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LUMINOUS INSIGHTS

Research Article

Environmental Concern and Price Value in Electric Vehicle Adoption: Examining Intentions of Indian Consumers

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ABSTRACT

The present study attempts to enhance our understanding of the intention to purchase electric vehicles in India and incorporates price value and environmental concern into the Theory of Planned Behavior model. The study was conducted in three phases. Phase I involved developing and testing the research instruments used to collect data. In Phase II, a pilot study was conducted, employing exploratory factor analysis to confirm the dimensionality of the study constructs. Phase III focused on validating the study model against a larger sample size. The data for Phase III was collected using a combination of online and offline approaches and analyzed using AMOS 24.0. The study findings suggest that environmental concern and price value positively influence the attitude toward electric vehicles. The study also supports the positive influence of Theory of Planned Behavior variables—subjective norms, perceived behavioral control, and attitude—on the intention to purchase electric vehicles. The study offers insights to practitioners to encourage the use of electric vehicles and, hence, contributes to the 2030 Sustainable Development Goals as the use of electric vehicles would help to mitigate climate change, improve human health, and enhance the well-being of society.

KEYWORDS

electric vehicle intention, attitude, environmental convern, price value

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1. Introduction

A recent study from the Cross-Dependency Initiative pointed to the growing global environmental problems (Gupta, 2023). The study estimates that by 2050, among the top 50 "most at risk" states and provinces, around 80 percent will be located in China, the US, and India. Furthermore, nine Indian states were found to be among the top 50 states most vulnerable to the effects of climate change. Transportation is one of the key causes of greenhouse gases that contribute to climate change (Han et al., 2017; Larson et al., 2014; Wang et al., 2017). As per the International Energy Agency's (IEA, 2018) research, the sector is responsible for nearly one-fourth of the global greenhouse gas emissions, projected to reach 50% from the current 23% by 2030. Hence, transportation is a key barrier to developing sustainable economies (Ajanovic, 2015; Turton, 2006).

Approximately 89% of transportation-related car-

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bon emissions in Asia come from the road sector (IEA, 2020). According to Sierzchula et al. (2014), the fuel demand will increase by 40 percent by 2035, and hence, the impact of vehicle use on greenhouse gas emissions and air pollution will be alarmingly high (Egbue & Long, 2012; Qian & Soopramanien, 2011).

Electronic vehicle adoption relies on lithium-ion batteries, which are in high demand due to their long lifespan and high energy density (Niri et al., 2024). However, factors such as geographical distribution, unpredictable incidents, geopolitical issues, and environmental, social, and governance complexities have disrupted supply chains (Nakano, 2021). Minerals like cobalt, copper, lithium, manganese, nickel, and tin are also at high supply risks due to their cumulative demands exceeding global reserves and future production potential (Niri et al., 2024). Mining practices raise health risks, human rights violations, and environmental impacts, with artisanal and small-scale operations affected (Rachidi et al., 2021). Extracting lithium deposits is accompanied by environmental impacts, particularly high water contamination risk, a common challenge in 65% of the lithium mines.

Consequently, there is a burgeoning debate regarding the adoption of alternative vehicles, with a particular emphasis on electric vehicles. Electric vehicles operate on battery-powered motors, allowing for battery recharge through household or public charging station connections to the electric grid (Mastoi et al., 2022). Electric vehicles hold multiple benefits compared to traditional automobiles. First, they are ecologically advantageous as they do not release any greenhouse gases (McCollum et al., 2018). Second, they are cost-effective due to their better energy efficiency and low maintenance costs (Costa et al., 2021). Third, electric vehicles are generally associated with enhanced comfort due to their minimal vibration and noise output (Ghosh & Chatterjee, 2023). Due to these advantages, electric vehicles have been touted as possible substitutes for traditional vehicles.

Nevertheless, the adoption of electric vehicles faces obstacles, including elevated retail costs stemming from a scarcity of economies of scale, inadequate charging infrastructure, limited driving ranges that fall short of consumer anticipations, and substantial expenses associated with battery replacement. It is believed that the key constraint to the widespread adoption of electric vehicles is their higher cost of purchase (Cecere et al., 2018). The high acquisition costs of electric vehicles may be offset by their lower operating costs, making them more attractive to consumers in the long run (Degirmenci & Breitner, 2017).

Previous research has explored how public policy and consumer preferences affect the adoption of new car technologies (Helveston et al., 2015). For instance, Huang et al. (2021) looked into the desire for electric cars in light of the disparities in age groups and geographical locations. Additionally, past studies have aimed to ascertain the attitudes and traits of consumers toward adopting electric cars (Bühler et al., 2014). Liu et al. (2017) examined the key elements that affect the widespread acceptance of e-vehicles, including laws, technology, consumer satisfaction, models, competition, and pricing. Few studies have connected the adoption of e-vehicles with customers' technical, demographic, and economic characteristics (Haustein & Jensen, 2018; Zhao et al., 2010).

Several past researchers have examined consumer adoption of electric vehicles. For example, Gulzari et al. (2022) and Featherman et al. (2021) replicated the Theory of Reasoned Action (Ajzen & Fishbein, 1980), to understand the consumers' electric vehicle adoption. Similarly, Deka et al. (2023) extended the Theory of Planned Behavior (Ajzen, 1985)) to understand the intentions of Indian consumers to purchase electric vehicles. In the same vein, the researchers such as Bockarjova & Steg (2014), Dong et al. (2020), He & Zhan (2018) , Khan et al. (2022), Wang et al. (2021), Lee et al. (2023), Ngoc et al. (2023), Nayum & Thøgersen (2022), Wang et al. (2022), Jain et al. (2022), Curtale et al. (2021), Singh et al. (2023), and Zhou et al. (2021) have examined electric vehicle adoption by consumers by extending well-established theories such as the Protection Motivation Theory (Rogers, 1983), Norm Activation Model (Schwartz, 1977), Value-Belief-Norm Theory (Stern et al., 1999), Theory of Goal Fram-

ing (Lindenberg & Steg, 2007), Technology Acceptance Model (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003, 2012)).

The present study used the Theory of Planned Behavior for several reasons. First, Theory of Planned Behavior has effectively explained the influence of attitude, perceived norms, and perceived behavior control on behavioral intentions (Ajzen, 2002). Second, The Theory of Planned Behavior is considered highly effective for improving predictions of consumers' intentions regarding environmentally friendly behaviors, such as the adoption of electric vehicles (Asadi et al., 2021). Third, Theory of Planned Behavior is a comprehensive theory that is extensively examined in the context of pro-environmental behavior (Rezaei et al., 2019; Shin et al., 2018; Zhou et al., 2021).

Theory of Planned Behavior has been widely used to analyze the variables influencing a variety of pro-environmental behaviors, such as low carbon consumption (Jiang et al., 2019) , waste recycling (Echegaray & Hansstein, 2017), water conservation (Lam, 2006) and energy conservation (Allen & Marquart-Pyatt, 2018). By employing Theory of Planned Behavior, researchers can pinpoint attitudes regarding the behaviors under study and progressively evaluate how important these actions are for a certain crowd. According to Yuriev et al. (2022), this aids in comprehending the drivers and obstacles of a certain behavior, such as adopting electric vehicles. Tim & Deal (2016) assert that Theory of Planned Behavior is a very efficacious paradigm for creating behavioral treatments. Researchers can develop treatments that target variables impeding electric vehicle adoption by identifying direct predictors such as perceived behavioral control, subjective norms, and consumer attitude. The flexibility of the Theory of Planned Behavior framework allows researchers to expand the model by including variables such as self-identity (Mannetti et al., 2004), moral norms (Wang et al., 2017), and past behavior (Richetin et al., 2012). This makes it appropriate in situations where other factors, such as the adoption of electric vehicles, may influence decision-making. While other theories concentrate on components like beliefs, values, and norms, they frequently ignore the interaction between perceived control, social influences, and attitudes. Theory of Planned Behavior provides a more balanced method to study behaviors such as adopting electric vehicles by efficiently bridging these gaps by considering external factors (subjective norms and perceived control) and internal motives (consumer attitude).

The roles of altruism and self-interest are significant in adopting electric vehicles. Altruism is concerned with environmental sustainability, while self-interest focuses more on cost savings and financial benefits (He & Zhan, 2018). Hence, the factors "environmental concern," catering to altruism, and "price value," catering to self-interest, were added to the study. Environmental concerns are highly valued factors for the adoption of electric vehicles (Quak et al., 2016). Several studies indicate that environmental concerns impact the shopping decisions of socially conscious consumers (Khan et al., 2020). Customers who care about the environment are more inclined to buy electric vehicles (Schuitema et al., 2013). Furthermore, a number of polls revealed that environmental concerns are a major factor in the decision to buy an electric car (Peters & Dütschke, 2014). According to Schuitema et al. (2013), environmentally friendly personal traits greatly influence the development of positive attitudes about electric vehicle adoption.

As per Venkatesh et al. (2012), the consumer cognitive trade-off between the perceived benefits and the monetary cost of using them is known as Price Value. Price value is a crucial factor that influences customers' intention to use technology, impacting the adoption of new technologies like online games, low-cost airline tickets, antimalware software, and live e-commerce shopping (Escobar-Rodríguez & Trujillo, 2014; Ramírez-Correa et al., 2019; Zhou et al., 2021). Customers' feelings about electric cars are particularly crucial since they are price-conscious and consider cost before purchasing. The price value of electric vehicles is critical to their adoption because it shapes customer choices by balancing upfront high costs with long-term fuel and maintenance savings and coordinating financial and environmental advantages. Their evaluation of the financial advantages of switching to

an electric car over its lifetime will determine whether or not they make the switch. Hence, price value is a determining factor in the decision-making process as a whole. In order to design strategies that will successfully promote the purchase intentions towards electric vehicles, manufacturers and policymakers should have a thorough understanding of Price Value.

In light of the above discussion, we have addressed the following research questions in the current study:

RQ1: What are the factors that can impact electric vehicle adoption by Indian consumers?

RQ2: How can price value and environmental concern integrate into the Theory of Planned Behaviour to explain electric vehicle adoption by Indian consumers?

The study provides enlightening details regarding factors that affect consumers' choices to buy electric vehicles in developing countries. The study offers a thorough framework for comprehending consumer behavior in the context of electric vehicles by examining the effects of price value and environmental concern on consumer attitude toward electric vehicles, as well as the influence of subjective norms and perceived behavioral control on purchase intention. Furthermore, the study emphasizes the factors influencing consumers' adoption of electric vehicles by providing a thorough framework based on in-depth research and a literature review. The study in the Indian context is important as recent studies have shown that Indian consumers are willing to contribute towards sustainability measures (Kirmani et al., 2023; Uddin et al., 2024). Further, the Government of India has also aimed to reduce carbon emissions by 35 percent and, as a result, set a target to increase electric vehicle penetration for privately owned and commercial vehicles (Uddin et al., 2024). Thus, India is a good case for a study on electric vehicles.

2. Literature Review and Hypothesis Development

The theoretical framework supporting this study, known as the "theory of planned behavior" (Ajzen, 1991; Ajzen & Fishbein, 1980), includes the components of "attitude, subjective norm, and perceived behavioral control" as the primary drivers of consumer-purchase-intention. This theory suggested that "the stronger the intention to engage in a behavior, the more likely is its execution" (Ajzen, 1991). This notion supports the idea that customers' intentions may be characterized by their propensity to purchase environmentally friendly products and their internal drive to do so (Dagher & Itani, 2014).

Theory of Planned Behavior model has widely been applied in the area of travel behavior (Ahmed et al., 2021), shared mobility (Li et al., 2021; Si et al., 2020), green products (Qin & Song, 2022), energy saving (Daiyabu et al., 2022), and electric cars (Shakeel, 2022).

2.1. Relationship between Consumer Attitude and Purchase Intention

Attitude is the product of an internal evaluation and association process that regulates the production of positive or negative intents (Fishbein & Ajzen, 1977) and is one of the important components in influencing behavioral intentions (Zhang et al., 2023). Customers have strong opinions about environmentally sustainable products that support environmental sustainability (Riethmuller & Buttriss, 2008). Prior research has demonstrated that attitude is a useful predictor of pro-environmental activities, such as carpooling (Zhang & Li, 2020) and purchasing eco-friendly furniture (Xu et al., 2020).

Literature supports the significance of consumer attitude for consumer purchase intention of electric vehicles (Shakeel, 2022; Upadhyay & Kamble, 2023). Hence, drawing from existing literature, the subsequent hypothesis was formulated:

H1: Consumer attitude towards electric vehicles positively impacts purchase intention of electric vehicles.

2.2. Relationship between Subjective Norm and Purchase Intention

As per Fishbein & Ajzen (1977), "felt social pressure to engage in specific behaviors" is referred to as a "subjective norm." Subjective norms may also be defined as consumers' perceptions of how important others feel about whether or not they should buy electric vehicles (Asadi et al., 2021; Huang & Ge, 2019). According to Shalender & Sharma (2021),

it refers to the belief that an individual or group encourages and endorses specific behavior. Previous research has demonstrated the important impact of subjective norms on pro-environmental intentions or actions, such as the reduction of PM 2.5 and the use of sustainable heating systems (de Jong et al., 2024). Intention to purchase electric vehicles is positively influenced by subjective norms (Deka et al., 2023; Wang et al., 2022). Considering the above literature, the following hypothesis was suggested:

H2: Subjective norm positively impacts electric vehicles' purchase intention.

2.3. Relationship between Perceived Behavioral Control and Purchase Intention

Perceived behavioral control is defined as the "perceived ease or difficulty of doing certain behavior" (Ajzen, 2002). Perceived behavioral control is the consumer's perception of the opportunities and resources required to act in a specific manner (Ajzen, 1991). In the context of electric vehicles, perceived behavioral control efers to a prospective customer's perceptions of cost, technology, simplicity of use, and—above all—the capacity to smoothly adjust and manage electric vehicles (Shalender & Sharma, 2021). The perceived behavioral control is particularly pertinent to our situation since Indians are still learning about electric vehicles and need to be comfortable with technology to successfully switch from conventional to electric cars (Dhar et al., 2015; Shalender & Yadav, 2018a). Some studies identified perceived behavioral control as one of the most powerful predictors of several pro-environmental behaviors, such as battery pack recycling (Lizin et al., 2017), sustainable usage of bike sharing (Si et al., 2020), and reusable bags (Wang et al., 2022).

Research indicates that consumers are more willing to buy electric vehicles with a higher Perceived Behavioral Control (Deka et al., 2023; Lee et al., 2023). Thus, assuming that perceived behavioral control is a significant predictor of purchase intention is plausible. Consequently, the subsequent hypothesis was formulated:

H3: Perceived behavioral control positively impacts electric vehicles' purchase intention.

2.4. Relationship between Environmental Concern and Consumer Attitude

Environmental concern can be defined as "the degree to which people are aware of environmental problems, support initiatives to improve the environment, or are prepared to contribute to a solution directly" Fransson & Gärling (1999).

The specific components of environmental concern include efficient energy utilization, clean energy awareness, and sensitivity to climate change (Zimmer et al., 1994). As people become aware of the negative impact of climate change, such as increased energy use and greenhouse gas emissions, they are more inclined to purchase electric cars in an effort to minimize harmful emissions. Prior studies have also demonstrated that adopting electric vehicles is influenced by various factors, including environmental concerns (Hackbarth & Madlener, 2016; Sang & Bekhet, 2015).

Previous studies have also shown that attitudes toward pro-environmental behaviors, such as sharing leftover food (Kirmani et al., 2023; Zaidi et al., 2022), eco-friendly toys (Saini et al., 2023), eco-sustainable products (Lauri, 2021), and electric vehicles (Wang et al., 2021), are positively affected by environmental concern. As per the above literature, the following hypothesis was suggested:

H4: Environmental concern has a positive impact on consumer attitude towards e-vehicles electric vehicles.

2.5. Relationship between Price Value and Consumer attitude

Price value is the "cognitive trade-off that users make between the costs and perceived benefits of utilizing various applications" (Venkatesh et al., 2012) . Consumers often choose products and services that provide a positive or somewhat better value for their money (Jaiswal et al., 2023). In contrast, consumers who feel the technology is excessively costly or not worth the cost could be less inclined to keep using it (Kilani et al., 2023). Several studies have examined the impact of price value on attitudes concerning local food consumption, electric automobiles, and autonomous vehicles (Hussain et al., 2023; Zefreh et al., 2023; Zhou et al., 2021). Individuals who believe

that the benefits of automobiles outweigh the potential costs have a positive attitude toward them (Zefreh et al., 2023). Based on these grounds, the following hypothesis was proposed:

H5: Price value positively impacts consumer attitude towards electric vehicles.

3. Material and Methods

This study was carried out in two phases. In Phase I, a pilot study on sample size was conducted (employing exploratory factor analysis) to confirm the dimensionality of the study constructs. In Phase II, the study model(s) were validated against a larger sample size.

3.1. Phase I

3.1.1. *Research Instrument Development and Pretesting*

There were two distinct sections in the research questionnaire. The first segment comprised twenty-two items. The primary aim of this section was to assess the six study constructs adapted from past studies (See Appendix), namely price value (Venkatesh et al., 2012), subjective norm (Mohamed et al., 2018), perceived behavioral control (Mohamed et al., 2018), intention to buy electric vehicle (Mohamed et al., 2018), environmental concern (Khurana et al., 2020), consumer attitude (Hamzah & Tanwir, 2021). All the above items were measured on a five-point Likert scale. The second part aimed to gather the respondents' demographic information. The factors that were measured included age (20 years or younger; 21–40 years; 41–60 years; over 60 years); gender (male, female, and prefer not to say); an occupation (student; employed; business; others); and monthly household income (Rs. 20,000 or below; Rs. 20,001–40,000; Rs. 40,001–60,000; above Rs. 60,000).

The study constructs were adapted to fit well in the context of the present study. To validate this, expert opinions from five distinguished academicians and researchers affiliated with reputed universities located in the National Capital Region (NCR) of India were sought. These experts were informed of the study objective and requested to provide feedback about the language, comprehensibility, and relevance of the questionnaire items. The experts suggested minor changes be incorporated into the questionnaire to prepare it for the pilot study.

3.1.2. *Pilot Study*

Initially, a pilot study was conducted on 103 respondents in New Delhi (An Indian Metropolitan City). In addition, the dimensions of the questionnaire were assessed using the exploratory factor analysis. The sample size for the pilot study was determined using standards suggested by previous researchers such as (Kline, 2014) and (Saunders et al., 2016) for pilot survey sample size. More than 75% of the variance was explained, and the Kaiser-Meyer-Olkin (KMO) value (0.923; >0.6) was found acceptable (Malhotra & Dash, 2011). The Bartlett sphericity test (0.05) was also significant, confirming the sample and data sufficiency of the exploratory factor analysis. The values of the Cronbach alpha were also greater than 0.70 (Table 1).

3.2. Phase II: Final Study

Both offline and online surveys were utilized for data collection. The offline survey was conducted to get respondents' consent to participate and obtain their consent. The data was collected from the participants of the Auto Expo, which took place from January 11–18, 2023, at the India Expo Mart in Greater Noida. Auto Expo is a periodic automotive show in Greater Noida, National Capital Region, India. The event is organized jointly by the Society of Indian Automobile Manufacturers, the Confederation of Indian Industry, and the Automotive Component Manufacturers Association. The respondents were briefed and informed of the purpose of the study, and their consent was obtained to include them in the study. Respondents interested in participating in the study were asked to provide their email addresses. The questionnaire link was then sent to them. Responses were collected online for two reasons. First, it has recently been reported that modern-day consumers spend much of their daily time on digital platforms (Kirmani et al., 2023; Statista, 2022). Second, online surveys allow respondents to respond at leisure and in their preferred location, making them more likely to provide more engaged responses. We received 397 responses, of which around 136 questionnaires were partially filled or contained unengaged responses and hence were eliminated from further analysis. Thus, only

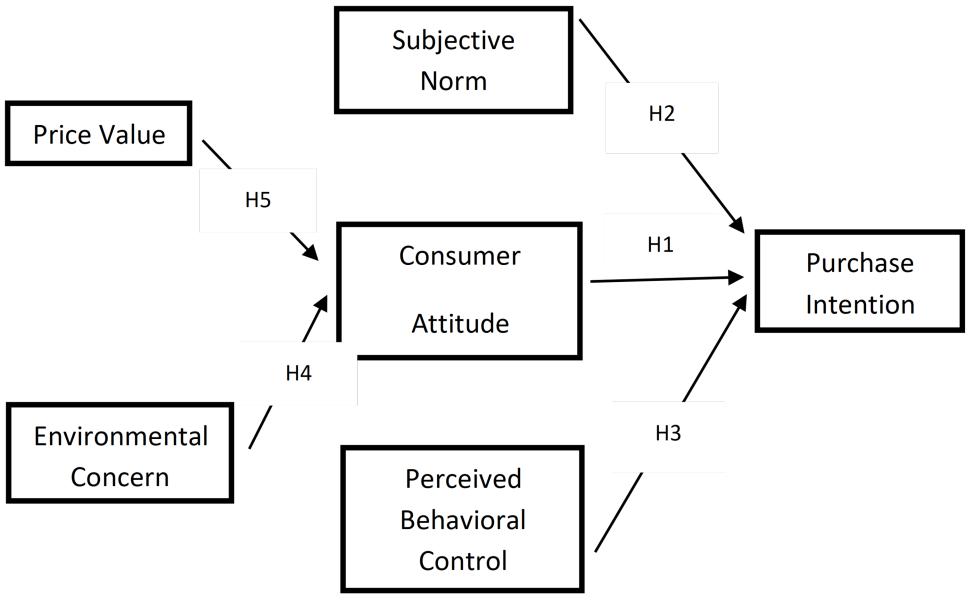

Figure 1. Proposed Model

261 were found suitable for the study analysis. This sample size of 261 respondents was consistent with previous researchers' recommendations (Hatcher, 1994; Maccallum et al., 1999).

hows the sample's detailed demographic characteristics. 59%of the respondents were men, while 41% were women. 87% aged between 20 and 40. Students made up more than half of those who responded. Almost 55% of respondents had a monthly income of up to INR 20,000.

4. Results

The analysis using AMOS 24's structural equation modeling (SEM) formed the basis for the study's conclusions. With more than one dependent variable, SEM performs multiple regression and provides overall fit statistics (Tabachnick et al., 2007). First-generation statistical analysis techniques, such as linear regression, are limited to testing one dependent variable sequentially compared to SEM. In addition, SEM considers the measurement flaws related to the variables (Hair et al., 1998). These factors led us to decide that using SEM would be appropriate to generate the survey results.

4.1. Confirmatory Factor Analysis

Confirmatory Factor Analysis was conducted on all six constructs. We obtained an acceptable range of model fit indices (CMIN/df = 2.076; TLI = 0.933; CFI = 0.944; SRMR = 0.0578; RMSEA = 0.064; Pclose =.005) (Hair et al., 2010). The Convergent Validity was confirmed using Average Variance Extracted (AVE) values. All constructs' AVE values (Table 3) were significantly higher than the threshold value of >0.5 (Fornell & Larcker, 1981; Hair et al., 2010). Composite Reliability (CR) was also higher than the threshold value of >0.7 across all study constructs. All study constructs (Table 4) achieved a heterotrait-monotrait ratio of correlations (HTMT) score of less than 0.85, demonstrating their discriminant validity (Henseler et al., 2015).

4.2. Common Method Bias

Cross-sectional studies are frequently linked to the problem of common method bias (Podsakoff et al., 2003). As per the suggestions by Chang et al. (2010), we randomized the question sequence with an aim to identify unengaged responses. Also, the responses' anonymity was ensured to the respondents in order

Table 1. Exploratory Factor Analysis Results

Items	Loadings	Cronbach Alpha
Price Value		0.773
P1	0.812	
P2	0.767	
P3	0.77	
Environmental Concern		0.867
EC1	0.756	
EC2	0.827	
EC3	0.806	
EC4	0.718	
Consumer Attitude		0.905
ATT1	0.812	
ATT2	0.83	
ATT3	0.845	
ATT4	0.616	
ATT5	0.737	
Purchase Intention		0.913
INT1	0.674	
INT2	0.727	
INT3	0.861	
INT4	0.826	
Perceived Behavioral Control		0.852
PBC1	0.786	
PBC2	0.738	
PBC3	0.647	
Subjective Norm		0.781
SN1	0.83	
SN2	0.643	
SN3	0.532	

Total Variance =75.572 percent; BTS (sig = 0.000; KMO= 0.923)

to encourage them to give honest answers to questionnaire statements.

Then, Harman's one-factor test was used. Less than the recommended limit of 50%, the single factor in Harman's one-factor test accounted for 43.868% of the data. We also employed the common latent factor method to check CMB. The standardized weights were calculated, first with a common latent factor and then without common latent factor. The difference between standardized weights with and without common latent factor for all the study constructs was observed to be below 0.200, suggesting that the common method bias is not a major concern for the current study.

4.3. Structural Model

A structural model was created using AMOS (24) Structural Equation Modeling, and the relationships were then assessed using the model. Table 6 illustrates that the model fit indices were within acceptable limits (Hair et al., 2010). The purchase intention squared multiple correlations was 0.702, which indicates that subjective norm, consumer attitude, and perceived behavioral control combined contribute 70 % to the

Table 2. The Demographic Characteristics of the Respondents

Measure	Item	Count	Percentage
Gender	Male	153	59
	Female	108	41
	Prefer Not to say	0	0
Age (in years)	20 or below	16	6
	21-40	227	87
	41-60	16	6
	60+	2	1
Occupation	Student	135	52
	Employed	83	32
	Business	12	5
	Any Other	31	11
Monthly Income (in INR)	Up to 20,000	144	55
	20,001-40,000	51	20
	40,001-60,000	30	12
	Above 60,000	36	13

Table 3. Validity and Reliability

Constructs	CR	AVE
Subjective Norm	0.8	0.58
Price Value	0.77	0.53
Perceived Behavioral Control	0.85	0.66
Environmental Concern	0.86	0.62
Purchase Intention	0.91	0.72
Consumer Attitude	0.90	0.66

Table 4. HTMT Analysis

Constructs	SN	PV	PBC	EC	INT	ATT
Subjective norm (SN)	-	-	-	-	-	-
Price Value (PV)	0.50	-	-	-	-	-
Perceived Behavioral Control (PBC)	0.75	0.51	-	-	-	-
Environmental Concern (EC)	0.46	0.33	0.65	-	-	-
Purchase Intention (INN)	0.81	0.53	0.74	0.49	-	-
Consumer Attitude (ATT)	0.55	0.48	0.60	0.66	0.57	-

variance in purchase intention.

H1 was supported by the fact that consumer attitude had a favorable and significant effect on intention (b= .14, t= 2.49, p <.05). H2 was supported by the fact that the influence of subjective norm on intention was favorable and significant (b= .56, t= 5.63, p <.05). intention was positively and significantly impacted by perceived behavioral control, supporting H3 (b= .25, t= 2.91, p <.05). Environmental concern had a positive and significant effect on consumer attitude (b= .56, t= 8.44, p <.05), supporting hypothesis H4. Price value had a positive and significant effect on consumer attitude (b= .32, t= 4.79, p <.05), supporting hypothesis H5. Results for the model fit indices, hypotheses, and final struc-

tural model are shown in Table 5,Table 6, and Figure 2, respectively.

4.4. Competing Model to Check Mediation

A competing model was specified to confirm the robustness of the indirect-only mediation hypothesis proposed in this study, incorporating direct paths from the constructs environmental concern and price value to the construct intention to adopt electric vehicles (Zhao et al., 2010). A chi-square difference test was conducted to compare the proposed model and the competing model. The chi-square statistic for the proposed model (indirect-only model) was χ2=414.578, df=178, p<.001, while the competing model yielded χ2=411.973, df=176, p<.001. These results indicate that the chi-square value of the hypothesized model is not significantly higher than that of the competing model, supporting the conclusion that the indirect-only mediation model (hypothesized model) is more parsimonious. Furthermore, the direct paths in the competing model were not significant for both environmental concern (b=−0.080, p=0.364) and price value (b=0.075, p=0.271). This finding suggests that the mediation effect in the hypothesized model operates exclusively through indirect paths.

5. Discussion

Consumer demand for electric vehicles is expected to rise due to the increasingly alarming air pollution problem. The current study offers a framework to understand better the elements influencing consumers' intentions to buy electric vehicles, and the immediate study offers a framework in this regard. The study attempted to extend the Theory of Planned Behavior model by integrating constructs such as environmental concern with price value. The study findings supported previous studies' findings that consumer attitude positively impacts the intention to buy an electric vehicle. Prior research has indicated a positive relationship between customer perceptions of electric cars and their intention to buy them (Asadi et al., 2021; Dong et al., 2020). This finding also supported the Theory of Planned Behavior model, suggesting that attitude is a powerful predictor of purchase intention. Moreover, the study findings also support the previous studies advocating the strong influence of consumer green attitudes on the purchase intentions of environment-friendly products (Huang & Ge, 2019; Tan et al., 2017; Yadav & Pathak, 2016).

Further, the study reiterates the key role of subjective norms in shaping customers' intention to purchase an electric vehicle (Dhar et al., 2015; Shalender & Yadav, 2018b). This elucidates that an individual's subjective norm significantly impacts purchase behaviors for high-engagement durables such as electric vehicles. In India, social influence continues to sway in numerous facets of existence, with society assuming a pivotal role in shaping personal preferences (Dhar et al., 2015; Shalender & Yadav, 2018b). Disseminating information to the public about the advantages of electric vehicles through social media platforms and campaigns can help in promoting and encouraging the adoption of electric vehicles. Furthermore, public awareness of electric vehicles through public broadcasts can significantly affect the adoption of electric vehicles. electric vehicle manufacturers should focus on society, the environment, and health in their promotions and marketing campaigns rather than on the theme of individuality, style, or luxury (Shalender & Sharma, 2021).

The importance of perceived behavioral control to adopt electric vehicles, as mentioned by (Castanier et al., 2013) and (Ajzen, 1991), is also established by the study. Consumers' belief in the ease of owning and maintaining electric vehicles will encourage them to purchase electric vehicles. One important observation from the study is that the subjective norms have a more profound impact (β= 0.56) on the intention to purchase electric vehicles than the other two Theory of Planned Behavior constructs, i.e., attitude (β= 0.14) and perceived behavioral control (β= 0.25). This is due to the societal nature of Indian consumers in such a way that they are concerned about society and comply with societal norms (Kirmani et al., 2022, 2023).

The findings also support the positive impact of environmental concerns on consumer attitudes toward electric vehicles. Past research has also established positive connections between environmental concerns and consumer attitudes toward electric vehicles (Bennett & Vijaygopal, 2018; Kim & Choi, 2005). The construct of environmental concern has been observed to be an

Table 5. Model Fit

Model Fit Indeces	Values
CMIN/df	2.10
GFI	0.875
TLI	0.932
CFI	0.941
SRMR	0.0632
RMSEA	0.065 (p>0.05)

Table 6. Hypothesis Testing

Path	Standard Estimates	t- value	p-value	Result
ATT-INT	0.14	2.49	<.05	Supported
SN-INT	0.56	5.63	<.05	Supported
PBC-INT	0.25	2.91	<.05	Supported
EC-ATT	0.56	8.44	<.05	Supported
PV-ATT	0.32	4.79	<.05	Supported

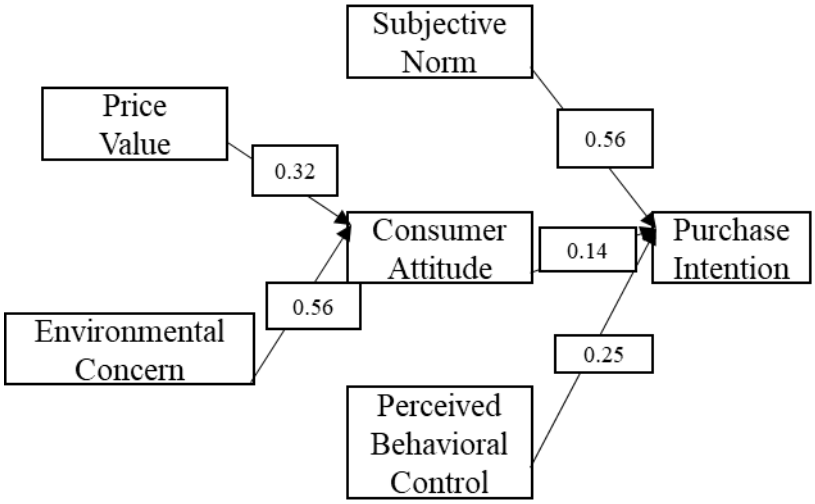

Figure 2. Final Structural Model

important predictor factor in the sustainable behavior demonstrated by individuals (Li et al., 2021). Manufacturers and sellers should adopt an environment-focused approach to promote electric vehicles as this can potentially arouse the customer's ecological concern while reinforcing their adoption intention (Shalender & Sharma, 2021).

The current study's findings echo Degirmenci & Breitner's (2017) findings that price value is critical in forming consumers' attitudes toward eco-friendly market offerings. When considering product utility and quality, consumers believe the price of electric vehicles is worth paying. They also realize that these vehicles can help them save money on fuel in the long run (Zhang et al., 2020).

Consumers' price value is significant because it may influence them to compare the perceived value of an electric vehicle to the cost associated with its purchase.

For instance, vehicle manufacturers ought to focus on enhanced performance, quality, fuel economy, and eco-friendliness to justify the high price of electric vehicles. Consequently, policymakers may consider tax incentives (for e.g., road tax exemption) or other supportive incentives (such as offering a research grant to an electric vehicle manufacturing company) to lower the electric vehicle retail price (Vafaei-Zadeh et al., 2022). Comparing the impacts of enviornmental concern and price value on the consumer attitude towards electric vehicles, it was revealed that enviornmental concern has a stronger impact on consumer attitude to purchase electric vehicles than the price value. This is an indication of the rising environmental concern among the consumers. The environmental benefits of electric vehicles seem to be more important for consumers than the cost benefits.

6. Conclusion and Practical Implications

This study makes the following theoretical contributions. Firstly, this study contributes to the body of prior research by examining the variables that particularly affect consumers' intentions to acquire electric vehicles. Second, by including price value and environmental concern in the context of the Indian automobile industry, this study has shed light on consumers' decision-making process while making purchases. As a result, the theoretical proposition and rigor of the Theory of Planned Behavior have been expanded. The consequences of these two factors in Ajzens' Theory of Planned Behavior in the automotive sector have yet to be observed. Third, in the context of a developing nation (like India), this paper details the empirical evidence of Theory of Planned Behavior for electric vehicle purchase intention.

To better understand the intricate interactions between economic factors and environmental motivations that influence consumer behavior toward electric vehicles, the Theory of Planned Behavior has been revised to emphasize sustainability and environmental factors in consumer choices. The revised Theory of Planned Behavior highlights the trade-off between price value and environmental concern, considering how consumer views of price value and environmental concerns are evolving. Using the updated Theory of Planned Behavior, more accurate predictions of electric vehicle adoption decisions may be made.

It is imperative for policymakers and marketers to prioritize the ways in which electric vehicles can enhance the daily lives of potential customers. The primary focus should be educating them on the relative advantages of electric vehicles, such as timesaving, cost-effectiveness, and viability as a sustainable alternative to internal combustion engine vehicles. It is recommended that emphasis be placed on these benefits rather than on the ease of use, societal reactions, or the development of habitual use of electric vehicles. Furthermore, electric vehicles should be priced reasonably when compared to internal combustion engine vehicles. To attract a larger customer base, the price of electric vehicles should be lower than that of internal combustion engine vehicles. For instance, the Tata Nexon, which is the most popular electric vehicle in the Indian market, is priced at almost twice the amount of its petrol equivalent, a fact that may prove unsatisfactory to prospective consumers. To curtail expenses associated with manufacturing and technological advancements, it is recommended that the Indian electric vehicle manufacturer engage in collaborative efforts with other global manufacturers. Furthermore, electric vehicle manufacturers should optimize their supply chain and demand investment incentives from the Government of India to improve value for money and lower electric vehicle prices (Singh et al., 2023).

The study's findings emphasize the significance of developing a specific strategy to increase electric vehicle knowledge among manufacturers and develop their environmental concerns to promote electric vehicle adoption in India. Environmental concerns significantly impacted consumer attitudes toward eco-friendly market offerings. Encouraging environmental issues is a national and regional issue that can be achieved through citizen campaigns highlighting the eco-friendliness of electric vehicles.

According to the present study, subjective norms exert the greatest influence on the desire to buy electric vehicles. This conclusion suggests that electric vehicles manufacturers must stimulate consumers' desire

to pursue social approval and to be recognized by others. In addition, marketers should appoint prominent community leaders, celebrities, and social leaders as ambassadors and spokespersons to promote the environmental benefits and product efficiency, strengthen consumer positive attitudes, and develop subjective standards for electric vehicles. Similarly, manufacturers should use environmental labeling and certification of electric vehicle environmental impacts to create ease of use and trust in the purchase of electric vehicles. This will also help to boost consumer confidence in purchasing electric vehicles.

People can also be encouraged to have positive attitudes toward electric vehicles in general by educating them about the latest advancements in electric vehicle technology, providing regular updates on state and district-level electric vehicle infrastructure developments, and dispelling myths surrounding electric vehicle use. Finally, perceived behavioral control has a major impact on consumers' intentions to buy electric vehicles, demonstrating that they have greater volitional control over their decisions. Therefore, electric vehicles should be widely available in most locations to help save time and effort and to provide more opportunities to purchase electric vehicles.

Furthermore, this study contributes to accomplishing "the 2030 sustainable development goals" (Papas, 2017), which include mitigating climate change, enhancing human health and well-being, providing access to affordable, clean energy, and improving life on land and in the ocean.

7. Limitations & Future Research Directions

The study analyzed the factors affecting the customer's intention to purchase electric vehicles rather than their actual purchase behavior. Though behavioral intention is the most important determinant of the actual behavior, it may not thoroughly highlight the real behavior (Asadi et al., 2021). Hence, purchase intention may not mean actual buying. Although past studies point out that purchase intention is an important predictor of actual purchasing behavior (Chan, 2001; Kaiser & Gutscher, 2003), without measuring actual purchasing behavior with respect to electric vehicles, it can only be assumed that the change in actual purchasing behavior can explained through purchasing intention. Researchers must examine the respondents' real adoption behavior using various survey and interview techniques to further refine this study's findings. Price value and environmental concern were the two new covariates measured in the study. Further investigation into the role of other covariates may be warranted. These could include self-image, green trust, environmental knowledge, personal moral standards, perceived consumer effectiveness, risk aversion, range anxiety, and infrastructure readiness. In the future, testing this model with real electric vehicle owners would be beneficial. Lastly, mediation analysis is not used in the study as attitude is used as a mediator.

The data was generated from the respondents who attended the auto shows. These respondents are expected to be more informed and updated about environmental issues and understand the short-term and long-term benefits of using e-vehicles for the environment, society, and individuals. Therefore, future studies should consider adopting other data collection methods, allowing the representation of respondents who may need to be updated about environmental issues and electric vehicles but account for a significant proportion of the overall population. Further, the students comprised the highest percentage of respondents (52 percent). Future studies can gauge the attitudes and intentions of other consumer groups to improve the generalizability of the study findings. Last, mediation analysis can be done to calculate direct and indirect effects, as in this model assumes indirect only mediation effects of price value and environmental concern on purchase intention through consumer attitude.

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Appendix. Questionnaire Items

Items	Statement
Price Value	
P1	electric vehicle is reasonably priced.
P2	electric vehicle is a good value for the money.
P3	At the current price, electric vehicle provides a good value.
Environmental Concern	
EC1	I want to adopt electric vehicles because of increased pollution.
EC2	electric vehicles contribute to saving the environment for future generations.
EC3	I am familiar with the environmental benefits offered by electric vehicles.
EC4	I want to conserve the environment by preferring electric vehicles over the conventional vehicle.
Consumer Attitude	
ATT1	Purchasing electric vehicles is good.
ATT2	Purchasing electric vehicles is beneficial.
ATT3	Purchasing electric vehicles is worthwile
ATT4	Purchasing electric vehicles is satisfactory.
ATT5	Purchasing electric vehicles is valuable.
Purchase Intention	
INT1	I am willing to buy electric vehicle in the near future.
INT2	I am willing to spend more money to buy electric vehicle.
INT3	I am willing to tolerate some battery charging inconvenience for the benefits of driving electric vehicle.
INT4	I would adjust my travel patterns in order to own electric vehicle.
Perceived Behavioral Control	
PBC1	With an excellent battery warranty, I would not worry about buying an electric vehicle.
PBC2	I am confident that it is easy to maintain and operate an electric vehicle (Reverse coded)
PBC3	If I buy an electric vehicle, it will accommodate my travel needs even with the limited battery range
Subjective Norm	
SN1	I feel some social pressure to purchase electric vehicle.
SN2	Some people who are important to me think I should purchase electric vehicle.
SN3	People who are close to me think that it is important to consider the environment when I purchase a vehicle