study.

The systematic review revealed limited theoretical integration between the TPB and the SDGs, particularly in studies focused on specific regions such as Northeast Brazil. This scenario reinforces the scientific opportunity to develop models that integrate individual determinants and global normative frameworks to explain intentions to purchase EVs.

Beyond demonstrating a limited theoretical integration between the Theory of Planned Behavior (TPB) and the Sustainable Development Goals (SDGs), the literature also reveals an important conceptual opportunity. Recent reviews indicate that TPB-based models consistently explain electric vehicle purchase intention through individual psychosocial determinants, particularly attitude, subjective norm, and perceived behavioral control [13,14]. However, sustainable consumption decisions increasingly involve evaluations that extend beyond individual costs and benefits, incorporating environmental values, moral considerations, and broader sustainability orientations [15]. In the context of electromobility, consumers may evaluate electric vehicles not only as products that satisfy personal mobility needs but also as technologies capable of contributing to sustainable cities, responsible consumption, and climate action. These broader sustainability perceptions are not explicitly operationalized within the original TPB framework. Therefore, incorporating SDG 11, SDG 12, and SDG 13 as complementary normative sustainability perceptions extends the explanatory scope of the TPB by capturing dimensions of sustainable consumer behavior that remain underexplored in existing TPB-based models.

Given this, the study seeks to answer the following research question: What is the influence of the Theory of Planned Behavior and SDGs 11, 12, and 13 on consumers' intentions to purchase electric vehicles in Northeast Brazil? The objective of this study is to empirically analyze these relationships using multivariate techniques, jointly examining psychosocial factors and normative sustainability perceptions within a single explanatory model. In doing so, the study contributes to the literature on electromobility and sustainable consumer behavior while also providing insights for public policy and business strategies aimed at accelerating the transition to low-carbon mobility. The article is organized around six hypotheses, followed by sections presenting the Theoretical Framework, Methodology, Results, Discussion and Conclusions.

## 2. Theoretical Framework

### 2.1. Intention to Purchase Electric Vehicles

The intention to purchase electric vehicles (EVs) refers to consumers' planned willingness to adopt this technology in the near future, encompassing beliefs related to performance, cost, infrastructure, and environmental benefits [16,17]. The literature suggests this intention is shaped by a combination of psychosocial determinants, such as attitudes, environmental concerns, and personal values, as well as economic and structural factors, including vehicle price, driving range, and charging availability [18,19]. Systematic reviews indicate that favorable attitudes, social norms, and perceived environmental benefits are among the most common predictors of EV purchase intention, whereas cost and infrastructure limitations continue to represent significant barriers, particularly in emerging markets [1,20–23].

In Brazil, although consumers generally show a positive predisposition toward EVs, adoption remains at an early stage due to the combined influence of psychological factors and limitations related to infrastructure and cost [2,24]. Brazilian studies identify innovation-related attitudes and emotions as significant predictors of purchase intention, while persistent barriers include charging infrastructure, charging time, driving range, and vehicle cost [7]. Findings also indicate that perceived performance, along with psychosocial and environmental variables, operate together, reinforcing the idea that the transition to electromobility depends both on adequate material conditions and pro-environmental engagement [2]. These results are consistent with international evidence highlighting the importance of environmental concerns, vehicle performance, and economic advantages in shaping EV adoption [5]. In TPB-based models, attitude, subjective norm, and perceived

behavioral control emerge as central dimensions in the Brazilian context, interacting with economic and infrastructure-related factors [4].

## 2.2. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) proposes that behavioral intention is determined by attitude, subjective norm, and perceived behavioral control, and it has been widely applied to the study of pro-environmental behaviors and electric vehicle adoption [3,25]. Recent evidence supports TPB as a robust explanatory framework for sustainable technologies, particularly when decision-making involves environmental values, perceived ecological benefits, and the evaluation of risks associated with innovation [16,17]. Extensions of TPB further suggest that moral norms, sustainable identity, and green values can enhance the model's explanatory power across different cultural contexts [18,19].

Empirical studies show that the three core constructs of TPB continue to explain purchase intention even in contexts characterized by technological uncertainty [26] and remain relevant in extended theoretical models [17]. Convergent findings have been observed across different demographic groups and markets, including studies involving millennials and focused on purchase intention [27,28]. In Brazil, empirical evidence also confirms statistically significant effects of attitude, subjective norm, and perceived behavioral control on purchase intention, reinforcing the suitability of the TPB in the national context [4].

### 2.2.1. Pro-Environmental Attitude

Within the TPB framework, attitude refers to an individual's favorable or unfavorable evaluation of a behavior, constituting an immediate determinant of behavioral intention [3]. In the context of sustainable mobility, Pro-environmental Attitudes, such as perceiving EVs as beneficial, innovative, and aligned with sustainability values, are among the most consistent predictors of purchase intention [16,29]. Previous reviews indicate that positive attitudes often mediate the relationship between environmental beliefs, ecological values, and purchase intention [1], which is consistent with empirical evidence highlighting environmental benefits and innovation as important drivers of intention [21,25].

In Brazil, attitude ranks as one of the main determinants of EV usage intention, even when factors such as price and infrastructure are taken into account [7]. In other contexts, perceived green value strengthens positive attitudes and, consequently, purchase intention [6]. Likewise, digital innovation, environmental concern, and perceived value influence attitude and intention in an integrated manner [17]. In the broader context of sustainable consumption, empirical evidence indicates that environmental awareness is positively associated with intentions to purchase remanufactured products, suggesting a conceptual pattern similar to that expected for EV adoption [27].

Studies on the circular economy suggest that pro-sustainability attitudes are associated with responsible consumption decisions [30,31]. In Brazil, positive consumer attitudes and environmental awareness have also been found to increase the adoption of sustainable consumption practices involving remanufactured products [32]. Additional studies indicate that pro-sustainability attitudes are linked with support for circular economy practices and a preference for lower-impact technologies, including battery-related technologies and EV adoption [8,33].

Although previous studies consistently report a positive relationship between Pro-Environmental Attitudes (PEA) and electric vehicle purchase intention, the magnitude of this effect varies across countries and socioeconomic contexts, suggesting that contextual factors may influence how environmental attitudes are translated into behavioral intentions. In addition, much of the existing evidence has been generated in developed economies, leaving important gaps regarding emerging markets such as Brazil. Therefore, further

investigation is needed to verify whether this relationship remains robust in different cultural and economic settings.

Therefore, based on the TPB framework and the empirical evidence presented, hypothesis H1 is proposed:

**H1.** *Consumers' pro-environmental attitudes positively influence the intention to purchase electric vehicles.*

### 2.2.2. Subjective Norm

In the TPB framework, subjective norm refers to the perception of expectations held by relevant individuals or social groups regarding the performance of a given behavior [3]. In the context of electromobility, social approval and the influence of reference groups tend to reduce uncertainty and strengthen purchase intention, especially during the early stages of innovation diffusion [1,5]. Evidence from Brazil suggests that psychosocial dimensions and public debates on sustainability influence the perceived attractiveness of EVs [2]. Previous studies have also identified positive effects of social influence on purchase intention, especially when EVs are associated with modernity and environmental responsibility [30].

National literature reviews also emphasize the relevance of social and image-related factors in EV adoption [2]. In products associated with sustainability, social norms and environmental discourses interact with individual variables in shaping behavioral intention [26,27]. In addition, institutional signals, public policies, and regulatory mechanisms may reinforce favorable perceptions of electromobility and positively influence purchase intention [4,8,28]. When combined with moral norms, subjective norm tends to further strengthen behavioral intention [18,34].

Despite the extensive application of subjective norm within the TPB, previous findings remain heterogeneous regarding its explanatory strength. While some studies identify subjective norm as one of the strongest predictors of electric vehicle purchase intention, others report only modest or indirect effects, suggesting that social influence may vary according to cultural characteristics and market maturity. These inconsistencies reinforce the importance of examining this relationship in developing countries, where evidence remains comparatively limited. Therefore, H2 is proposed:

**H2.** *Subjective Norm positively influences the intention to purchase electric vehicles.*

### 2.2.3. Perceived Behavioral Control

Perceived Behavioral Control refers to individuals' perceptions of their ability to perform a given behavior, considering available resources, opportunities, and potential barriers [3]. In the context of EV adoption, this construct is reflected in consumers' evaluations of financial capacity, access to charging infrastructure, technical support, and confidence in everyday vehicle use, all of which shape the perceived practical feasibility of the innovation [3,23]. Reviews indicate a consistent relationship between perceived behavioral control and purchase intention, particularly in contexts where infrastructure and adoption conditions remain limited. These studies highlight the importance of perceived technological readiness and cost-effectiveness in strengthening consumer intention [1,8,18].

In Brazil, perceived barriers such as vehicle price, charging availability, and driving range negatively affect consumer confidence and purchase intention when perceived control is low [7]. In addition, economic and performance-related factors continue to play a central role in emerging markets [2,31]. Models derived from the TAM framework in Brazil also indicate that perceived environmental utility, ease of use, and infrastructure readiness positively influence intention, suggesting that infrastructure availability is an important

component of perceived behavioral control [32,35]. Other evidence further suggests that integrating technological and behavioral models improves the explanation of EV purchase intention [28].

In the sustainability literature, environmental practices and organizational capabilities influence environmental adoption, reinforcing the relevance of feasibility conditions in shaping behavioral outcomes [22,36]. In the circular economy, perceived benefits and consumers' understanding of product use also influence sustainable consumption practices, conceptually aligning with perceived behavioral control at the consumer level [32]. Therefore, greater awareness of available resources, knowledge, and infrastructure tends to strengthen purchase intention, particularly when supported by institutional incentives and trust in technology [25].

Although perceived behavioral control is generally associated with stronger purchase intentions, previous research indicates that its influence may depend on contextual factors such as charging infrastructure, purchase costs, and government incentives. Consequently, its explanatory power appears to vary considerably across different institutional and economic environments, highlighting the need for additional empirical evidence from emerging economies. Thus, H3 is proposed:

**H3.** *Perceived Behavioral Control positively influences the intention to purchase electric vehicles.*

### 2.3. Sustainable Development Goal 11—Sustainable Cities and Communities

SDG 11 emphasizes the development of safe, accessible, and sustainable transportation systems aimed at reducing emissions and improving urban quality of life [33,37]. The literature suggests that urban electromobility policies, such as charging infrastructure expansion, public transportation electrification, and low-emission zones, increase the visibility and perceived feasibility of EVs, thereby strengthening their alignment with sustainable urban development initiatives [2,8], especially when integrated with urban planning strategies and government incentives [2,28].

International and national studies indicate that perceiving EVs as a solution to urban challenges, including air pollution, traffic congestion, and environmental sustainability, increases attractiveness, green value, and purchase intention [2,5,7,19,34]. In addition, the legitimacy of EVs as sustainable mobility solutions is reinforced by narratives surrounding sustainable innovation and pro-sustainability values [36,38,39].

Although sustainable urban development has increasingly been associated with electromobility, empirical studies directly examining how consumers' perceptions of SDG 11 influence purchase intention remain scarce. Most previous research focuses on urban policies or technological adoption rather than on consumers' perceptions of sustainable cities as motivational drivers of individual purchase decisions. Therefore, H4 is proposed:

**H4.** *SDG 11 (Sustainable Cities and Communities) positively influences the intention to purchase electric vehicles.*

### 2.4. Sustainable Development Goal 12—Responsible Consumption and Production

SDG 12 aims to promote sustainable consumption and production patterns, including the reduction in waste and environmental impacts across the entire product life cycle [31,37]. In the context of EVs, this goal relates to a preference for lower-emission and more efficient technologies, linking green consumption patterns to a broader sustainable production transition [33]. Evidence from the circular economy and sustainable consumption literature suggests that environmental awareness, pro-sustainability values, and perceived benefits increase consumers' willingness to choose lower-impact alternatives, including remanu-

factured products [27,31]. These findings are consistent with frameworks of behavioral change and environmental identity [19,37].

From a production perspective, cleaner production practices and environmental management systems are important precursors of sustainable innovation, bringing the industrial sector closer to the objectives of SDG 12 [36]. At the same time, low-carbon policies strengthen the link between EVs and responsible consumption in Brazil [2,34]. In addition, green value and perceived environmental benefits serve as channels for converting sustainable consumption orientations into purchase intention [6,18].

Previous research recognizes responsible consumption as an important driver of sustainable purchasing decisions. However, relatively few studies explicitly examine consumers' perceptions of SDG 12 within behavioral intention models, particularly when integrated with the Theory of Planned Behavior. This gap justifies further investigation into the explanatory role of responsible consumption perceptions in the context of electric vehicle adoption. Thus, H5 is proposed:

**H5.** *SDG 12 (Responsible Consumption and Production) positively influences the intention to purchase electric vehicles.*

## 2.5. Sustainable Development Goal 13—Climate Action

SDG 13 emphasizes climate action and the reduction in greenhouse gas emissions in the transportation sector, a central theme in research on decarbonization and the energy transition [33,37,38]. Evidence suggests that climate concern and environmental motivation increase intentions to adopt low-emission technologies, particularly when EVs are perceived as effective tools for mitigating carbon emissions and reducing overall environmental impact [32]. These patterns are consistent with national climate strategies and policy frameworks [5,33], which are often reinforced through public awareness and environmental education initiatives [39,40]. The perception of climate contribution strengthens green value and purchase intention, aligning with evidence on climate risk perception and the adoption of green vehicles [6,8].

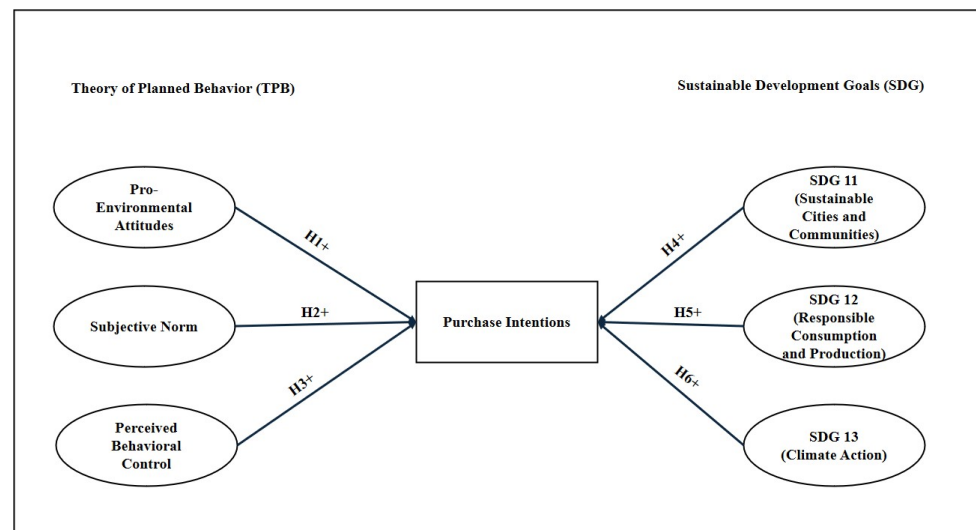
In Brazil, although economic and infrastructure barriers remain relevant, climate concerns and emissions reduction emerge as motivators among more environmentally conscious consumers [2,40], consistent with studies on climate perception in emerging markets [41,42]. The literature on sustainable consumption and the circular economy indicates that climate concerns translate into a preference for products with lower carbon footprints and life-cycle mitigation strategies [32,43,44]. This perspective is supported by clean production practices and low-impact innovation [36,45], operating through psychosocial mechanisms such as environmental awareness and personal and moral norms [16,27,40].

Although climate change awareness has become increasingly prominent in sustainability research, empirical evidence regarding how consumers' perceptions of climate action influence electric vehicle purchase intention remains fragmented. Existing studies differ in their conceptualization and operationalization of climate-related constructs, reinforcing the need for additional empirical investigation within integrated behavioral models. Based on this theoretical and empirical framework, H6 is proposed:

**H6.** *SDG 13 (Climate Action) positively influences the intention to purchase electric vehicles.*

Although the Theory of Planned Behavior explains behavioral intention through attitude, subjective norm, and perceived behavioral control [3], the recent literature suggests that pro-environmental decisions are also influenced by broader normative and value-based mechanisms. Environmental values shape individuals' beliefs about environmental responsibility [46], moral norms reinforce the perceived personal obligation to engage

in environmentally responsible behaviors [47], and environmental identity strengthens individuals' willingness to adopt sustainable behaviors that are consistent with their self-concept [48,49]. Recent evidence also indicates that consumers with stronger sustainability orientations tend to evaluate products not only according to their individual benefits but also according to their perceived contribution to broader environmental and societal goals [13]. Consistent with this perspective, the present study does not conceptualize the SDG-related constructs as individual psychological traits or as extensions of the original TPB constructs. Rather, they represent consumers' normative sustainability perceptions regarding the extent to which electric vehicles contribute to the objectives of SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Consequently, these constructs complement the traditional TPB dimensions by capturing sustainability-oriented evaluations that reinforce behavioral intention while remaining theoretically distinct from attitude, subjective norm, and perceived behavioral control. Figure 1 presents the theoretical framework adopted in this study and the six hypotheses proposed to explain consumers' intention to purchase electric vehicles.



**Figure 1.** Theoretical Framework of the Study.

### 3. Methodology

This study adopted a quantitative, descriptive approach using a survey to empirically examine the influence of constructs from the Theory of Planned Behavior (TPB) and the Sustainable Development Goals (SDGs 11, 12, and 13) on consumers' intention to purchase electric vehicles in Northeast Brazil [50]. The target population consisted of residents from the nine states in the region aged 18 years or older. A non-probability convenience sampling strategy was used, complemented by snowball sampling, which is appropriate for reaching dispersed populations [36,50]. Data collection took place between 5 October 2025 and 25 November 2025, through an online questionnaire distributed via social media and messaging platforms, resulting in 450 valid responses after applying internal validation criteria.

The internal validation criteria included screening for duplicate submissions, verification of response completeness, inspection of inconsistent response patterns, and identification of potential univariate outliers. Because the online questionnaire required responses to all items before submission, no incomplete questionnaires were recorded. After these screening procedures, all remaining responses met the predefined quality criteria and were retained for the subsequent statistical analyses.

The final sample comprised 450 valid responses. Although this sample size may be considered moderate, it is consistent with empirical research in consumer behavior and electric vehicle adoption, where studies frequently rely on survey samples of a few hundred respondents. For example, recent international research investigating electric vehicle discontinuance across the United States, China, and Germany employed comparable survey-based samples to examine consumer perceptions and behavioral intentions [12]. Therefore, the sample size adopted in this study is consistent with the methodological standards commonly observed in this research field.

The research instrument consisted of a structured questionnaire (Appendix A Table A1) organized into four sections and measured using a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree): (i) purchase intention; (ii) TPB constructs (attitude, subjective norm, and perceived behavioral control); (iii) perceptions of SDGs 11, 12, and 13; and (iv) sociodemographic characteristics. The measurement items were adapted from prior literature and summarized in Table A1 (Appendix A), including scales based on Judge et al. [51] for the TPB constructs. The items related to SDG 11, SDG 12, and SDG 13 were developed by the authors based on the conceptual definitions and targets established in the United Nations 2030 Agenda [37], aiming to operationalize consumers' perceptions of the contribution of electric vehicles to sustainable cities, responsible consumption, and climate action. To establish content validity, the questionnaire was independently evaluated by two specialists with expertise in consumer behavior and sustainability research, who assessed the clarity, theoretical relevance, and representativeness of each item. Subsequently, a pilot test with 25 respondents was conducted to verify the comprehensibility and usability of the questionnaire. Since no significant comprehension problems or ambiguities were identified, no revisions to the instrument were necessary before the main data collection.

Data analysis was conducted using SPSS 21. Scale validity was assessed using Exploratory Factor Analysis (EFA), including internal reliability (Cronbach's Alpha), sample adequacy (KMO), and Bartlett's test of sphericity, as well as factor loadings, communalities, and total explained variance [50,52]. Multiple Linear Regression (MLR) was then used to test the proposed hypotheses. Regarding sample size adequacy, the guideline of five to ten respondents per indicator was followed, consistent with established recommendations for multivariate analyses [50].

After confirming the reliability and unidimensionality of the constructs through Exploratory Factor Analysis (EFA), all measurement items presented satisfactory factor loadings ( $\geq 0.50$ ) and were therefore retained in the final measurement model. Consequently, no questionnaire items were excluded following the EFA. Composite scores were then calculated as the arithmetic mean of the items associated with each construct. The dependent variable (Intention to Purchase Electric Vehicles) and each independent construct (Pro-environmental Attitude, Subjective Norm, Perceived Behavioral Control, SDG 11, SDG 12, and SDG 13) were operationalized using these composite mean scores, which were subsequently employed in the correlation and Multiple Linear Regression analyses.

The study followed ethical principles of anonymity, confidentiality, and voluntary participation. It was classified as minimal-risk research and conducted exclusively for academic purposes.

## 4. Results

### 4.1. Sample Profile

The sample consisted of 450 respondents, representing a predominantly young and economically active population. Regarding gender, 56.2% of participants were male, and 43.8% were female, indicating a relatively balanced gender distribution.

In terms of age, most respondents were 24 years old or younger (78.9%), followed by participants aged 25 to 39 (12.4%). The remaining age groups were less represented, including respondents aged 40 to 54 (5.3%), 55 to 64 (2.2%), and 65 or older (1.1%). These results indicate a strong concentration of younger respondents in the sample.

Regarding educational attainment, 41.1% of respondents had completed high school, while 36.2% reported incomplete higher education. In addition, 8.7% held a postgraduate degree (specialization, master's, or doctorate). Lower percentages were observed among respondents with complete elementary education (7.6%), complete higher education (5.6%), and incomplete elementary education (0.9%), indicating a predominance of medium to high education attainment levels.

With respect to monthly household income, 32.4% of participants reported earning between two and five minimum wages, 25.6% reported earning more than ten minimum wages, and 18.9% reported earning between five and ten minimum wages. The remaining respondents reported household incomes of up to one minimum wage (12.4%) and between one and two minimum wages (10.7%), suggesting socioeconomic diversity in the sample.

Regarding marital status, most respondents reported being single (86.9%), followed by married participants (11.3%), divorced participants (1.1%), and widowed participants (0.7%), reinforcing the predominance of individuals in the early stages of the family life cycle.

Table 1 presents the Pearson correlation, mean, and standard deviation values for the constructs. It is worth noting that the 7-point Likert scale (1 = strongly disagree; 7 = strongly agree) used to measure the observable variables has a median value of 4. In this regard, mean response values above 4.0 (PEA, SDG11, SDG12, and SDG13) indicate a high level of agreement among respondents that the items addressed in the questionnaire are present with greater intensity. The standard deviation values for the constructs, which are close to 1, indicate that the sample is homogeneous.

**Table 1.** Pearson Correlation, Mean and Standard Deviation of the Constructs.

| Construct                          | PI <sup>a</sup> | PEA <sup>a</sup> | SN <sup>a</sup> | PBC <sup>a</sup> | SDG11 <sup>a</sup> | SDG12 <sup>a</sup> | SDG13 <sup>a</sup> |
|------------------------------------|-----------------|------------------|-----------------|------------------|--------------------|--------------------|--------------------|
| Purchase Intentions (PI)           | 1               |                  |                 |                  |                    |                    |                    |
| Pro-Environmental Attitudes (PEA)  | 0.646           | 1                |                 |                  |                    |                    |                    |
| Subjective Norm (SN)               | 0.569           | 0.357            | 1               |                  |                    |                    |                    |
| Perceived Behavioral Control (PBC) | 0.523           | 0.373            | 0.351           | 1                |                    |                    |                    |
| SDG 11                             | 0.434           | 0.282            | 0.246           | 0.345            | 1                  |                    |                    |
| SDG 12                             | 0.538           | 0.316            | 0.305           | 0.372            | 0.233              | 1                  |                    |
| SDG 13                             | 0.510           | 0.343            | 0.248           | 0.381            | 0.308              | 0.279              | 1                  |
| Mean <sup>b</sup>                  | 3.564           | 4.903            | 3.147           | 3.685            | 5.103              | 4.904              | 4.791              |
| Standard Deviation <sup>b</sup>    | 1.648           | 1.415            | 1.421           | 1.650            | 1.341              | 1.419              | 1.387              |

<sup>a</sup> Significant Pearson Correlation ( $p < 0.01$ ). <sup>b</sup> Values calculated with the means of each construct.

To evaluate the Pearson correlation values, parameters were recommended in the literature [32,50]. Although there is no consensus among researchers, this study adopted the following classification for the Pearson correlation coefficient ( $r$ ): (i) low intensity ( $>0.3$ ) for the construct pairs PEA ↔ SDG11, SN ↔ SDG11, SN ↔ SDG13, SDG11 ↔ SDG12, and SDG12 ↔ SDG13; (ii) moderate intensity (between 0.3 and 0.5) for the correlations between PI ↔ SDG11, PEA ↔ SN, PEA ↔ PBC, PEA ↔ SDG12, PEA ↔ SDG13, SN ↔ PBC, SN ↔ SDG12, PBC ↔ SDG11, PBC ↔ SDG12, and PBC ↔ SDG13; and, (iii) high intensity ( $>0.5$ ) for the correlations between the constructs PI ↔ PEA, PI ↔ SN, PI ↔ PBC, PI ↔ SDG12, and PI ↔ SDG12. It should be noted that a high Pearson correlation

between constructs signifies a strong, predictable linear relationship, but it does not imply causality.

#### 4.2. Exploratory Factor Analysis

Initially, the dataset was screened to ensure its suitability for multivariate analysis. Univariate outliers and data normality were assessed using skewness and kurtosis measures, following the criteria recommended [50,53]. Since the electronic questionnaire did not allow unanswered items, no missing data were identified. In addition, no extreme response patterns were observed that could compromise data quality. After the screening procedures, 450 valid cases were retained for subsequent analyses.

Next, the suitability of the dataset for Exploratory Factor Analysis (EFA) was assessed. Bartlett's Test of Sphericity was statistically significant ( $\chi^2 = 18,323.42$ ;  $p < 0.001$ ), while the Kaiser-Meyer-Olkin measure ( $KMO = 0.954$ ) indicated excellent sample adequacy [50,52]. The internal reliability of the constructs was confirmed by high Cronbach's alpha coefficients (Purchase Intention:  $\alpha = 0.942$ ; Attitude:  $\alpha = 0.939$ ; Subjective Norm:  $\alpha = 0.949$ ; Perceived Behavioral Control:  $\alpha = 0.961$ ; SDG 11:  $\alpha = 0.941$ ; SDG 12:  $\alpha = 0.943$ ; SDG 13:  $\alpha = 0.947$ ), demonstrating satisfactory internal consistency across all scales.

EFA was conducted using the Maximum Likelihood extraction method with Varimax orthogonal rotation. The resulting factor solution identified seven factors, consistent with the proposed theoretical model, explaining 76.18% of the total variance. All items presented factor loadings above 0.50, with no evidence of significant cross-loadings, indicating adequate convergent validity and an empirical structure aligned with the theoretical constructs [50].

To assess the potential influence of common method bias, Harman's single-factor test was performed. The unrotated solution indicated that the first factor accounted for less than 50% of the total variance, suggesting that common method variance is unlikely to represent a serious concern in the present study.

In the "Intention to Purchase Electric Vehicles" construct, a high level of explained variance was observed, particularly for the item related to consumers' future purchase predisposition, highlighting its central role in operationalizing the construct [3,4]. For the Attitude construct, the highest factor loadings were associated with perceptions of the environmental benefits of electric vehicles, corroborating the literature that identifies pro-environmental attitudes as relevant antecedents of EV adoption [4,19,26].

The Subjective Norm construct presented high factor loadings for items related to the influence of reference groups, indicating the importance of social approval in the decision-making process [3,26,28]. Similarly, Perceived Behavioral Control showed strong contributions from items associated with financial feasibility, charging infrastructure, and ease of use, reinforcing the importance of perceived practical capability in the adoption of sustainable technologies [2,4,20].

Regarding the constructs associated with the Sustainable Development Goals, the EFA revealed well-defined factor structures. For SDG 11, items related to reducing urban pollution and improving quality of life in cities showed the highest factor loadings, aligning with the literature on sustainable mobility [2,5]. The SDG 12 construct presented higher factor loadings for items associated with responsible consumption, supporting previous studies on sustainable consumption behavior [6,18,32]. Finally, SDG 13 demonstrated adequate factor loadings for items related to climate change mitigation, reinforcing the relationship between electromobility and climate action [5,6].

Overall, the factor structure obtained was consistent with the proposed theoretical model, presenting high levels of explained variance, satisfactory factor loadings,

and adequate internal reliability. These results support the continuation of subsequent inferential analyses.

Although the Pro-environmental Attitude construct and the SDG-related constructs are conceptually related to environmental sustainability, the Exploratory Factor Analysis provided empirical support for distinguishing these constructs by allocating their measurement items into separate latent dimensions. While Pro-environmental Attitude reflects consumers' general evaluations regarding the environmental benefits of electric vehicles, SDG 11, SDG 12, and SDG 13 assess consumers' perceptions of the contribution of electric vehicles to specific sustainability dimensions, namely sustainable cities and communities, responsible consumption and production, and climate action, respectively. Therefore, the observed factor structure suggests that the SDG-related constructs capture specific sustainability perceptions rather than merely reflecting general pro-environmental evaluations of electric vehicles.

Based on these results, composite scores (mean values of the items belonging to each construct) were calculated and subsequently used in the Multiple Linear Regression analysis.

#### *4.3. Multiple Linear Regression*

Before estimating the model, the statistical assumptions of the observable variables were verified using the reliability and sampling adequacy indicators obtained from the Exploratory Factor Analysis. The high Cronbach's alpha coefficients ( $\alpha > 0.90$ ), the overall KMO index of 0.954, and the statistically significant Bartlett's Test of Sphericity ( $p < 0.001$ ) indicated the data were suitable for multivariate analyses [50].

To empirically test the proposed hypotheses, Multiple Linear Regression (MLR) using the enter method was performed. The dependent variable, Intention to Purchase Electric Vehicles, was operationalized as the mean score of its respective items. Likewise, each independent construct (Pro-environmental Attitude, Subjective Norm, Perceived Behavioral Control, SDG 11, SDG 12, and SDG 13) was operationalized using the mean score of its respective items. This procedure is commonly adopted in behavioral research when the measurement model demonstrates satisfactory psychometric properties. In the present study, all constructs showed high internal consistency (Cronbach's  $\alpha$  ranging from 0.939 to 0.961), satisfactory factor loadings, and a well-defined factor structure, supporting the use of composite scores for the regression analysis.

Preliminary analysis of the Pearson correlation matrix did not reveal excessively high correlations among the predictors. The Variance Inflation Factor (VIF) values ranged from 1.22 to 1.44, remaining well below the critical threshold of 5.0 recommended in the literature, indicating the absence of problematic multicollinearity [54]. In addition, regression diagnostics confirmed that the assumptions underlying the Ordinary Least Squares (OLS) estimation were adequately satisfied. The Durbin–Watson statistic was 1.89, indicating no evidence of residual autocorrelation. Cook's Distance values remained below 0.03 for all observations, suggesting the absence of influential cases. Furthermore, visual inspection of the standardized residuals did not indicate substantial heteroscedasticity, while the residual distribution approximated normality, supporting the robustness of the regression estimates.

In addition, residual diagnostics were performed to verify the assumptions underlying the Ordinary Least Squares estimation. Visual inspection of the standardized residuals indicated no evidence of substantial heteroscedasticity, while the residual distribution approximated normality, supporting the adequacy of the regression estimates.

The model was then estimated using the Ordinary Least Squares (OLS) method, and overall model fit was assessed using the coefficient of determination ( $R^2$ ), adjusted  $R^2$ , the F-test, and the standard error of the estimate, as presented in Table 2.

**Table 2.** Model Summary.

| Model | R     | $R^2$ | $R^2$ Adjusted | Standard Error |
|-------|-------|-------|----------------|----------------|
| 1     | 0.836 | 0.698 | 0.694          | 0.9116         |

The results indicated strong explanatory power, with an  $R^2$  value of 0.698, showing that approximately 69.8% of the variance in the intention to purchase electric vehicles was jointly explained by the constructs analyzed. In applied social science research,  $R^2$  values above 0.50 indicate the model explains more than half of the variance in the dependent variable, representing a substantial level of explanatory power [50]. In addition, the F-test was statistically significant ( $F = 170.97$ ;  $p < 0.001$ ), confirming the overall adequacy of the model.

Based on the estimated coefficients, the hypotheses were tested, and the results are presented in Table 3.

**Table 3.** Research Hypotheses and Results.

| Hypothesis | Construct                    | $\beta$<br>(Standard) | T      | $p$    | $sr^2$ | Result    |
|------------|------------------------------|-----------------------|--------|--------|--------|-----------|
| H1         | Pro-environmental Attitude   | 0.341                 | 11.256 | <0.001 | 0.116  | confirmed |
| H2         | Subjective Norm              | 0.263                 | 8.959  | <0.001 | 0.069  | confirmed |
| H3         | Perceived Behavioral Control | 0.104                 | 3.304  | <0.001 | 0.011  | confirmed |
| H4         | SDG 11                       | 0.127                 | 4.384  | <0.001 | 0.019  | confirmed |
| H5         | SDG 12                       | 0.231                 | 7.867  | <0.001 | 0.053  | confirmed |
| H6         | SDG 13                       | 0.185                 | 6.217  | <0.005 | 0.034  | confirmed |

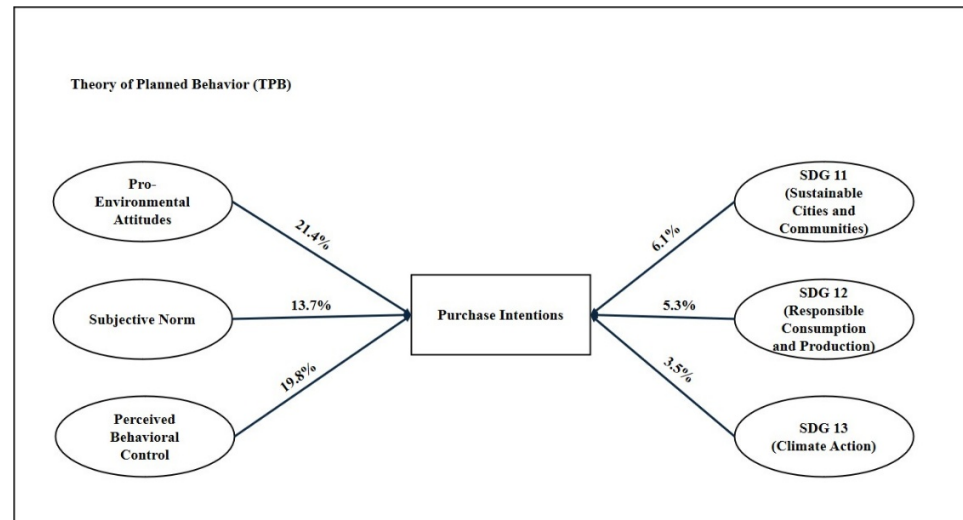
Note.  $\beta$  = standardized coefficient;  $sr^2$  = squared semi-partial correlation, representing the unique contribution of each predictor to the explained variance.

Table 3 presents the standardized coefficients,  $t$ -statistics, significance levels, and squared semi-partial correlations ( $sr^2$ ) of the constructs. All hypothesized relationships were positive and statistically significant, confirming the central role of the Theory of Planned Behavior in explaining the intention to purchase electric vehicles. Pro-environmental Attitude showed the largest standardized effect ( $\beta = 0.341$ ) and the largest unique contribution ( $sr^2 = 0.116$ ), followed by Subjective Norm ( $\beta = 0.263$ ), highlighting the relevance of cognitive and social factors in shaping behavioral intentions.

The constructs associated with the Sustainable Development Goals also demonstrated significant effects, although with comparatively smaller magnitudes, suggesting that perceptions related to urban sustainability, responsible consumption, and climate action act as complementary factors in explaining sustainable consumer behavior. These findings are consistent with the results of the Exploratory Factor Analysis, which provided empirical support for distinguishing the SDG-related constructs from Pro-environmental Attitude. While Pro-environmental Attitude reflects consumers' general evaluations regarding the environmental benefits of electric vehicles, SDG 11, SDG 12, and SDG 13 capture consumers' perceptions of how electric vehicles contribute to sustainable cities and communities, responsible consumption and production, and climate action, respectively. The fact that both Pro-environmental Attitude and all three SDG-related constructs remained statistically

significant in the regression model suggests that these constructs provide complementary, rather than overlapping, explanations of consumers' intention to purchase electric vehicles.

Figure 2 presents the multiple linear regression analyses used to test the six research hypotheses, separately illustrating the explanatory power of each independent variable on the dependent variable, Intention to Purchase Electric Vehicles.



**Figure 2.** Research Findings.

## 5. Discussion

The results indicate that purchase intention toward electric vehicles is significantly explained by the constructs of the Theory of Planned Behavior (TPB) together with consumers' perceptions related to SDG 11, SDG 12, and SDG 13, with the model demonstrating substantial explanatory power ( $R^2 = 0.698$ ). This finding reinforces the understanding that electric vehicle adoption is a multifaceted behavior influenced by individual evaluations, social pressures, perceptions of practical feasibility, and sustainability-oriented normative frameworks [1,3,4]. Accordingly, the results support the joint consideration of psychosocial and sustainability-related factors to better explain electromobility in emerging economies, where psychological and contextual factors interact more intensely.

The strong explanatory power of the proposed model also suggests that sustainable mobility decisions cannot be fully understood through purely individual cognitive determinants. Rather, consumers appear to consider both personal evaluations and broader sustainability perceptions when forming purchase intentions. This finding reinforces recent arguments that TPB-based models may benefit from incorporating complementary normative sustainability dimensions, particularly in emerging economies where environmental concerns coexist with economic and structural constraints.

Within the TPB framework, the confirmation of hypotheses H1, H2, and H3 reinforces the central role of cognitive and social determinants in shaping purchase intention. Pro-environmental Attitude exhibited the largest standardized effect, indicating that favorable evaluations of the environmental and symbolic benefits of electric vehicles represent one of the main antecedents of intentional behavior [7,17,26].

The stronger effect of Pro-environmental Attitude compared with the SDG-related constructs suggests that consumers primarily evaluate electric vehicles according to their own beliefs regarding environmental benefits and personal value rather than according to broader sustainability agendas. This interpretation is consistent with the Theory of Planned Behavior, which considers attitude the most proximal cognitive determinant of behavioral intention [3]. Although the SDGs contribute to explaining purchase intention,

they appear to operate as complementary normative references rather than primary drivers of individual decision-making.

The significance of Subjective Norm suggests that the social legitimization of this technology plays an important role in the adoption decision, particularly in contexts where the innovation is still at an early stage of diffusion [1,2,4]. Likewise, Perceived Behavioral Control showed a significant influence, indicating that perceptions related to infrastructure, cost, and usability remain key determinants in markets characterized by structural barriers to electromobility [2,32].

The confirmation of the hypotheses associated with the Sustainable Development Goals expands the study's theoretical contribution by demonstrating that broader normative frameworks also influence purchase intention. The positive effect of SDG 11 suggests that consumers perceive electric vehicles as tools capable of contributing to urban sustainability, particularly by reducing pollution and improving urban quality of life [2,5]. This finding indicates that electromobility is understood not only as an individual consumption choice, but also as part of a broader collective effort toward socio-environmental transformation.

Similarly, the significance of SDG 12 highlights that values associated with responsible consumption and the reduction in environmental impacts throughout the product life cycle positively influence intentions to purchase electric vehicles. This finding is consistent with studies emphasizing the importance of environmental awareness and sustainable production practices as antecedents of sustainable consumption behavior [27,32,36]. In the context analyzed, electric vehicles appear to be perceived as alternatives aligned with sustainable lifestyles and with the transition toward economic models characterized by lower environmental impacts.

Finally, the confirmation of the hypothesis associated with SDG 13 indicates that climate concerns also contribute to the formation of purchase intention, although with a relatively smaller effect than the central TPB constructs. This result is consistent with the literature suggesting that climate-related motivations function as normative reinforcements of pro-environmental behavior, particularly among consumers with higher levels of ecological awareness [2,5,6]. Thus, the findings suggest that although the climate agenda [37] already exerts a meaningful influence on decisions related to sustainable mobility in Brazil, its effectiveness still depends on interaction with more immediate psychological and structural factors.

Taken together, the findings related to SDG 11, SDG 12, and SDG 13 indicate that although all sustainability dimensions significantly contribute to explaining consumers' purchase intentions, their effects remain comparatively smaller than those associated with the central constructs of the Theory of Planned Behavior. This pattern suggests that, in the Brazilian context, global sustainability agendas have not yet been fully internalized as primary determinants of consumer decision-making. Instead, they appear to reinforce favorable attitudes by providing an additional normative framework through which consumers interpret the environmental and social benefits of electric vehicles. This interpretation is particularly relevant for emerging economies, where immediate economic, psychological, and structural considerations tend to coexist with broader sustainability concerns.

These findings also contribute to the international literature by suggesting that the explanatory role of sustainability-related constructs is conditioned by the institutional and socioeconomic context in which consumer decisions occur. While previous studies grounded in the Theory of Planned Behavior consistently identify attitude as one of the strongest predictors of pro-environmental intentions, the present study demonstrates that SDG-related perceptions provide significant complementary explanations of purchase intention, although they remain secondary to individual cognitive evaluations. From a

practical perspective, this evidence suggests that environmental communication strategies and public policies should translate the Sustainable Development Goals into tangible consumer benefits, thereby strengthening favorable attitudes toward electric vehicles and promoting sustainable mobility.

## 6. Conclusions

The objective of this study was to analyze the influence of the Theory of Planned Behavior (TPB) and the Sustainable Development Goals (SDGs 11, 12, and 13) on consumers' intention to purchase electric vehicles in Northeast Brazil. The results indicate that the intention to adopt electromobility is strongly explained by psychosocial factors together with sustainability-related normative orientations. These findings suggest that the decision to purchase electric vehicles extends beyond purely economic or technological considerations and also involves individual evaluations, social influence, and perceptions of practical feasibility.

Within the TPB framework, Pro-environmental Attitude, Subjective Norm, and Perceived Behavioral Control showed positive and statistically significant effects on purchase intention, highlighting the importance of cognitive and social determinants in the adoption of sustainable technologies. In particular, favorable attitudes and perceptions of control emerged as relevant antecedents, suggesting that perceived environmental benefits and consumers' confidence in their ability to acquire and use electric vehicles are key factors in the formation of behavioral intentions. These findings reinforce the suitability of TPB as a theoretical framework for understanding electromobility in emerging market contexts.

In addition, perceptions related to urban sustainability (SDG 11), responsible consumption (SDG 12), and climate action (SDG 13) also showed positive and statistically significant associations with purchase intention. Although these effects were smaller in magnitude than those associated with the TPB constructs, the results indicate that consumers recognize electric vehicles as alternatives aligned with global sustainability for the UN's SDGs for the 2030 Agenda [37]. This finding reinforces the relevance of the SDGs as complementary variables for explaining sustainable consumer behavior.

The study also offers important theoretical contributions by empirically examining the Theory of Planned Behavior together with sustainability-related constructs associated with SDG 11, SDG 12, and SDG 13. Rather than proposing a fundamentally new theoretical model, the study demonstrates that these sustainability dimensions represent significant predictors of purchase intention alongside the traditional TPB constructs when analyzing consumers' intention to purchase electric vehicles. The findings provide empirical evidence from the Brazilian context, an emerging economy still underrepresented in the international literature on sustainable mobility, and reinforce the relevance of integrating broader sustainability narratives into behavioral models of environmentally responsible consumption. Furthermore, the analytical framework adopted in this study may serve as a reference for future investigations examining the interaction between psychosocial determinants and sustainability-oriented normative dimensions in different contexts.

In terms of management and public policy, the findings suggest that strategies aimed at expanding electromobility should extend beyond economic incentives and include communication initiatives, environmental education, and infrastructure development. Such measures may strengthen Perceived Behavioral Control and reinforce the association between electric vehicles and the benefits related to urban sustainability, climate action, and responsible consumption.

Furthermore, the results indicate that different stakeholders should adopt complementary strategies to accelerate electric vehicle adoption. For policymakers, expanding charging infrastructure, maintaining fiscal incentives, and integrating electromobility into broader

sustainability policies aligned with the Sustainable Development Goals may strengthen consumers' confidence in this technology. For automakers and marketing professionals, communication strategies should emphasize not only the environmental benefits of electric vehicles but also their contribution to sustainable cities, responsible consumption, and climate action. Since Pro-environmental Attitude and Subjective Norm emerged as the strongest predictors of purchase intention, campaigns based on environmental awareness, social influence, and opinion leaders may be particularly effective in increasing consumer acceptance of electric vehicles.

Considering the socioeconomic characteristics of Northeast Brazil, these strategies should be adapted to regional conditions. In addition to expanding charging infrastructure in major urban centers, policymakers and energy companies should prioritize the availability of charging stations in smaller cities and along regional transportation corridors to reduce territorial disparities in access to electromobility. Furthermore, regional incentive programs aimed at improving the affordability of electric vehicles, particularly for middle- and lower-income consumers, may help reduce financial barriers identified in emerging markets. Finally, partnerships among governments, energy utilities, charging service providers, and automakers are essential to accelerate the expansion of charging infrastructure and promote a more inclusive transition to sustainable mobility throughout the region.

Despite these contributions, some limitations should be considered. The use of a non-probability sample concentrated in Northeast Brazil limits the generalizability of the findings to other contexts. Moreover, the sample was predominantly composed of young (78.9% aged 24 years or younger) and single (86.9%) respondents. This demographic concentration may have influenced the observed purchase intentions, since age and life-cycle stage are recognized as factors capable of shaping environmental attitudes, technology adoption, financial perceptions, and vehicle purchase decisions. Recent studies also indicate that the influence of sociodemographic characteristics on electric vehicle purchase intention varies across contexts and populations, reinforcing the need for caution when generalizing these findings beyond the profile represented in this sample. It is considered important to acknowledge the study's limitations regarding the data collection method and the use of the Likert scale, as these may contribute to the Halo effect (i.e., incorrect generalization) and Common Method Variance (CMV) [55,56]. However, statistical tests did not identify research biases.

Therefore, the results should be interpreted primarily as reflecting the perceptions of younger consumers in Northeastern Brazil rather than the preferences of the broader regional population. In addition, the study examined purchase intention rather than actual purchasing behavior, which may result in discrepancies between intention and action.

Another limitation concerns the absence of sociodemographic control variables, such as age, gender, education, and income, in the regression model. Although the primary objective of this study was to evaluate the explanatory power of the theoretical constructs derived from the Theory of Planned Behavior and the Sustainable Development Goals, future studies may incorporate these variables as controls to assess their potential influence on consumers' purchase intentions.

Future studies may also employ Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to validate the measurement model and simultaneously estimate the structural relationships among latent constructs, thereby providing additional evidence regarding the robustness of the proposed theoretical model.

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**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## Appendix A

Table A1 details the operational definitions and observable variables for each construct. Items were framed as affirmative statements, and respondents rated their agreement on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

**Table A1.** Exploratory Factor Analysis—Varimax Rotation.

| Observable Variables                     |                                                                                                                                                                  | Factor Loading | Communality |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
| Purchase Intentions <sup>a</sup>         |                                                                                                                                                                  |                |             |
| ICCE01                                   | I intend to purchase an electric vehicle in the coming years.                                                                                                    | 0.527          | 0.731       |
| ICCE02                                   | I am likely to buy an electric vehicle when replacing my current one.                                                                                            | 0.479          | 0.651       |
| ICCE03                                   | If I had to choose a vehicle today, my preference would be for an electric vehicle.                                                                              | 0.465          | 0.654       |
| ICCE04                                   | I am willing to seriously consider purchasing an electric vehicle.                                                                                               | 0.499          | 0.673       |
| ICCE05                                   | It is highly probable that I will buy an electric vehicle in the near future.                                                                                    | 0.513          | 0.681       |
| Pro-Environmental Attitudes <sup>b</sup> |                                                                                                                                                                  |                |             |
| TCPA01                                   | Purchasing an electric vehicle is useful.                                                                                                                        | 0.842          | 0.800       |
| TCPA02                                   | Purchasing an electric vehicle is beneficial.                                                                                                                    | 0.852          | 0.804       |
| TCPA03                                   | Purchasing an electric vehicle is a smart decision.                                                                                                              | 0.846          | 0.781       |
| TCPA04                                   | Purchasing an electric vehicle is a way to reduce environmental impacts.                                                                                         | 0.834          | 0.755       |
| TCPA05                                   | Purchasing an electric vehicle provides a positive experience.                                                                                                   | 0.854          | 0.787       |
| Subjective Norm <sup>b</sup>             |                                                                                                                                                                  |                |             |
| TCPNJ01                                  | People who are important to me believe that I should buy an electric vehicle because it generates less environmental impact.                                     | 0.854          | 0.767       |
| TCPNJ02                                  | I feel social pressure to purchase an electric vehicle.                                                                                                          | 0.846          | 0.762       |
| TCPNJ03                                  | People who are important to me would be pleased if I bought an electric vehicle because it generates less environmental impact.                                  | 0.837          | 0.744       |
| TCPNJ04                                  | When it comes to purchasing products with lower environmental impact, such as electric vehicles, I usually follow the opinion of people who are important to me. | 0.832          | 0.760       |
| TCPNJ05                                  | Most people who are important to me intend to buy or have already bought an electric vehicle because it generates less environmental impact.                     | 0.852          | 0.800       |

Table A1. Cont.

| Observable Variables                                         |                                                                                                                                                                      | Factor Loading | Communality |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
| TCPNJ06                                                      | The number of people important to me who have acquired electric vehicles because they generate less environmental impact is high.                                    | 0.859          | 0.763       |
| TCPNJ07                                                      | Considering people important to me who buy products with a lower environmental impact, such as an electric vehicle, I believe my behavior would be similar to theirs | 0.819          | 0.767       |
| Perceived Behavioral Control <sup>b</sup>                    |                                                                                                                                                                      |                |             |
| TCPCCP01                                                     | For me, purchasing an electric vehicle would be easy.                                                                                                                | 0.846          | 0.804       |
| TCPCCP02                                                     | If I wanted to, I would be able to purchase an electric vehicle.                                                                                                     | 0.859          | 0.824       |
| TCPCCP03                                                     | I have control over the decision of whether or not to purchase an electric vehicle.                                                                                  | 0.841          | 0.799       |
| TCPCCP04                                                     | If I decide to, I am likely to be able to purchase an electric vehicle.                                                                                              | 0.844          | 0.825       |
| TCPCCP05                                                     | I have sufficient financial resources to consider purchasing an electric vehicle.                                                                                    | 0.839          | 0.807       |
| TCPCCP06                                                     | There are many facilitating factors that contribute to purchasing an electric vehicle.                                                                               | 0.854          | 0.833       |
| TCPCCP07                                                     | I have sufficient knowledge about electric vehicles to make a decision to purchase one.                                                                              | 0.839          | 0.823       |
| SDG 11 (Sustainable Cities and Communities) <sup>c</sup>     |                                                                                                                                                                      |                |             |
| SDG1101                                                      | I believe that the adoption of electric vehicles can contribute to reducing air pollution in cities, making them more sustainable.                                   | 0.880          | 0.817       |
| SDG1102                                                      | I consider it important for cities to invest in accessible and sustainable transportation systems, including incentives for the use of electric vehicles.            | 0.873          | 0.833       |
| SDG1103                                                      | Purchasing an electric vehicle is a way to help make my city more inclusive, safe, and resilient when facing environmental challenges.                               | 0.860          | 0.795       |
| SDG1104                                                      | I believe that the use of electric vehicles contributes to improving urban quality of life by reducing noise and negative environmental impacts.                     | 0.852          | 0.815       |
| SDG1105                                                      | I view the purchase of an electric vehicle as a way to support public policies for sustainable mobility and responsible urban planning.                              | 0.859          | 0.794       |
| SDG 12 (Responsible Consumption and Production) <sup>c</sup> |                                                                                                                                                                      |                |             |
| SDG1201                                                      | Purchasing an electric vehicle is a way to practice more responsible consumption, reducing the environmental impacts of my choices.                                  | 0.846          | 0.795       |
| SDG1202                                                      | I believe that the adoption of electric vehicles contributes to a more efficient use of natural resources.                                                           | 0.849          | 0.781       |
| SDG1203                                                      | I view the purchase of electric vehicles as an important step toward reducing dependence on fossil fuels and their negative effects.                                 | 0.835          | 0.766       |
| SDG1204                                                      | By opting for an electric vehicle, I feel that I am contributing to more sustainable production and consumption patterns.                                            | 0.851          | 0.790       |
| SDG1205                                                      | I consider electric vehicles to be part of a lifestyle in harmony with nature.                                                                                       | 0.830          | 0.775       |
| SDG1206                                                      | For me, acquiring an electric vehicle represents supporting the transition to a cleaner and circular economy model.                                                  | 0.855          | 0.772       |
| SDG 13 (Climate Action) <sup>c</sup>                         |                                                                                                                                                                      |                |             |
| SDG1301                                                      | I believe that the adoption of electric vehicles significantly contributes to reducing greenhouse gas emissions and fighting climate change.                         | 0.869          | 0.800       |
| SDG1302                                                      | I consider purchasing electric vehicles a way to support climate change mitigation policies.                                                                         | 0.827          | 0.791       |
| SDG1303                                                      | For me, opting for an electric vehicle is a way to increase my personal responsibility regarding the impacts of global warming.                                      | 0.825          | 0.765       |
| SDG1304                                                      | I view the transition to electric vehicles as an urgent and necessary measure to address the risks related to climate change.                                        | 0.851          | 0.798       |
| SDG1305                                                      | Purchasing an electric vehicle represents an important step toward making cities more resilient and adapted to the consequences of climate change.                   | 0.867          | 0.810       |
| SDG1306                                                      | I believe that the widespread use of electric vehicles should be an essential part of national and local strategies to combat climate change.                        | 0.850          | 0.805       |

<sup>a</sup> Developed by the authors. <sup>b</sup> Based on elements from the studies by Judge et al. [51]. <sup>c</sup> Definitions from the UN's SDGs for the 2030 Agenda [37].

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