

Article

Impact of Variables in the UTAUT 2 Model on the Intention to Use a Fully Electric Car

Murat Selim Selvi ^{1,*}  and Şermin Önem ² 

¹ Department of Business Administration, Faculty of Economics and Administrative Sciences, Tekirdağ Namik Kemal University, Tekirdağ 59030, Türkiye

² Asyaport Liman Co., Inc., Tekirdağ 59020, Türkiye; serminonem@gmail.com

* Correspondence: msselvi@nku.edu.tr

Abstract: This study aims to determine the effects of the variables within the UTAUT 2 model on the intention to use a Fully Electric Car. In this context, data were collected through survey forms from 401 white-collar workers who are considered to have a higher economic status. Initially, validity and reliability analyses were conducted on the scales used in the Smart PLS program, and subsequently, the hypotheses were interpreted using the results obtained from structural equation modeling. In this study, it was found that effort expectancy, social influence, perceived ease of use, hedonic motivation, and habit had a positive and significant impact on the intention to use electric vehicles. Performance expectancy has a negative and significant effect on the intention to use electric cars, while price has no significant effect. It was determined that the intention to use electric vehicles was found to mediate the relationship between perceived ease of use and actual usage behavior. This research can offer significant contributions to literature, particularly by examining the influence of habit on behavioral intention and the effect of hedonic motivation on electric vehicle usage intention. By testing the UTAUT 2 model in the context of electric vehicle acceptance, this study supports the universality and applicability of the model to various technologies. Emphasizing the role of variables such as hedonic motivation and habit in electric vehicle acceptance adds a new dimension to the UTAUT 2 model. Thus, it makes an important contribution to technology acceptance research.



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1. Introduction

Fully Electric Cars (FECs), also known as Battery Electric Vehicles (BEVs), are considered environmentally friendly as they exclusively rely on electricity, significantly reducing environmental impact. The use of electric automobiles is rapidly increasing due to their ecofriendliness, including reduced carbon emissions and lower noise pollution [1]. FECs represent one of the most promising solutions to the energy crisis and environmental pollution. Despite increasing investments in addressing concerns such as the high cost of electric automobiles, quick-charging stations, range, and battery issues in parallel with developing technologies, these concerns persist for consumers [2,3]. Furthermore, studies are being conducted on various aspects such as Electric Vehicles (EVs) preferences [4], the adoption process of FECs [5], the motivations that play a role in the adoption of EVs [6], and the importance of various incentives, including price reductions, in EVs purchasing decisions [7].

Several studies in the literature have employed the Unified Theory of Acceptance and Use of Technology 2 (UTAUT 2) model to examine consumer acceptance of technological innovations developed in the automotive industry [8–10]. For example, the UTAUT 2 model has been used to understand drivers' adoption of in-vehicle navigation systems [11]. These studies have revealed that a product's image, value, perceived usefulness, and perceived risk directly influence consumers' purchasing decisions [12]. For EVs, these factors are crucial for marketing professionals to develop targeted adoption strategies [13].

As evident in the previous studies, the focus has been on factors influencing EV preferences and the impact of these factors on purchase intention [14]. However, there is a need for comprehensive research on fully electric automobiles from the perspective of consumers' behavioral intention and usage culture, utilizing different models and theories [15]. The primary research question of this study is the effect of the variables in the UTAUT 2 model on consumers' electric automobile usage intention. From this standpoint, the aim of this study is to determine if the variables in the UTAUT 2 model affect the intention to use electric automobiles [16].

The UTAUT 2 model comprises seven distinct independent variables—performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit—and features two dependent variables: behavioral intention and use behavior [8].

This study empirically validates the applicability of the UTAUT 2 model in the automotive sector, specifically for EVs, thereby supporting the model's validity and generalizability across diverse contexts. In addition to contributing to the overall validity of the UTAUT 2 model, this research introduces a unique perspective to the existing literature by examining specific factors within the context of EVs. This study enriches the scope of the UTAUT 2 model by demonstrating that the elements of individual enjoyment and satisfaction derived from electric car usage positively influence usage intention. Furthermore, this study contributes to the field by investigating the theoretical role of hedonic motivation within the electric car context. By testing the validity of the UTAUT 2 model in the context of electric vehicle adoption, this research supports the model's universality. The roles of hedonic motivation and habit in electric car adoption contribute to both the UTAUT 2 model and the technology acceptance literature. It is expected that the research results may be effective in automobile production, sales, and marketing decisions; provide important clues to players and consumers in the automotive industry; and provide researchers with new ideas for examining different aspects of the subject in future studies.

Building on these previous findings, this study aims to address the following research questions:

Question 1: According to the variables in the UTAUT 2 model, what kind of attitudes do consumers have toward electric cars?

Question 2: Are the variables in the UTAUT 2 model effective on consumers' intention to use FECs?

In this context, 400 white-collar employees, who are thought to have higher economic welfare, were included in the scope of the research. White-collar workers are thought to be more knowledgeable and conscious about electric cars. Therefore, they are an important target group for electric car manufacturers. Because the price of these cars is still high in Türkiye, it is very difficult for low-income groups to buy them. If they are offered the opportunity to use credit and make installments, middle-income groups may also be able to buy them.

2. Literature Review

FECs and their futures: Electric automobiles are a rapidly growing segment of the automotive industry and make significant contributions to environmental protection [17]. Environmental concerns regarding greenhouse gas emissions from traditional internal combustion engines are considered important factors that accelerate and support the growth in the use of electric automobiles [18,19]. Fully Electric Cars are characterized by the substitution of the conventional internal combustion engine and fuel tank with an electric motor and a battery [2]. Today, 11% of new cars sold worldwide consist of fully electric automobiles. Although there are various types of electric automobiles, this study focuses on FECs. A FEC is a battery-operated and rechargeable automobile that provides movement solely through an electric motor [20]. FECs obtain power exclusively from the energy stored in battery packs. Therefore, the range of FECs is directly dependent on battery capacity [21]. Research indicates that attitudes regarding the technical specifications of electric vehicles (EVs) have an impact on behavioral intention [22,23]. Moons and De Pelsmacker [22] assessed EV attitudes using semantic differentials, Likert scales, and emotional expressions, and analyzed data with the Extended DTPB model. The results highlight the significant influence of attitudes, subjective norms, and perceived behavioral control on EV usage intention, while external barriers such as battery safety diminish this intention. Emotional responses were found to be key drivers, while social norms from peers had no significant effect. In their study, Schmalfuß et al. [23] assessed consumer attitudes toward electric vehicles using various scales, including Likert-type scales for BEV attributes (acceleration, low noise, etc.), general attitudes towards EVs (satisfaction, usefulness), and subjective norms (social environment influence), along with Likert-type scales and willingness-to-pay ranges for purchase intention. The analysis employed an extended version of the Theory of Planned Behavior (TPB). The study found that participants with EV experience placed greater emphasis on certain attributes (e.g., low noise emission, environmental benefits) than those without, while some studies (as cited in the article) reported no significant change in attitudes or purchase intentions among experienced EV users.

There are also technical obstacles to the adoption of electric cars. Research identifies significant technical barriers to electric car adoption: Noel et al. [24] note that limited battery life impacts consumer trust, while Adhikari et al. [25] state that range leads to negative attitudes and charging times complicate usage. Dwipayana et al. [26] emphasize that batteries, minimal sound, geographic/climatic conditions, and cyber risks create safety concerns. Furthermore, Adhikari et al. [25] and Patt et al. [27] acknowledge that a lack of charging infrastructure affects purchase intent, while Gnann et al. [28] point out that a lack of fast-charging infrastructure negatively affects users. Krishna [29] notes that concerns regarding data loss and loss of control relating to autonomous driving persist, and Giansoldati et al. [30] state that range affects the purchase decision.

Disadvantages of electric cars: FECs also have some disadvantages as stated below [31]:

- Higher initial cost compared to petroleum-powered automobiles;
- Uncertainty for long-distance driving due to limited battery capacity;
- Inadequate access to electric charging areas after the vehicle's low battery;
- Lack of technological maturity may lead to a lack of reliability compared to traditional diesel tractors.

Political incentives: Electric automobile sales are further propelled by emerging policies, including U.S. Inflation Reduction Act (IRA) tax credits and European/Californian regulations phasing out fossil fuel vehicle sales by 2035. Anticipating this growth, au-

tomakers intend to invest USD 1.2 trillion in electric vehicle design and manufacturing by 2030 [32].

With the Electric Mobility Act, Germany has defined the authority of local administrations to provide free parking, use of bus lanes, and restricted traffic zones for low-emission (fully electric or hybrid) automobiles [33]. Furthermore, to promote the proliferation of charging facilities, it has supported investments to promote the construction of charging infrastructure by publishing the “Charging Stations Regulation” [34].

Environmental impact: It can be said that the potential of FECs to reduce emission levels is actually much greater than that of hybrid automobiles [35]. Gasoline automobiles are a significant source of carbon emissions. In addition to decarbonizing the transportation sector, ensuring that electricity generation is provided from renewable energy sources is an important component in reducing emissions. Therefore, electric automobiles are a necessary and positive development [21].

Global environmental policies embrace strategies that improve and encourage the production and use of electric automobiles. In Türkiye, there are numerous incentives and efforts related to the production and use of electric automobiles [36]. The number of electric automobiles in Türkiye continues to increase. Electric automobiles are becoming more popular and gaining more focus and awareness due to various factors such as decreasing prices and increasing environmental consciousness [4].

According to Table 1, hybrid automobile sales in 2024 show an increase of approximately 73.62% compared to the previous year, while electric automobile sales show an increase of 45.90%.

Table 1. The most preferred automobile engine type in Türkiye (Source: Webtekno [37]).

Motor Type	2023	2024	% Change
Gasoline	644.047	588.914	8.56
Diesel	132.707	95.985	−27.67
LPG	10.559	5.950	−43.65
Hybrid	107.809	187.177	73.62
Electric motor	72.179	105.315	45.90

In the automotive sector, the dominance of diesel vehicles is giving way to hybrid and electric vehicles due to environmental concerns and technological developments. Although the market share of gasoline vehicles is still high, the increase in electric car sales demonstrates the transformation occurring in the automotive industry. The fact that electric vehicle sales exceeded 100,000 units in 2024 can be considered as a reflection of this trend in Türkiye [37].

Model: To understand the determinants of technology adoption among technology end-users (TEOs), researchers have utilized various models, such as the Technology Acceptance Model (TAM), the Motivational Model (MM), and the Theory of Planned Behavior (TPB) [9,12]. In this context, the Theory of Planned Behavior is particularly relevant. TPB is designed for situations where individuals do not have complete volitional control over behavior [38]. According to the theory, intention is the most significant determinant of behavior. An individual’s likelihood of performing a specific behavior is directly proportional to the strength of their intention to do so, which is shaped by their attitude toward the behavior and prevailing subjective norms. Subjective norms relate to what the individual perceives significant others believe about that behavior [39]. If an individual has motivational factors (opportunity and resources), such as the necessary time, ability, and money, their intention to perform the behavior will be stronger, and they will perform the behavior [40].

Venkatesh et al. [8] proposed the UTAUT 2 model, which suggests that behavioral intention toward technology and its use are influenced by four core constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. Specifically, performance expectancy, effort expectancy, and social influence impact the behavioral intention to use technology, whereas behavioral intention and facilitating conditions determine actual technology usage. Moreover, individual difference variables such as age, gender, and experience are considered to have significant effects in managing various UTAUT 2 relationships [9]. In the study conducted by Venkatesh et al. [8], within the scope of consumer acceptance and technology use, performance expectancy, ease of use, effort expectancy, social influence, hedonic motivation, and expectation of economic benefit (price value) are critical factors influencing behavioral intention [41].

3. Hypothesis Development

To understand the factors influencing the adoption behaviors of FEC users towards new technologies, it is known that studies are conducted on various models [42]. Among these models are the Technology Acceptance Model (TAM), the Motivational Model (MM), and the Theory of Planned Behavior (TPB) [9]. At this point, the Theory of Planned Behavior particularly stands out. The Theory of Planned Behavior was developed for use in cases where individuals cannot exercise complete volitional control over a behavior [38]. According to the theory, intention is the most important determinant of behavior. That is, the stronger a person's intention to perform a behavior, the higher the probability of performing that behavior. Intention is influenced by positive or negative attitudes toward behavior and subjective norms. Subjective norms relate to what the individual perceives that others, whose opinions they value, think about that behavior [39]. If an individual has the necessary motivational factors (opportunities and resources) such as time, ability, and money, their intention to perform the behavior will be stronger and they will perform the behavior [40].

The UTAUT 2 model possesses four fundamental constructs that influence behavioral intention toward technology and/or technology usage: performance expectancy, effort expectancy, social influence, and facilitating conditions [8]. In the UTAUT 2 framework, behavioral intention toward technology adoption is shaped by performance expectancy, effort expectancy, and social influence, while actual technology use is determined by behavioral intention and facilitating conditions. In addition, it is considered that individual difference variables such as age, gender, and experience have significant effects in managing various UTAUT 2 relationships [9]. According to this model, within the scope of consumer acceptance and technology usage, performance expectancy, ease of use, effort expectancy, social influence, hedonic motivation, and expectation of economic benefit (price value) are critical factors influencing behavioral intention [41]. Within this scope, the factors influencing behavioral intention within the context of consumer acceptance and technology usage are briefly explained in the research:

Performance Expectancy: Performance expectancy refers to the extent to which consumers believe that utilizing a technology will enhance their effectiveness in performing particular tasks. It is the degree to which an individual meets the expectation perceived after using the improved technology in terms of performance. Researchers have revealed that performance expectancy is the most reliable indicator of an individual's behavioral intention [3,43]. Based on this, the H1 hypothesis was created:

H1. *“Performance expectancy” affects the intention to use fully electric automobiles.*

Effort Expectancy: Effort expectancy expresses the degree of ease between an individual's use of a fully electric automobile [44]. In other words, effort expectancy is the degree

of ease associated with technology use for consumers. It is the extent to which a person perceives that learning a system is comfortable and effortless [45,46]. Both performance expectancy and effort expectancy are powerful predictors of technology acceptance [47]. Based on this, the H2 hypothesis was created.

H2. *“Effort expectancy” affects the intention to use electric automobiles.*

Social Influence: Social influence is the degree of perception related to the beliefs of others that an individual should use the system in question [48]. Social influence is the change in people’s opinions, attitudes, emotions, and behaviors, directly or indirectly, as a result of their interactions with others [49]. Social influence is the influence of people or groups (e.g., family and friends) that a person values in their environment. Compliance behaviors emerge in individuals as a result of social influence [8–10]. Behavioral intention is significantly influenced by social influence and ease of use factors [50]. Based on this, the H3 hypothesis was created.

H3. *“Social influence” affects the intention to use electric automobiles.*

Facilitating Conditions (Ease of Use): Facilitating conditions are consumers’ perceptions of the resources and support available to perform a behavior [8]. Facilitating conditions are the level of ease or difficulty in carrying out a behavior. It is stated that consumers see electric vehicles as useful, easy, and safe [51]. It is stated that consumers’ purchasing tendencies increase if they believe that using electric automobiles is easier and more reliable [52]. It is stated that ease of use is significantly and positively related to learning behavior [53]. Based on this, the H4 and H5 hypotheses were created.

H4. *“Perceived ease of use” affects the intention to use electric automobiles.*

H5. *“Perceived ease of use” affects electric automobile usage behavior.*

Hedonic Motivation: Hedonic motivation is known as the pleasure or happiness that individuals can derive from using a system [54]. Hedonic motivation is the enjoyment, excitement, and pleasure that people perceive after using advanced technologies. Hedonic motivation is an important driving force behind technology adoption because it helps trigger a positive attitude among users [55]. Pleasure-oriented motivations have a significant impact on consumers’ adoption and use of fully electric automobiles [56]. In a study, it was shown that consumers exhibit positive attitudes towards electric vehicles that provide enjoyment and excitement-inducing prestige and reputation, and these factors positively affect use intention [57]. Using electric vehicles adds an extra image to consumers [51]. Hedonic motivation is the most important predictor of behavioral intention [58]. Based on this, the H6 hypothesis was created.

H6. *“Hedonic motivation” affects the intention to use electric automobiles.*

Habits: Habit is accepted as a feature that reflects the perceptual structure of results obtained from past experiences. It also expresses behaviors that arise spontaneously after learning [8,59]. Habit is people’s tendency to do something without thinking about that behavior after they have learned it [60]. Habit requires learning and will adopt an automatic response in a limited range to specific situations or stimuli [61]. There are studies proving that habits have positive and significant effects on user intentions and user behaviors. For example, habit directly and indirectly affects usage intention and has an even more

significant impact on the behavioral intention to use software [58]. Based on this, the H7 and H8 hypotheses were created.

H7. *“Habits” affect the intention to use electric automobiles.*

H8. *“Habits” affect electric automobile usage behavior.*

Behavioral Intention: Behavioral intention can be understood to the extent to which a strong intention to use influences the actual utilization of a system. Intention also expresses a person’s desire to use a technological system in the future. System utilization is contingent upon an individual’s intrinsic motivation to employ said system. Furthermore, user intention exhibits a direct and significant correlation with actual information system usage behavior [9]. Usage intention has a significant positive impact on usage behavior [62]. Behavioral intention is a significant factor in electric vehicle adoption. For instance, Ajao et al. [63] demonstrate that facilitating conditions (such as charging infrastructure) have a stronger effect on behavioral intentions, suggesting that factors like facilitating conditions can influence behavioral intention and, consequently, usage behavior. Furthermore, Samarasinghe et al. [64] note that drivers’ confidence in the performance of electric vehicles is associated with higher use intentions and recommendations of electric vehicles to others. This implies that intention predicts subsequent actions. Across both studies, behavioral intention emerges as a key element in electric vehicle adoption, influencing subsequent behaviors. These studies corroborate that behavioral intention can lead to an act of usage. Based on this, the H9 hypothesis was created.

H9. *The intention to use electric automobiles affects usage behavior.*

The proposed hypotheses also necessitate the creation of some mediating hypotheses in accordance with the UTAUT 2 model.

Perceived ease of use mediates usage behavior by relating to the perception of how effortless technology is to use. This perception fosters a positive attitude and a sense of competence, increasing usage intention. Heightened intention, in turn, triggers actual use by motivating individuals to use technology they find easy and enjoyable. Therefore, while perceived ease of use may not have a direct effect on usage behavior, it indirectly influences it by prompting positive attitudes and intentions. In this context, the H10 hypothesis was created.

H10. *Electric automobile usage intention has a mediating role in the effect of perceived ease of use on electric automobile usage behavior.*

Understanding how habits (past experiences) shape future behavior through intentions is crucial. Established habits can both directly influence usage behavior and indirectly create an effect by triggering usage intention. Therefore, intention, as a mediating variable, enables a better understanding of the complex effects of habit. In this context, the H11 hypothesis was created.

H11. *Electric automobile usage intention has a mediating role in the effect of habits on electric automobile usage behavior.*

The research model created considering the above hypotheses created in accordance with the literature is presented in Figure 1.

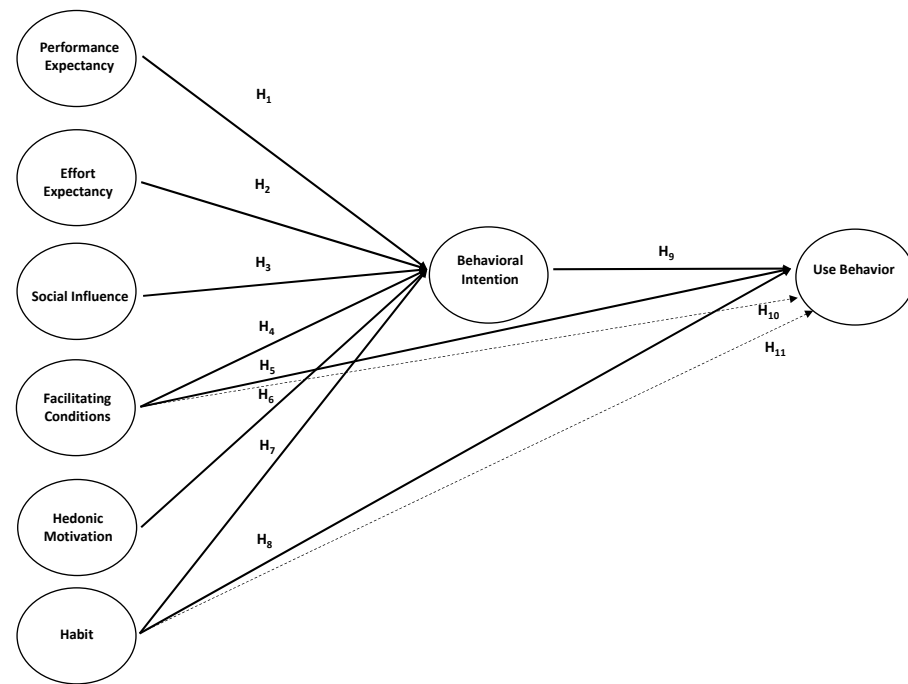


Figure 1. Research model (developed by the authors).

4. Materials and Methods

This study targeted a sample of 401 white-collar workers residing in the Thrace region of Türkiye (specifically in the cities of Tekirdağ, Kırklareli, Edirne, and Çanakkale), who possess knowledge of electric vehicles but do not currently use them and are presumed to have a higher socioeconomic status. It is posited that these white-collar workers, due to their affinity for technological innovations, will enable a better understanding of the factors influencing electric vehicle usage intention through the UTAUT 2 model. However, the restriction of the data to the Thrace region and the absence of electric vehicle experience limits the generalizability of the results to other regions and socioeconomic groups. The pioneering role of white-collar workers in technology adoption supports the model's testing and contributes to marketing strategies regarding the importance of electric car attributes.

Some authors state that the sample size to be taken for a main population of 100,000 and above should be 384 people [65], and that even this figure should be 400 people [66].

To collect data, the necessary permission/approval was obtained from the Scientific Research and Publication Ethics Committee of Tekirdağ Namik Kemal University with the official letter dated 1 March 2024, and numbered 420311. Subsequently, data were collected online via Google Forms between 5 March 2024 and 5 September 2024. The survey form consists of two sections. The first section includes 7 multiple-choice questions to determine demographic characteristics; the second section includes 27 Likert-type statements regarding the intention to use electric automobiles. Likert-type statements were obtained as a result of a literature review regarding the variables in the UTAUT 2 model [8–10,21]. These Likert-scale items are designed to measure consumers' "intention to use" electric automobiles. This intention is a core component of UTAUT 2, critical for understanding electric vehicle adoption. The scale enhances the validity of the measurement instrument by using items adapted from literature with proven validity [67]. For example, the statement "Using EVs saves time" is associated with performance expectancy, "Driving EVs requires little effort" is associated with effort expectancy, and "I would praise EVs to my inner circle" is associated with social influence. The statement "EVs fit my lifestyle" evaluates value fit, while the statement "No additional information is required when using EVs" demonstrates

ease of use for non-technology-inclined consumers. Negative items reduce response bias and capture different perspectives.

In this study, UTAUT 2 scale and structural equation modeling were used. Due to the repeated use of the scale before and the finalization of the scale structure, explanatory factor analysis is not needed [68]. In this context, validity and reliability analyses were first performed with confirmatory factor analysis to re-check the accuracy of the scale with the Smart-PLS program, and then the hypotheses were interpreted with the results obtained from structural equation modeling. Structural equation modeling (SEM) is used to test the relationship between more than one latent variable and to minimize the estimation error as much as possible. When the literature was reviewed, it was seen that structural equation modeling (PLS-SEM) with the partial least squares method was more suitable than multiple regression analysis and covariance-based structural equation modeling (CB-SEM) for this study [69]. Given the exploratory nature of this study, the characteristics of the dataset, and the complexity of the research model, partial least squares structural equation modeling (PLS-SEM) was chosen as the analysis method. PLS-SEM is more effective than covariance-based SEM (CB-SEM) for estimating the strength of relationships between variables and discovering new associations, particularly when working with smaller, non-normally distributed datasets. Therefore, it provides a suitable approach for exploring the complex relationships inherent in electric vehicle adoption and achieving robust results.

Considering the UTAUT 2 scale specifically, partial least squares structural equation modeling (PLS-SEM) is frequently used. This stems from the ease of use in question and some advantages of PLS-SEM [70]. From this point of view, it should also be stated that the sample application regarding the use model and explanations of UTAUT-2 with Smart-PLS 4.0 is located directly on the program's opening page, in accordance with intense demand. PLS-SEM is based on a combined model structure compared to CB-SEM. It is seen that PLS-SEM, including working with smaller and non-normal data, reveals more satisfactory results and offers modeling flexibility [71].

PLS-SEM is an important approach that is especially preferred for modeling predictions. PLS-SEM is essentially the use of a series of statistical methods to model the relationships between independent and dependent variables and latent and observed variables [72]. From this point of view, it is seen that five different logical steps are followed. It is the measurement and examination of the significant relationship between observed and latent variables regarding determination, identification, parameter estimation, model estimation, and model modification [73]. Smart-PLS was used in this study due to its prevalence and ease of use, even though many programs are used for measurement and examination.

5. Results

The demographic characteristics of the participants in this study are presented below. According to Table 2, most of the participants were from Tekirdağ (55.6%); the majority were male (65.30%), between the ages of 31–50, and held either a bachelor's or a graduate degree. More than half of the participants had an average monthly income exceeding TRY 80,000.

This section, potentially organized with subheadings, should offer a succinct and rigorous presentation of the experimental results, their interpretation, and the evidence-based conclusions derived from the investigation. Various methods are used to measure the validity and reliability of the scales used. From this point of view, it is seen that the most popular ones are Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). It is expected according to the literature that obtaining a value above 0.60 for Cronbach's Alpha, above 0.70 for CR, and above 0.50 for AVE is sufficient for the

validity and reliability of the scale [74]. In this context, information on the analysis made is presented in Table 3.

Table 2. Demographic features ($n = 401$).

Variables	Groups	<i>n</i>	%	Variables	Groups	<i>n</i>	%
Cities	Tekirdağ	223	55.6	Education	High school and below	49	12.2
	Edirne	41	10.2		Associate degree	84	20.9
	Çanakkale	61	15.2		Bachelor's degree	181	45.1
	Kirklareli	76	19.0		Master's degree	63	15.7
Gender	Female	139	34.70		Doctorate degree	24	6.0
	Male	262	65.30	Average Monthly income	Between TRY 51,000–60,000	2	0.5
Age	Between the ages of 0–20	2	0.5		Between TRY 61,000–70,000	19	4.7
	Between the ages of 21–30	76	19.0		Between TRY 71,000–80,000	143	35.7
	Between the ages of 31–40	116	28.9		Between TRY 81,000–90,000	87	21.7
	Between the ages of 41–50	171	42.6		Between TRY 91,000–100,000	66	16.5
	Aged 51 and over	36	9.0		TRY 101,000 and above	84	20.9

Table 3. Factor loadings, validity, and reliability values.

Items	Fac. Load.	Mean	S.D.	Kurtosis	Skewness
Performance Expectancy Scale Cronbach's $\alpha = 0.889$, CR = 0.923, AVE = 0.750					
Performance1—I think that driving an electric car will allow me to save time.	0.903	2.958	1.411	−1.248	−0.048
Performance2—I believe that electric cars will cause fewer problems compared to gasoline-powered vehicles.	0.894	2.848	1.449	−1.348	0.070
Performance3—I expect that owning an electric car would make my commute to work more comfortable.	0.822	2.564	1.425	−1.225	0.359
Performance4—I anticipate that driving an electric vehicle will enhance my driving experience.	0.842	2.656	1.415	−1.215	0.301
Effort Expectancy Scale Cronbach's $\alpha = 0.859$, CR = 0.904, AVE = 0.702					
Effort1—I find electric cars to be practical.	0.799	2.808	1.406	−1.212	0.150
Effort2—I believe that driving an electric car requires minimal effort.	0.881	3.152	1.283	−0.997	−0.137
Effort3—I do not anticipate needing additional information (regarding operation, driving instruction, vehicle introduction, etc.) when driving an electric car.	0.815	3.032	1.337	−1.135	−0.053
Effort4—I do not foresee any difficulties in using an electric car should I use one in the future.	0.855	3.212	1.280	−0.966	−0.216
Social Influence Scale Cronbach's $\alpha = 0.893$, CR = 0.934, AVE = 0.825					
Social1—I would be pleased if those whose opinions I value were to drive electric vehicles.	0.894	3.299	1.229	−0.763	−0.287
Social2—I am interested in hearing about the experiences of those in my social circle with electric cars.	0.936	3.214	1.267	−0.908	−0.180
Social3—I am more likely to use an electric car if it is recommended by people whose opinions I trust.	0.894	3.289	1.256	−0.832	−0.301

Table 3. Cont.

Items	Fac. Load.	Mean	S.D.	Kurtosis	Skewness
Facilitating Conditions Scale Cronbach's $\alpha = 0.733$, CR = 0.834, AVE = 0.559					
Facilitating1—I find it quite easy to operate an electric vehicle.	0.696	3.594	1.312	−0.686	−0.640
Facilitating2—I anticipate that using an electric car would be effortless for me should I decide to use one.	0.646	3.436	1.383	−0.951	−0.527
Facilitating3—I expect that the use of electric vehicles will increase soon.	0.792	3.633	1.260	−0.747	−0.558
Facilitating4—I am considering using an electric vehicle in the future, influenced by the electric cars recently acquired by those in my immediate circle.	0.842	3.793	1.143	−0.143	−0.745
Hedonic Motivation Scale Cronbach's $\alpha = 0.874$, CR = 0.922, AVE = 0.799					
Hedonic1—I believe that driving an electric car would bring me joy	0.882	2.771	1.395	−1.213	0.172
Hedonic2—I believe that owning an electric car would add excitement to my life.	0.901	3.075	1.342	−1.097	−0.106
Hedonic3—Enthusiastic posts by celebrities/influencers about electric cars make me excited about the product.	0.898	3.287	1.304	−0.952	−0.252
Habit Scale Cronbach's $\alpha = 0.841$, CR = 0.901, AVE = 0.753					
Habit1—I anticipate that using an electric car would become a habit for me.	0.852	3.668	1.286	−0.907	−0.514
Habit2—I would always opt for an electric vehicle when driving in traffic.	0.899	3.798	1.234	−0.393	−0.761
Habit3—I consider electric cars to be a natural and familiar mode of transportation.	0.851	3.786	1.235	−0.596	−0.671
Habit4—I am obliged to use an electric car for transportation * (Delete)	0.498	2.986	1.123	−0.802	−0.265
Behavioral Intention Scale Cronbach's $\alpha = 0.861$, CR = 0.915, AVE = 0.783					
Behavioral1—I am planning to use an electric vehicle soon.	0.900	3.810	1.241	−0.363	−0.815
Behavioral2—I anticipate that the price of electric vehicles will be lower than that of internal combustion engine vehicles in the future.	0.896	3.800	1.255	−0.452	−0.772
Behavioral3—I expect that the maintenance and spare part costs for electric vehicles will be lower.	0.858	3.776	1.134	−0.242	−0.683
Use Behavior Scale Cronbach's $\alpha = 0.654$, CR = 0.810, AVE = 0.589					
UseBeh1—I perceive electric car owners as having a higher social standing.	0.665	2.883	1.401	−1.260	0.062
UseBeh2—I share the advantages of electric vehicles with those in my immediate environment.	0.838	3.229	1.367	−1.108	−0.232
UseBeh3—I consider electric cars to be mechanically less complex.	0.789	2.860	1.377	−1.185	0.069

From the statements in Table 2, one question in the Habit scale was removed from the scale because the factor loading value was below 0.50. According to the other values given in the table, it is seen that the scales provide sufficient reliability and validity. However, this table does not provide information on the independence and distinctiveness of the scales [75]. The Fornell–Larcker and Heterotrait/Monotrait Ratio (HTMT) analyses need to be performed to show that the scales are different from each other or can be distinguished. The findings regarding the Fornell–Larcker analysis are presented in Table 4.

Table 4. Fornell–Larcker analysis.

	Fornell–Larcker Criterion (AVE-SV)							
	1	2	3	4	5	6	7	8
Behavioral Intention	0.885							
Effort Expectancy	0.585	0.838						
Facilitating Conditions	0.565	0.511	0.748					
Habit	0.188	−0.105	0.213	0.868				
Hedonic Motivation	0.643	0.715	0.523	−0.085	0.894			
Performance Expectancy	0.491	0.689	0.428	−0.168	0.728	0.866		
Social Influence	0.689	0.691	0.536	−0.035	0.777	0.732	0.908	
Use Behavior	0.484	0.533	0.437	−0.029	0.543	0.579	0.560	0.767

The Fornell–Larcker criterion posits that the AVE values of the scales should be higher than their correlation values. In this way, it is accepted that discriminant validity between scales is ensured [68]. When Table 4 is examined, it is seen that the scales provide discriminant validity. However, it would also be useful to apply HTMT, another analysis regarding discriminant validity [76]. The findings regarding the HTMT analysis are presented in Table 5.

Table 5. Heterotrait/Monotrait Ratio analysis.

	Heterotrait/Monotrait Ratio of Correlations							
	1	2	3	4	5	6	7	8
Behavioral Intention								
Effort Expectancy	0.672							
Facilitating Conditions	0.705	0.640						
Habit	0.203	0.134	0.255					
Hedonic Motivation	0.737	0.821	0.653	0.107				
Performance Expectancy	0.548	0.786	0.524	0.202	0.820			
Social Influence	0.784	0.784	0.658	0.066	0.879	0.819		
Use Behavior	0.614	0.704	0.637	0.085	0.708	0.753	0.717	

HTMT analysis suggests that scales with correlations below 0.90 mutually ensure discriminant validity [77]. The results obtained from both analyses show that discriminant validity is ensured. For this reason, the model testing phase has been passed, and the fit values for the model are presented in Table 6.

Table 6. Goodness of fit values.

	Model Fit	
	Saturated Model	Estimated Model
SRMR	0.057	0.071
d_ULS	1.207	1.931
d_G	0.545	0.583
Chi-Square	1.299.067	1.358.012
NFI	0.818	0.809

When Table 6 is examined, it can be said that the desired goodness-of-fit values are achieved because the Standardized Root Mean Squared Residual (SRMR) value is below 0.08 and the Normal Fit Index (NFI) value is above 0.80 [78]. The visual representation of the model is presented in Figure 2.

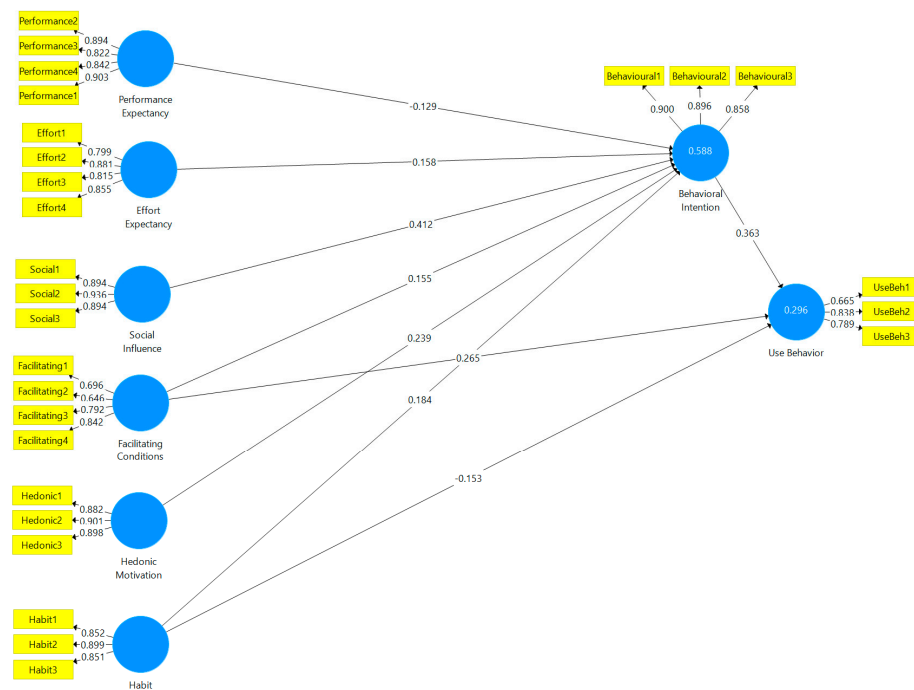


Figure 2. Path diagram (developed by the authors).

Having established validity and reliability, it became feasible to perform the analysis using the bootstrapping method for structural equation modeling (SEM). To mitigate potential participant biases, calculations were performed using a bootstrapping approach, generating 5000 random subsamples from the original sample at a significance level of 0.05. This computation aimed to determine *t*-statistics, *p*-values, and standard errors of path coefficients for the statistical assessment of the hypotheses [79]. Detailed values pertaining to the model in Figure 2 and the hypothesis testing results are presented in Table 7.

Table 7. Hypothesis analysis.

Paths	Estimate	SD	<i>t</i> -Values	<i>p</i>	Hypothesis
Performance Expectancy → Behavioral Intention	−0.129	0.057	2.254	0.024	H1 Accept
Effort Expectancy → Behavioral Intention	0.158	0.053	2.989	0.003	H2 Accept
Social Influence → Behavioral Intention	0.412	0.065	6.364	0.000	H3 Accept
Facilitating Conditions → Behavioral Intention	0.155	0.049	3.177	0.001	H4 Accept
Facilitating Conditions → Use Behavior	0.265	0.057	4.669	0.000	H5 Accept
Hedonic Motivation → Behavioral Intention	0.239	0.060	4.004	0.000	H6 Accept
Habit → Behavioral Intention	0.184	0.037	5.029	0.000	H7 Accept
Habit → Use Behavior	−0.153	0.046	3.350	0.001	H8 Accept
Behavioral Intention → Use Behavior	0.363	0.056	6.441	0.000	H9 Accept
Facilitating Conditions → Behavioral Intention → Use Behavior	0.056	0.018	3.062	0.002	H10 Accept
Habit → Behavioral Intention → Use Behavior	0.067	0.017	3.951	0.000	H11 Accept

An examination of Table 7 reveals that all hypotheses, which were formulated in accordance with the literature, were supported. Performance expectancy was found to have a negative and significant effect on electric vehicle usage intention ($\beta = -0.129$; $p < 0.05$), thus supporting H1. Effort expectancy was found to have a positive and significant effect on electric vehicle usage intention ($\beta = 0.158$; $p < 0.05$), thus supporting H2. Social influence was found to have a positive and significant effect on electric vehicle usage intention ($\beta = 0.412$; $p < 0.05$), thus supporting H3. Perceived ease of use was found to have a

positive and significant effect on electric vehicle usage intention ($\beta = 0.155$; $p < 0.05$), thus supporting H4.

Perceived ease of use was found to have a positive and significant effect on electric vehicle usage behavior ($\beta = 0.265$; $p < 0.05$), thus supporting H5. Hedonic motivation was found to have a positive and significant effect on electric vehicle usage intention ($\beta = 0.239$; $p < 0.05$), thus supporting H6. Habits were found to have a positive and significant effect on electric vehicle usage intention ($\beta = 0.184$; $p < 0.05$), thus supporting H7. Perceived ease of use was found to have a positive and significant effect on electric vehicle usage behavior ($\beta = -0.153$; $p < 0.05$), thus supporting H8. Electric vehicle usage intention was found to have a positive and significant effect on electric vehicle usage behavior ($\beta = 0.363$; $p < 0.05$), thus supporting H9. Electric vehicle usage intention was found to mediate the effect of perceived ease of use on electric vehicle usage behavior ($\beta = 0.056$; $p < 0.05$), thus supporting H10. Electric vehicle usage intention was found to mediate the effect of habits on electric vehicle usage behavior ($\beta = 0.056$; $p < 0.05$), thus supporting H11.

To assess the quality of the results obtained, R^2 and Q^2 analyses are required. The R^2 and Q^2 analyses are presented in Table 8.

Table 8. R^2 ve Q^2 analysis.

Latent Variable	R^2	R^2 Adj.	Q^2
Behavioral Intention	0.588	0.582	0.452
Use Behavior	0.296	0.290	0.167

The initial value presented in Table 8 is designated as the coefficient of determination (R^2). R^2 represents the amount of variance in the model that can be explained by the factors. In this regard, an R^2 value equal to or greater than 0.25 indicates acceptable explanatory power [80]. For Q^2 analysis, values greater than zero ($Q^2 > 0$) suggest adequate predictive relevance [68]. As shown in the table, the R^2 and Q^2 values meet the desired levels, indicating the suitability of the analysis conducted.

6. Discussion and Conclusions

In recent years, there has been a surge of interest in electric vehicles (EVs) worldwide. The fact that they offer energy savings, are environmentally friendly, and provide numerous advantages to consumers has led to their acceptance as a strong alternative. Consequently, countries are implementing various incentive-based regulations for these types of vehicles. Unlike prior studies, this research explains consumers' intention to use EVs through the variables considered within the UTAUT 2 model. In other words, the subject of this research is the effect of the variables of performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, economic benefit, and habit, as included in the UTAUT 2 model, on consumers' intention to use EVs. Although this study primarily focuses on the intention to use electric vehicles, it is pertinent to address its relationship with the intention to purchase electric vehicles.

Our choice of the UTAUT 2 model stems from its comprehensive framework, encompassing various factors influencing technology adoption, such as performance expectancy, effort expectancy, social influence, and hedonic motivation. While models like TAM and TPB focus on a subset of these factors, UTAUT 2 is particularly well suited for understanding consumer products like electric vehicles. Furthermore, UTAUT 2 accounts for emotional and behavioral dimensions in electric vehicle adoption by including factors such as hedonic motivation and habit. This study advances existing research by highlighting the role of hedonic motivation, often overlooked in previous literature, in electric vehicle usage intention, while also presenting novel findings within the Turkish context. These

results offer valuable insights for players in the electric vehicle sector in developing targeted strategies for their audience.

Purchase intention is the probability that consumers will be willing to execute a purchasing transaction [49]. If an individual possesses the necessary motivational factors (opportunities and resources) such as time, ability, and money, their intention to perform the behavior will be stronger, and they will execute the behavior [40]. According to Spears and Singh [81], purchase intention is ‘an individual’s conscious plan to exert effort to purchase a brand’. According to Dadwal et al. [82], purchase intention encompasses a blend of emotional, behavioral, and cognitive factors related to innovation adoption, acquisition, and product usage.

Usage intention, rooted in definition of behavioral intention, reflects the strength of an individual’s commitment to performing a specific behavior. Behavioral intention quantifies the likelihood that an individual will engage in a specific action [83]. It encompasses the motivational elements influencing that behavior, serving as indicators of the degree to which individuals plan to try and the amount of effort they intend to expend in performing the action [40]. Users initially form an intent to utilize technology before subsequently adopting it. Consequently, behavioral intention to use becomes the proximate predictor of actual usage [84].

The intention to purchase an electric car reflects an individual’s conscious and rational decision regarding the future acquisition of an electric car. This intention is the culmination of an evaluation process, factoring in the individual’s financial circumstances, the cost of electric cars, available incentives, future needs, sustainability objectives, and other personal considerations. The intention to purchase signifies a commitment to a tangible action: the purchase of an electric car. The intention to use an electric car indicates an individual’s willingness to operate an electric car, whether they currently own one or anticipate doing so in the future through means such as leasing, car-sharing programs, or borrowing. This intention considers the performance characteristics of electric cars, the driving experience, charging convenience, environmental benefits, and other usage factors. The intention to use is a broader concept than the intention to purchase; an individual may intend to use an electric car at some point, even if they do not foresee purchasing one.

Lashari et al. [85] found that environmental benefits are the strongest determinant of positive attitudes toward EVs, while perceived technological concerns negatively impact EV purchase intentions, with safety concerns reducing the likelihood of purchase. Contrary to expectations, this study demonstrates that performance expectancy negatively impacted usage intention. This may be due to consumers holding misinformation about electric car performance, inadequate charging infrastructure/high costs influencing the perception of performance, or concerns about battery safety/technology adequacy. For instance, the significance of status and image in Turkish culture may lead consumers to prioritize appearance over performance. Furthermore, high prices and charging infrastructure inadequacies may hinder consumers’ ability to adequately evaluate the performance of electric vehicles. Consequently, the relationship between performance expectancy and usage intention may differ in Türkiye. Future research is needed to examine this relationship in greater detail and understand the role of cultural, economic, and infrastructure-related factors. The positive effect of social influence aligns with Turkish discourses, particularly through TOGG, and media support. While other hypotheses were supported, their low levels indicate reservations linked to insufficient charging stations and comparable charging costs to fossil fuels. Despite growing electric car awareness, technological limitations hinder high-level results, implying that future technological advancements should further increase customer demand.

Ajao et al. [63] emphasized facilitating conditions' influence on behavioral intentions, citing charging infrastructure as vital for electric car adoption. Ahmad et al. [67] noted environmental concerns, price value, and hedonic motivation significantly impacted usage behavior, while facilitating conditions did not. Habit positively influenced usage behavior, but effort expectancy and social influence were insignificant. Existing studies support the positive influences of perceived usefulness and ease of use on purchase intention [12,86].

Numerous studies affirm the effectiveness of UTAUT 2 variables on consumer attitudes toward new technologies [87,88], with components playing a key role in technology acceptance [39,89]. This study examines how performance expectancy, effort expectancy, and social influence impact electric car usage intention. Supporting these findings, other research emphasizes the significance of performance, ease of use, and social norms in EV adoption [2,90]. Research indicates that effort expectancy, social influence, and hedonic motivation positively influence attitudes towards and intention to use new technologies, while facilitating conditions negatively impact attitudes. Attitudes significantly and positively influenced EV usage intention [91]. Perceived benefit also positively affected EV acceptance among Turkish participants [92], and perceived usefulness and ease of use were key influencers in Turkish consumers' EV choices [93], suggesting education about EV features could increase adoption. Providing detailed information, such as charging times and station scarcity, also influences EV preferences [4]. Income, mileage, EV knowledge, prestige, and the local brand TOGG positively affect purchase desire [94].

Attitudes toward EVs support connections between value-based structures and pro-environmental norms [95]. Environmentally, EV adoption is predicted to reduce traffic and pollution [96]. Research indicates EVs lead to more eco-friendly journeys with less fatigue, though safety and charging concerns persist [97]. While one study found price insignificant [98], another indicated a low-level significant effect, with environmental concerns positively impacting EV purchase intention [94]. The environmental benefits variable strongly determines positive EV attitudes [85]. Innovativeness and functional performance attitudes significantly impact preferences for hybrid and battery EVs [99]. Perceived uncertainty negatively affects EV purchase intentions [100], with technological concerns and safety fears reducing likelihood of purchase [85]. Consumer anxieties about EVs are expected to decrease with future measures and increased access via incentives [5].

Studies indicate various factors influence EV adoption: Li et al. [101] highlight price, operating cost, charging time, range, stations, and battery guarantee; Shanmugavel and Micheal [102] emphasize marketing stimuli and incentives; Jenn et al. [7] note the effectiveness of incentives in California (2010–2017); Lashari et al. [85] stress the importance of consumer perceptions regarding compatible government incentives and low operating costs; and Acar and Taşkın [5] suggest future measures and incentives will ease consumer concerns and access. Türkiye's TOGG project aims to boost EV adoption, increasing awareness and interest. Fully electric vehicles are exempt from Motor Vehicle Tax, and benefit from ÖTV reductions based on motor power, enhancing affordability. Incentives also support charging station development, particularly in public areas.

Consumer perception of compatible government incentives and measures to reduce EV operating costs significantly impacts purchasing decisions, making emerging market-oriented incentives likely effective [85]. Battery guarantee, price, operating cost, charging time, range, and stations also positively affect adoption [101]. Analyzing demographic factors enables target audience analysis [98], with higher education and income being key demographic findings [6]. This study highlights consumers' attitudes toward UTAUT 2 variables and their impact on EV use intentions, providing insights into perceived risks. These findings enhance literature and improve understanding of factors affecting EV usage intention. The research can inform automobile companies' production and

marketing decisions, while constantly monitoring evolving consumer attitudes. Given the importance of performance expectancy and social influence, automotive companies should invest in increased range, charging infrastructure, and environmentally friendly branding. Governments should implement tax deductions, subsidies, and charging infrastructure investments to encourage EV usage.

This study affirms the value of the UTAUT 2 model in understanding electric vehicle (EV) usage intention and offers significant implications for marketing, product development, and policymaking. The key roles of performance expectancy and social influence suggest that EV companies should invest in increasing range, developing effective charging infrastructure, and strengthening their environmentally friendly image, while governments should support EV adoption through tax deductions and incentives. However, this study's limitations include a sample restricted to white-collar workers and regional constraints, limiting the generalizability of results. Future research should more comprehensively examine the factors influencing EV usage with studies encompassing diverse socioeconomic groups and broader geographies. Additionally, incorporating the perspectives of experienced EV users would further enrich the model. Findings indicate that hedonic motivation and habit increase EV usage intention, highlighting the importance of designs and marketing strategies that meet consumer expectations for enjoyment and convenience. However, the reducing effect of performance expectancy on usage intention suggests a need for further research to understand the role of misinformation about EV performance or frustration caused by infrastructure shortcomings. This implies that EV manufacturers in particular should increase efforts to manage consumer expectations. In conclusion, while this study provides a valuable framework for understanding EV usage intention using the UTAUT 2 model, it also reveals important insights into the model's applicability and the future of the EV sector.

7. Theoretical Contribution

This study employs the UTAUT 2 model to explain electric vehicle (EV) usage intention, aiming to test the model's applicability to EV adoption and determine the extent to which its variables explain this intention. This study contributes to the literature by validating UTAUT 2 in the automotive sector, specifically EV adoption, thereby supporting the model's validity and generalizability. Expanding existing literature, it examines specific factors within the EV context and highlights the positive effect of hedonic motivation on EV usage intention. By addressing hedonic motivation and habit, this study adds a new dimension to the UTAUT 2 model, significantly contributing to technology acceptance research.

Researchers suggest that pleasure-oriented motivations and technical features affect EV preferences, highlighting hedonic motivation's role in technology acceptance [22,103]. Consistent with existing research [104], this study confirms the impact of social influence and ease of use on behavioral intention, while also emphasizing EVs' contribution to consumer image and the importance of hedonic factors [102]. While the UTAUT 2 model was initially more functionality-oriented, this study shows that psychological factors such as hedonic motivation and habit also significantly affect electric vehicle usage intention. This is in line with other models such as the Technology Acceptance Model [89]. This study expands the UTAUT 2 model by demonstrating the positive influence of hedonic motivation on EV usage intention and highlighting its role in the EV context. By validating the UTAUT 2 in EV adoption, it supports the model's broad applicability and enhances technology acceptance research through the inclusion of hedonic motivation and habit.

This study shows that electric vehicle adoption is affected by different factors in different cultures, which indicates that consumer behaviors differ in different cultures [105]. When evaluated within the framework of cultural dimensions theory, it is thought that

cultural dimensions such as individualism–collectivism may affect the importance of variables such as social influence and hedonic motivation [106].

In individualistic cultures, EVs may be favored for creating an environmentally friendly image, while collectivist cultures may prioritize societal benefit. In hierarchical societies with respect for authority, government promotion can ease EV adoption. However, aversion to uncertainty may slow acceptance. Masculine cultures may emphasize EV performance, while feminine cultures prioritize environmental friendliness. Studies suggest collectivism positively influences pro-environmental adoption [107–109], while environmental concerns increase EV usage among women [110]. Heightened indulgence and altruism also facilitate novel technology adoption like EVs [108]. This study provides theoretical depth by examining the relationship between UTAUT 2 dimensions like usage intention and behavior [8]. Supporting existing research on EV preferences and adoption [4,22], the findings highlight the influence of consumer attitudes and the importance of environmental benefits and low operating costs [100]. While affirming UTAUT 2's utility, this study also suggests avenues for future research, such as exploring cross-cultural or demographic differences in EV acceptance, the environmental effects of EVs, and the acceptance of EV sharing services.

8. Managerial/Practical Implications

By analyzing consumer behaviors, the UTAUT 2 model offers strategic guidance for EV manufacturers, marketers, and authorities. This study provides key insights for EV marketing, helping identify factors shaping consumer attitudes and aiding targeted messaging. The importance of hedonic motivation suggests EVs should be marketed as exciting, prestigious, and symbolic of an innovative lifestyle. Positioning EVs as prestigious and innovative is crucial [57]. Meaning consumption theory suggests that meanings consumers attribute to products significantly impact purchasing decisions [111]. Drawing from McCracken's theory, these meanings, triggering hedonic motivation, can lead consumers to view EVs as lifestyle expressions, not just transportation. For instance, an electric sports car can express environmental awareness and tech-savviness. Social influence in the UTAUT 2 relates to McCracken's meaning transfer, with consumers adopting EVs based on meanings attributed by their social circles. EV brands attract consumers by associating their products with cultural meanings, such as environmental awareness or sportiness and excitement. Ozturk et al. [92] demonstrated that both utilitarian and hedonic values significantly influence consumers' continued usage intentions, offering practical marketing strategy insights for mobile hotel technology users.

From a marketing perspective, the impact of social influence suggests campaigns should foster social interaction through word-of-mouth, social media, and influencer collaborations to increase EV acceptance [104]. Governments can emphasize social media and charging infrastructure investments. As environmental awareness boosts EV interest [2], marketing messages should highlight EVs' environmental benefits and connection to a sustainable lifestyle. For product development and marketing, the strong effect of performance expectancy indicates manufacturers should prioritize technical features like range, charging time, performance, and reliability [88], leveraging lithium-ion battery advancements. Ease of use is also vital [101], demanding user-friendly interfaces and charging solutions [45]. Given that consumers view EVs as symbols of pleasure and status [44], manufacturers should focus on design, comfort, and brand image [100]. This study demonstrates that the UTAUT 2 model offers valuable insights into the future of EV adoption, while contributing to the sector's sustainable development [52] by analyzing EVs' societal and environmental impact.

This study indicates a negative impact of performance expectancy on EV usage intention, while highlighting social influence as a significant factor. To address low performance expectancy, strategies such as showcasing the latest battery technology advancements and offering videos and test-drive events demonstrating real-world EV performance are recommended. Given the observed importance of social influence, influencer marketing and social media campaigns may provide an effective means to promote EV ownership.

9. Limitations and Future Studies

This study has certain limitations. The sample of this study consists of white-collar employees living in the Thrace region of Türkiye. The data's restriction to this region and survey questions prevents broad generalizations about consumers' intentions across all provinces. Although various measures were taken during data collection and analysis to minimize these biases, it is important that future studies overcome these limitations by using larger and more representative samples and collecting data through qualitative methods. Mixed-methods research can be conducted using qualitative and quantitative data collection tools together to better understand the consumer's electric vehicle purchasing decision process. For example, interviews can be utilized to understand which information consumers seek during the electric car purchasing process, which resources they consult, how they evaluate various factors (e.g., price, range, charging time, brand image), and how they ultimately make their decisions. This study acknowledges a limited sample consisting of white-collar workers. Future research could explore how blue-collar workers or individuals with prior electric car experience might respond differently, and conduct further studies with samples selected from a broader geography to discuss how these factors may have influenced the results. It is of interest how regional economic or infrastructural differences (e.g., electric vehicle chargeability, urban and rural environments) may influence electric vehicle adoption.

Future studies should select geographically representative populations and samples from diverse socioeconomic groups. Examining the effects of different electric car types and comparing demographic attitudes, environmental impacts, and acceptance of electric car sharing services would be valuable. Future research could investigate which demographic factors (e.g., age, income, environmental awareness) are particularly influential in electric vehicle adoption, and which aspects (e.g., range, charging speed, costs) most significantly affect adoption. Further research could compare consumer experiences based on profiles and explore specific electric car features in certain regions. Investigating how preferences for range, charging, cost, etc. evolve over time and affect future sales is important. Mixed-methods research could better elucidate the electric car purchasing decision process. Studies could also examine the influence of psychographics and brand perception, as well as compare attitudes across countries and regions and assess the societal effects of electric car ownership. Future research could explore social influences such as peer pressure, community sustainability movements, and status signaling.

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