

Factors Influencing the Adoption of Electric Vehicles in Algeria

A Review and Conceptual Framework

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Abstract:

Although Algeria has expressed interest in launching procedures for importing, manufacturing, and deploying electric vehicles to achieve sustainable mobility and long-term energy transition objectives, studies on factors influencing Algerian consumers' decisions to adopt electric vehicles (EVs) remain lacking. This research is going to propose an integrative framework for consumers' EVs adoption by drawing on the most common theories of innovation adoption. Overall, an association of factors such as perceived innovation characteristics (PICs), facilitating conditions, values and norms, as well as attitude are examined in the electric vehicle market in Algeria.

Keywords: Electric Vehicles; innovation adoption; facilitating conditions; perceived innovation characteristics; friendly-environmental innovation.

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1. INTRODUCTION

The transportation sector is the second-largest contributor to global greenhouse gas (GHG) emissions, accounting for approximately 25% of annual emissions, with an estimated 88.6 megatons of CO₂ in 2023 (AIE, 2022). The transition to electric vehicles, driven by advancements in battery technology and charging infrastructure, is expected to mitigate the sector's environmental impact while enhancing sustainability, energy efficiency, and security. In line with global efforts, Algeria has launched an ambitious initiative to promote electric vehicle adoption nationwide.

Electric vehicles are generally described as all types of vehicles that operate by motors fully or partially powered by an electric energy source (Al-Alawi & Bradley , 2013). The different categories of EVs are the following:

- Battery-powered Electric Vehicles (**BEVs**): They are powered only and fully by rechargeable batteries, charged via external sources (Proff & Kilian, 2012).
- Hybrid Electric Vehicles (**HEVs**): They are powered by fuel and electricity and have an engine and an electric motor; recharges the battery through regenerative braking and the engine (Schuitema, Anable, Skippon, & Kinnear, 2013).
- Plug-in hybrid electric vehicles (**PHEVs**): They are like HEVs except that they have a larger battery. The batteries rechargeable by the braking system or by plugging into an external electric charging point (Bradley & Frank, 2009).

As electric vehicles (EVs) offer a promising solution to reducing transportation-related greenhouse gas emissions and enhancing societal well-being, understanding the factors influencing consumer adoption is essential. A comprehensive review of existing studies across various countries, including some in Africa—such as Rwanda, South Africa, Kenya, and Egypt—reveals a significant research gap in Algeria. Therefore, this study aims to develop an integrative framework and a theoretical model to examine the key factors shaping EV adoption in the Algerian market.

The proposed theoretical model is built on classic innovation adoption theories, such as the Diffusion Of Innovation theory (DOI, (Rogers, 1962)), the Theory of Reasoned Action (TRA; (Ajzen, I; Fishbein, 1980)), the Theory of Planned Behavior (TPB, (Ajzen I. , 1991)), the Technology Acceptance Model (TAM, (Davis , 1989)). In order to provide an adequate theoretical framework for the adoption of EVs, three main factors that relate to EVs particularities are considered. First, charging infrastructure, in which the dimension of availability, proximity and variety are crucial for individual's intentions to adopt an EV (Haustein, S; Jensen, A F; Elisabetta , C, 2021). Second, governmental incentives such as financials and non-financial subsidies increase the willingness to pay for an EV (Potoglou & Kanaroglou, 2007). Finally, personal norms, which refer to individual's moral obligations to behave in specific way that aligns with society standards, environment and ethical responsibilities, and that influence consumer's decision to purchase environmentally friendly products ((Hunecke, Blöbaum, Matthies, & Höger, 2001), (Jansson, J, 2011)).

The present research paper is organized as follow: theoretical frameworks in EV adoption research, model development and hypotheses, methodology and conclusion.

2. THEORETICAL FRAMEWORKS IN EV ADOPTION: A REVIEW

Innovation adoption can be defined as a consumer's decision to make full use of an innovation (Rogers, E M, 1983). As EVs are considered as technological car innovation, developed theoretical framework of EV's adoption is primary based on innovation adoption theories, in particular the Diffusion of Innovations theory (DOI), the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), and the Technology Acceptance Model (TAM). Each of these theories provides unique foundational perspectives that explain the processes and factors influencing the adoption of EVs.

2.1 Diffusion of Innovations theory (DOI):

The Diffusion of Innovations Model (DOI) was mainly developed in the early 1960s to explain how innovations spread through social systems

over time (Rogers, 1962) and has since been widely applied used to study adoption behavior of a variety of different innovations (Meuter, Bitner, Ostrom, & Brown, 2005) (Wejnert, 2002)). According to Rogers (1983), the adoption of innovations is determined by the perception of five key innovation characteristics, which are, relative advantage, compatibility, complexity, trialability, and observability. All constructs positively influencing adoption except for complexity, which has a negative effect ((Rogers, 2003) (Arts, Frambach , & Bijmolt, 2011)). In green innovation adoption studies, these five characteristics have been found to be a direct predictors of adoption intention or pro-environmental behavior ((Jansson, J, 2011) (Moons, I; De Pelsmacker, P, 2012)), especially the adoption of AFVs (Petschnig, Heidenreich, & Spieth, 2014) and EV (((Moons, I; De Pelsmacker, P, 2012) (Rami, 2020)).

2.2 Theory of Reasoned Action (TRA):

The Theory of Reasoned Action (TRA) was the first innovation adoption model developed within the field of psych sociology. This theory was proposed by Fishbein and Ajzen (1975), who posited that individual behavior is determined by three key cognitive factors: behavioral intentions, attitudes toward the behavior and subjective norms. Behavioral intentions, defined as the decision to engage in or abstain from a behavior, are shaped by attitudes and social norms. Attitude refers to an individual's positive or negative feelings toward a specific behavior, shaped by beliefs about its attributes, while subjective norms reflect an individual's perception of whether significant others believe they should or should not perform the behavior, determined by normative beliefs and motivation to comply with these norms (Fishbein & Ajzen, 1975).

2.3 Theory of Planned Behavior (TPB):

The Theory of Planned Behavior (TPB) extends the Theory of Reasoned Action (TRA) in explaining behavioral decisions by incorporating perceived behavioral control, which reflects an individual's perception of ease or difficulty in performing the behavior, shaped by external and internal constraints (Ajzen I. , 1991). Perceived behavioral control is believed to influence both intention and actual behavior, particularly when it aligns with actual control (Ajzen I. , 1991). Within the context of EVs adoption, The

TPB provides a comprehensive framework for understanding how attitudes, social norms, and perceived control interact to influence EV adoption intentions and behaviors ((Moons & De Pelsmacker, 2015) (Moons, 2018)).

2.4 Technology Acceptance Model (TAM):

The Technology Acceptance Model (TAM) builds on the Theory of Reasoned Action (Fishbein, M A; Ajzen, I, 1975) and was initially designed to predict the adoption of information and communication technology in organizations (Davis , 1989). It comprises five key elements: perceived usefulness, perceived ease of use, attitude toward use, intention to use, and actual usage. These components outline a sequential process from attitude formation to technology adoption (Venkatesh, V; Davis, F; Morris, M G, 2007). The TAM posits that attitude toward use of technology is shaped by perceived usefulness, defined as the extent to which a person believes the system enhances their performance, and perceived ease of use, defined as the belief that using the system requires minimal effort (Davis , 1989). These two primary factors of technology adoption (perceived usefulness and perceived ease of use) are influenced by external variables, and align with the beliefs dimension in the TRA and TPB.

The TAM posits perceived usefulness as a direct antecedent of behavioral intention, partially mediated by attitude. Originally, perceived ease of use was seen as predictor of behavioral intention, fully mediated by attitude and usefulness, but subsequent studies revealed its direct influence ((Davis , 1989) (Venkatesh, V; Davis, F D, 2000))

Regarding the field of EV's adoption, The TAM has been widely applied to explain how consumer attitudes toward EV technology influence their intention to adopt it (Moons, 2018). Perceived usefulness relates to factors such as reduced emissions, cost savings, and enhanced driving performance, while perceived ease of use encompasses to the simplicity of EV operation and the ease of learning how to operate with. Both factors have been found to influence positively the intention to adopt EVs ((Hussain & Qureshi, 2024), (Bektaş & Akyıldız Alçura, 2024), (Depuru & Wang, 2021)).

3. MODEL DEVELOPMENT AND HYPOTHESIS

As depicted in Figure 01, this study developed a research model to investigate the factors influencing EV's adoption in Algeria. Based on the DOI theory, we first propose that a consumer's decision to adopt EVs depends on three important innovation characteristics, in which perceived usefulness, perceived ease of use and perceived compatibility play a positive role (H1- H3). Besides the three perceived characteristics inspired by Rogers (2003), we add a fourth characteristics, which is perceived enjoyment that was proposed as an extension to the TAM theory by Davis et al. (1992), and we expect that consumer's intention to adopt EVs will increase by introducing this construct (H4).

Also, drawing on the UTAUT2 model, we propose that facilitating conditions are necessary for consumer's decision to adopt EVs, in which charging infrastructure and governmental incentives positively influence the intention to adopt EVs (H5- H6). Then, in light of Values, Norms and Beliefs theory (VBN), we also propose that social and personal norms are relevant factors that influence EV's adoption, since that electric cars are considered as friendly environment technology (H7- H8). Finally, we suppose that attitude will significantly influence the adoption of EVs (H9). This attitude toward EVs is generally determined by the perception of innovation characteristics (H10- H13).

The hypotheses presented in Figure 01 will be further developed in the following sections.

3.1 Intention to adopt EVs:

We define the adoption of EVs as 'consumer adoption', which is a behavioral response to technological innovations, which is the purchase or use of these technologies (cf. Huijts et al., 2012). Most models that predict the adoption of new technologies posit that adoption of new technologies is predicted by 'intention to adopt', which is itself predicted by various factors such as the perception of attitudes of these technologies (Ajzen, 1991; Davis et al., 1989). Both intentions to adopt and the actual adoption have the same determinants, albeit intention is generally more strongly predicted than adoption. This implies that intention to adopt EVs is probably more strongly related to the perceived EV attributes than the adoption of EVs are. In this

paper we focus on the intention to adopt EVs, as the measurement of the level of actual adoption is not easily achieved.

3.2 Perceived innovation characteristics (PICs):

A number of consumer behavior studies related to consumer's decision to adopt innovations have confirmed that individuals' perceptions of certain characteristics inherent to the innovation significantly influence the adoption of innovations ((Moore & Benbasat, 1991), (Meuter, Bitner, Ostrom, & Brown, 2005), (Kulviwat, et al., 2007), (Venkatesh, V; Davis, F; Morris, M G, 2007)).

In order to provide a comprehensive typology of PICs, especially in contexts where technological innovations, such as electric vehicles, encounter resistance or hesitation, two different innovation adoption theories were applied. First, Rogers' theory of innovation diffusion, in which individual's innovation decision making process is influenced by five perceived innovation characteristics: relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003). Second, Davis' technology acceptance model, according to which the adoption decisions and actual behavior is mainly determined by user's perception of the technology's usefulness, ease of use and enjoyment (Davis , 1989).

On that basis, this study has considered the four following characteristics within our hypotheses development: perceived usefulness, perceived ease of use, perceived compatibility and perceived enjoyment.

3.2.1. Perceived Usefulness and Perceived Relative Advantage:

Perceived usefulness refers to the degree to which an individual believes that using a particular innovation will enhance their performance or provide significant benefits (Davis , 1989). This concept closely aligns with Rogers' notion of relative advantage, which posits that innovations perceived as superior to existing alternatives are more likely to be adopted (Rogers, 2003).

Both constructs were considered as one of the most important predictors of intention to adopt innovation ((Davis , 1989), (Holak & Lehmann, 1990), (Venkatesh, V; Davis, F D, 2000), (Plouffe, Hulland, &

Vandenbosch, 2001), (Venkatesh, Morris, Davis, & Davis, 2003), (Meuter, Bitner, Ostrom, & Brown, 2005), (Arts, Frambach, & Bijmolt, 2011)).

In this study, we retain the factor perceived usefulness due to its prominence and recent emphasis in the literature, which measures consumer's perception of benefits and advantages offered by EVs compared to internal combustion enginering vehicles (ICE), such as high range, low prices and operating costs, high energy efficiency, low greenhouse gas emissions, etc. In this regard, consumers who perceive that EVs are more useful than ICE, are more likely to make the final decision to adopt EVs ((Steg L., 2005), (Jansson, J, 2011)), leading to the following hypothesis:

Hypothesis 1: Perceived usefulness has a positive influence on consumer intention to adopt EVs.

3.2.2. Perceived Ease of Use and Perceived Complexity:

Perceived ease of use was defined by Davis (1989), as the extent to which an individual believes that using an innovation will be free of effort. This characteristic aligns with Rogers' construct of complexity, where innovations perceived as less complex are more likely to be adopted (Rogers, E M, 1983). Venkatesh (2000) has argued that perceived ease of use is a vital component of the technology adoption intentions. With respect to EVs' adoption literature, perceived ease-of-use has been shown to have a positive effect on the adoption process (Sierzechula, 2014). Furthermore, previous research has shown that adopters of alternative fuel vehicles perceive such vehicles as less complex and easier to use than non-adopters (Jansson, J, 2011). Thus, the perception that an EV is easy to use is hypothesized to influence positively the intention to adopt it.

Hypothesis 2: Perceived ease of use has a positive influence on consumer intention to adopt EVs.

3.2.3. Perceived Compatibility:

Perceived compatibility refers to the degree to which an innovation fits with the existing values, past experiences, and needs of potential adopters ((Arts, Frambach, & Bijmolt, 2011) (Rogers, E M, 1983)). Rogers (2003) identified compatibility as a critical factor influencing the rate at which an innovation is adopted, asserting that the more innovations aligned with users' existing values and practices, the more this innovation is likely to be adopted.

Furthermore, many empirical studies have consistently show that higher perceived compatibility leads to increased adoption intentions.

Specific to the context of this study, perceived compatibility has been found to be a significant predictors of alternative fuel vehicles adoption, and that adopters of alternative fuel vehicles perceived these vehicles as more compatible than did non-adopters ((Jansson, J, 2011), (Graham-Rowe, et al., 2012)). Consequently, we naturally propose the following hypothesis:

Hypothesis 3: Perceived compatibility has a positive influence on consumer intention to adopt EVs.

3.2.4. Perceived Enjoyment:

Perceived enjoyment pertains to the intrinsic reward derived through the use of a technology or service. Davis et al. (1989) proposed perceived enjoyment as an extension to the TAM and found that the explanatory power of the model was increased by adding the construct. Liao et al. (2008) and Venkatesh et al. (2012), considered perceived enjoyment as an intrinsic motivation factor that significantly affect users' intentions and attitudes towards adopting new technologies. Technologies perceived to be enjoyable to use are more likely to be adopted, whatever it was its utilitarian benefits (Voss, Spangenberg, & Grohmann, 2003).

In this study, aspects related to the enjoyment deriving of an EV such as rapid acceleration, smooth ride and quiet operation, might have an enormous effect on the adoption of EVs. Moreover, Moons & De Pelsmacker (2012) and Schuitema et al. (2013) found that perceived enjoyment is a significant antecedent of intention toward adopting alternative fuel vehicles. Based on the above discussion, we posit the following hypothesis:

Hypothesis 4: Perceived enjoyment has a positive influence on consumer intention to adopt EVs.

3.3 Facilitating Conditions:

The intention to adopt new technologies is linked to the availability of facilitating conditions, which is defined as someone's perception about infrastructures or technical support existed for using a technology or system (Venkatesh, V; Thong, J Y; Xu, X, 2012). In the field of research in consumer's EVs adoption, two main facilitating conditions have been

considered: charging infrastructure and governmental incentives. These factors not only reduce the perceived effort associated with owning and using an EV but also enhance the overall attractiveness of adopting this technological innovation.

3.3.1. Charging infrastructure:

The availability of adequate charging infrastructure is among the most stimulating factors of EV adoption (Lieven (2015), (Haustein, S; Jensen, A F; Elisabetta , C, 2021)). An empirical study by Dimitropoulos et al. (2013) shows that, the density of public charging stations positively correlates with EV adoption rates. Furthermore, the proximity of charging stations reduce range anxiety by ensuring that vehicles can be conveniently recharged (Jensen, Cherchi, & Mabit, 2013). Moreover, the variety in charging technology, such as fast-charging systems, enhance the usability of EVs, making them more appealing to consumers who prioritize convenience (Struben & Sterman, 2008). Therefore, the following hypothesis is formulated.

Hypothesis 5: well-constructed charging infrastructure has a positive influence on consumer intention to adopt EVs.

3.3.2. Governmental incentives:

Multiple papers have reported that governmental incentives are crucial facilitating condition that directly influences EV adoption decisions ((Potoglou & Kanaroglou, 2007), (Langbroeck , Franklin, & Susilo, 2016), (Eppstein, Grover, & Marshall , 2012)). These incentives which include subsidies, tax reductions, and rebates, reduce the upfront cost of EV ownership. For example, Gallagher et al. (2011) showed that financial subsidies narrow the price gap between EVs and ICEs and increase consume's willingness to buy EVs. Similarly, Wang et al (2017) reported that consumers' intentions to purchase EVs has notably increased as a result of tax exemption. Non-financial incentives, such as access to carpool lanes or bus lanes, further enhance the appeal of EV ownership, but to a lesser extent than financial incentives, as carpool and bus lanes could become congested over time and the benefits for drivers disappear (Lieven, T, 2015). Thus, the following hypotheses are suggested.

Hypothesis 6: Governmental incentives have a positive influence on

consumer intention to adopt EVs.

3.4 Values, Norms and Beliefs:

Findings from EV's adoption literature support that that consumers' decision to adopt EVs is not solely influenced by technological, economic, and hedonic considerations ((Jansson, J, 2011), (Moons & Pelsmacker, 2012), (Graham-Rowe, et al., 2012), (Schuitema, Anable, Skippon, & Kinnear, 2013), (Noppers, Keizer, Bockarjova, & Steg, 2015)); it is also determined by psychological and social factors ((Jansson, J, 2011), (Noppers, E H; Keizer, K; Bolderdijk, J W; Steg, L, 2014), (Petschnig, Heidenreich, & Spieth, 2014)). Among this, the role of personal and social norms is highlighted in shaping individuals' attitudes and behaviors toward EV adoption. Grounded in the Value-Belief-Norm (VBN) theory (Stern, Dietz, Abel, Guagnano, & Kalof, 1999), these normative constructs provide a framework for understanding how moral obligations and social expectations motivate pro-environmental behavior. Since that electric vehicles are environmentally friendly innovations, this study examines the influence of personal and social norms on EV adoption.

3.4.1. Social norms:

Social norms represent an individual's perceived social pressure to perform, or refrain from performing, a specific behavior (Ajzen I. , 1991). Social norms are postulated to significantly affect behavior intention, as individuals are often likely to look for guidance and validation from other people whose opinions are important to them ((Ajzen, I; Fishbein, 1980), (Ajzen I. , 1991)).

In the context of consumers' adoption behavior regarding an innovation like the EVs, social norms have been found to play a central role in shaping adoption decisions of high involvement eco-innovations (Jansson, J, 2011). Furthermore, Petschnig et al. (2014) and Noppers et al. (2015) have confirmed that individuals are more likely to adopt EVs when they perceive that other people in their social networks are doing the same.

Based on above discussion following hypothesis was proposed:

Hypothesis 7: Social norms have a positive influence on consumer intention to adopt EVs.

3.4.2. Personal norms:

Personal norms can be defined as a consumer's personal feelings of responsibility or moral obligation to perform, or refuse to perform, a certain behavior (Ajzen I. , 1991). This construct was first introduced by Schwartz (1977) in his Moral Norm-Activation theory (NAM), and supported by many other researchers, such as Stern (1999), who found that person's behavior occurs in response to personal obligations that are activated in individuals who are aware of the consequences of their actions, and ascribe personal responsibility to mitigate those consequences.

In the context of EV adoption, personal norms and moral obligations are often linked to beliefs about environmental conditions and ecological issues and the individual's action that align with these beliefs. Research has shown that personal norms are significant antecedents of intention to adopt alternative fuel vehicles (Jansson, J, 2011), and the use of environmentally friendly travel modes (Hunecke, Blöbaum, Matthies, & Höger, 2001). Hence, we propose the following hypotheses:

Hypothesis 8: Personal norms have a positive influence on consumer intention to adopt EVs.

3.5 Attitude:

Consumers' decision to adopt or reject an innovation is mainly based on attitude formation toward the innovation. Attitude is defined as a consistent response or someone's assessment to a particular situation, an object, or class of objects. This construct has been discussed in many models, including the TRA, the TPB and the TAM. The basic assumption of TRA (Ajzen, I; Fishbein, 1980) is that individuals will consider the likely outcomes of the behavior and evaluate them before making a decision, and points out that attitude is a central predictor of individual's intention to perform a specific behavior. In TPB, Ajzen (2005) retained the same important role of attitude in predicting individual's intention to perform a behavior as in TRA but complemented by two additional factors which are subjective norms and perceived behavior control. On the basis of the reasoned action theory, Davis (1992) developed the TAM (technology acceptance model) and supposed that users' intention to adopt technologies is mainly affected by attitude and perceived usefulness.

In the context of new vehicle innovations, a positive relationship has been found between attitude and many consumer behavioral intention and actual adoption such as the adoption of high involvement eco-innovations (Jansson, J, 2011), intention to adopt electric vehicles (Schuitema, Anable, Skippon, & Kinnear, 2013), the use of the electric cars (Moons & Pelsmacker, 2012) and the adoption decisions of AFV (Petschnig, Heidenreich, & Spieth, 2014). Therefore, this study hypothesizes that:

Hypothesis 9: Attitude has a positive influence on consumer intention to adopt EVs.

However, consumers' attitude toward innovation is influenced by the perception of innovation characteristics (PICs). Rogers (1983) postulates that potential adopter's decision to adopt an innovation is based on his general attitude toward the innovation, which is formed by the perception of five specific characteristics described in the DOI. Moreover, Davis (1989) has food in his Technology Acceptance Model that attitude is a mediator that connect user's perception of technology with his intention to adopt it. He added that two primary perceptions shape this attitude, which are perceived usefulness and perceived ease of use.

Hence, we support this attempt in our study and we believe that each perceived innovation characteristic has a positive influence on consumers' attitude towards EVs.

Hypothesis 10: Perceived usefulness has a positive influence on consumer's attitude towards EVs

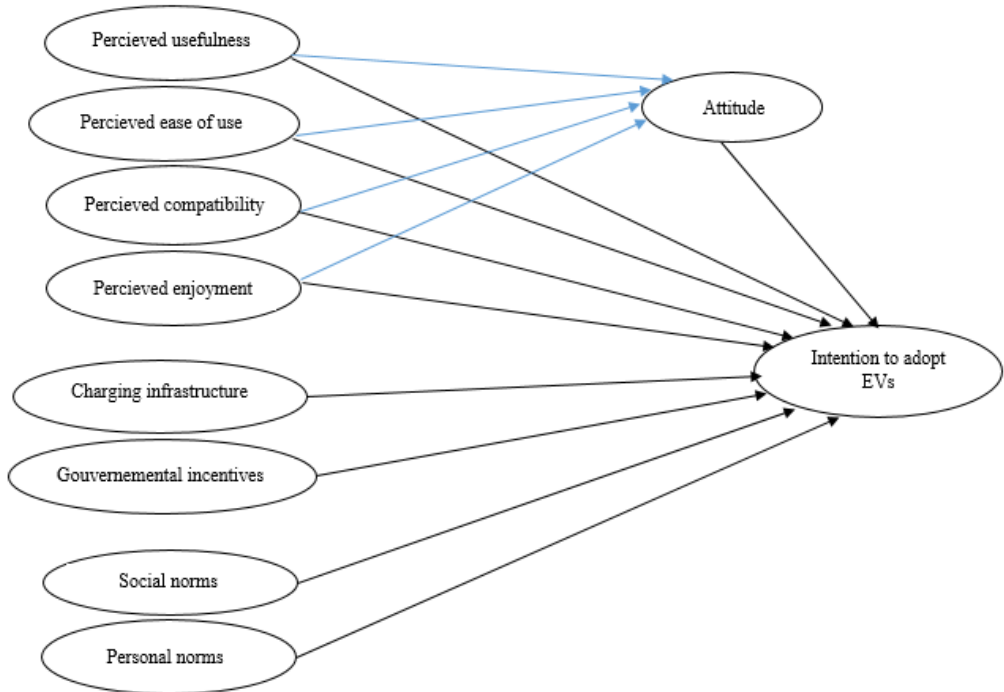
Hypothesis 11: Perceived ease of use has a positive influence on consumer's attitude towards EVs.

Hypothesis 12: Perceived compatibility has a positive influence on consumer's attitude towards EVs

Hypothesis 13: Perceived enjoyment has a positive influence on consumer's attitude towards EVs.

In Figure 1, the proposed model to study the intention to adopt electric vehicle is depicted.

Fig.1. Research model.



Source: Conducted by us.

4. METHODOLOGY

4.1 Procedure:

The main purpose of this study is to examine relationships between perceived characteristics, facilitating conditions, norms, attitude and intention to adopt EVs. To do so, this study is going to utilize quantitative method to design a semi-directive questionnaire designated to Algerian citizens holding a driving license. Data will be collected by distributing questionnaires via “Google Forms” and structural equations modeling will be used to test the proposed theoretical model and to validate hypotheses.

4.2 Variables and Measures:

The research framework consists of ten variables among which nine are independent variables and one dependent variable. Dependent variable is

the intention to adopt EVs, and independent variables are: perceived usefulness, perceived ease of use, perceived compatibility, perceived enjoyment, social norms, and personal norms, charging infrastructure, governmental incentives and attitude. All variables are subjectively measured using 7-point Likert-type scales, where 1 indicates "strongly disagree" and 7 indicates "strongly agree." Given the diversity of measurement scales proposed in the literature to study the same variable, we selected between three and five items for each variable. The chosen items are, in our view, the most relevant and appropriate for the context of our study.

4.2.1. Perceived innovation characteristics:

Perceived usefulness:

In this study, perceived usefulness refers to the degree to which the innovation is perceived by the consumer as superior to those available on the market. In the context of electric vehicles, the literature review has shown that perceived usefulness is a multidimensional variable, meaning that it encompasses several dimensions. The most frequently mentioned dimensions by researchers are the environmental dimension, performance, and autonomy. Therefore, when constructing our measurement scale, we took into account the inclusion of items addressing these three aspects (see Table 1).

Table 1. Measurement items of perceived usefulness.

Authors	Items
Noppers et al. (2015) Degirmenci et Breitner (2017)	PU1 : The electric vehicle's autonomy would be sufficient for my daily commuting needs
Schuitema et al. (2013) Adapté de Davis (1989); Degirmenci et Breitner (2017); Schmalfuß et al. (2017)	PU 2 : The performance of an electric vehicle is inferior to that of a gasoline-powered vehicle
Jansson (2011); kim et al. (2018); Degirmenci et Breitner (2017); Wang et al, (2018)	PU 3 : An electric vehicle would be capable of fulfilling my needs
	PU 4 : Using an electric vehicle helps reduce greenhouse gas emissions (GHG)

Source: Conducted by us.

Perceived ease of use:

Perceived ease of use was determined by means of three items (Table 2). Items are adopted from TAM model by Davis (1989).

Table 2. Measurement items of perceived ease of use

Authors	Items
Davis (1989)	PEU1 : Learning to use an electric vehicle would be easy for me
	PEU 2 : I believe I would find an electric vehicle easy to use
	PEU 3 : Driving an electric vehicle is as simple as driving a gasoline-powered vehicle

Source: Conducted by us

Perceived compatibility:

The compatibility of an innovation is measured through its alignment with individuals' lifestyles and habits. To study the influence of this attribute, perceived compatibility is determined by means of three items, two of them are adopted from Meuter et al. (2005) and one item is adopted from Petschnig et al. (2014).

Table 3. Measurement items of perceived compatibility

Authors	Items
Meuter et al. (2005)	PC1 : Using an electric vehicle aligns with my beliefs
Petschnig et al. (2014)	PC 2 : Electric vehicles align well with my driving habits
	PC 3 : Using an electric vehicle is fully compatible with my mobility needs
	PC 4 : An electric vehicle suits me well

Source: Conducted by us

Perceived enjoyment:

Perceived Enjoyment will be measured by three items adopted from UTAUT2 model presented by Venkatesh et al. (2012). Table 4 shows measures for perceived enjoyment.

Table 4. Measurement items of perceived enjoyment

Authors	Items
Venkatesh et al. (2012)	PE1: Driving an electric vehicle is fun.
	PE2 : Driving an electric vehicle is enjoyable
	PE3: Because of smoothness and high acceleration, driving an electric vehicle is very entertaining.
	PE1: Driving an electric vehicle is fun.

Source: Conducted by us

4.2.2. Facilitating conditions:

Charging infrastructure:

Facilitating conditions are crucial for the adoption of technological innovations. In the case of electric vehicles, the availability of technical support such as charging *infrastructure* influences positively the decision to adopt them. Facilitating condition was determined by means of five items (Table 5). Three items are adopted from Lin and Wu (2018), one item from Vafaei-Zadeh et al. (2022), and one other item from She et al. (2017).

Table 5. Measurement items of charging infrastructure

Authors	Items
She et al. (2017)	Ich1: Public charging infrastructure for electric vehicle is available
Vafaei-Zadeh et al. (2022)	Ich2: Electric vehicle charging infrastructure is available on highways
	Ich3: I live in a city with a very good infrastructure for electric vehicles
Lin et Wu (2018)	Ich4: I live or work near a location where I can charge an electric vehicle
	Ich5: I would choose to buy an electric vehicle if the charging facilities were better

Source: Conducted by us

Governmental incentives:

The construct Governmental incentives adopted from Kim et al. (2018) and Zhang et al. (2016), is determined by means of five items. Table 6 shows measures for governmental incentives.

Table 6. Measurement items of governmental incentives

Authors	Items
Kim et al. (2018) Et Zhang et al. (2016)	IG1: Purchase subsidies help me adopt electric vehicles
	IG 2: Reducing taxes related to the purchase helps me adopt electric vehicles
	IG 3: Preferential measures, such as access to bus lanes, help me adopt electric vehicles
	IG 4: The government's infrastructure expansion policy helps me adopt electric vehicles
	IG 5: The Algerian government actively offers incentives to increase electrical energy for electric vehicle owners

Source: Conducted by us

4.2.3. Values, Norms and Beliefs:

Social norms:

Social norms will be measured by five items adopted from Venkatesh et al. (2012). Table 7 shows measures of anxiety of social norms.

Table 7. Measurement items of social norms

Authors	Items
Venkatesh et al. (2012)	SN1: Driving a vehicle that attracts others' attention is important to me
	SN 2: People react positively when they see an EV on the road.
	SN 3: EVs have a positive image in society.
	SN 4: People whose opinions are important to me find EVs good.
	SN 5: An EV would reflect my personality

Source: Conducted by us

Personal norms:

Personal norms were determined by means of three items (Table 8). Items are adopted from VBN model by Petschnig et al. (2014). Table 8 shows measures for Personal norms.

Table 8. Measurement items of personal norms

Authors	Items
Petschnig et al. (2014).	PN1 : I would feel a moral obligation to use electric vehicles due to their low fuel consumption
	PN 2 : I would feel a moral obligation to use electric vehicles due to their low emissions
	PN 3 : I would feel a moral obligation to use electric vehicles as they are more environmentally friendly

Source: author's name, year, page

4.2.4. Attitude:

Attitude will be measured by three items adopted from Khurana et al. (2020). Table 9 shows measures of attitude toward EVs.

Table 9. Measurement items of attitude

Authors	Items
Khurana et al. (2020)	ATT1: I am inclined to switch to an electric vehicle.
	ATT2: Driving an electric vehicle will be a wise decision.
	ATT3 : It makes sense to use an electric vehicle rather than a gasoline-powered vehicle

Source: author's name, year, page

4.2.5. Intention to adopt EVs:

The dependent variable “Intention to adopt EVs” will be measured using three items inspired by Zhang et al. (2022) and one item from Han et al. (2017). Table 10 shows measures for intention to adopt EVs.

Table 10. Measurement items of Intention to adopt EVs

Authors	Items
Zhang et al. (2022)	IA1: I am ready to adopt an electric vehicle soon.
	IA2: I plan to adopt an electric vehicle soon.
	IA3 : If I need to purchase a new car soon, I would prefer an electric vehicle
Han et al. (2017)	IA4 : If my friends want to buy a new car, I would suggest purchasing an electric vehicle

5. CONCLUSION

One of Algeria's most pressing concerns is electric mobility and the reduction of polluting emissions. According to this, this research integrates several factors in the same conceptual framework, which was developed based on different theories of innovation adoption such as DOI, TRA, TPB, and TAM models to clarify and predict electric vehicles adoption by Algerian consumers.

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