



The Antecedents of Consumer Eco-Friendly Vehicles Purchase Behavior in United Arab Emirates: The Roles of Perception, Personality Innovativeness and Sustainability

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ABSTRACT

The study develops a personality-perception-intention framework to study the antecedents of consumer EFV-purchase intention by integrating consumer perception and personality. Based on the valence framework, the study considers two dimensions of utilities (positive and negative utilities) of consumer perceptions on EFV-purchase intention. The positive utility is represented by three different measurements, namely perceived environment, perceived monetary benefit and perceived symbol, while negative utility comprises of two measurements, namely, perceived fee and perceived risk. Further study also explores the impacts of two personality factors (personal innovativeness and sustainability) on EFV-purchase intention. The personality factors are also mediated by positive utility. Along with this, the study also investigates the association between consumers' intention to purchase EFVs and their actual buying behavior. These findings have significant theoretical contribution and provide recommendations for industry and policy makers.

JEL Classification: D12, F18, Q56

Keywords: Eco-friendly vehicles; Consumer purchase intention; purchase behavior; personality innovativeness; positive and negative utilities

Article history:

Received: 30 August 2020

Accepted: 11 November 2020

INTRODUCTION

Kotler (2011) highlights the environmental concern, where equally consumers and producers have a sustainability perspective that impacts their views and practices in relation to their activities (production, distribution, and consumption). In developed market, the consumers are more concerned about sustainability and the prefer eco-friendly products (Yamak et al., 2014). Simultaneously, a significant number of consumers believe that companies should take measures to improve environment (Yamak et al., 2014). In modern world, it's the customers' anticipations that drive firm's market practices, including the development of eco-friendly products and services. Recently, there is a substantial development in car industry and heavy investments are made in the development of eco-friendly vehicles. It is not only critical for companies themselves to maximize the rate of adoption of eco-friendly vehicles (EFVs), but also for viability of EFVs (Chu et al., 2018). The rate of adoption of EFVs is highly correlated with consumer personal innovativeness and concern about sustainability (Bamberg and Schmidt, 2003; Merriman, 2009). In addition, research has strong support for government initiatives (incentives) in respect of their influence on the rate of adoption of EFVs (Beresteanu and Li, 2011; Gallagher and Muehlegger, 2011; Li et al., 2013). As per researchers from Sociology and consumer behavior, attach social values to the products are highly important for consumers (Leary et al., 2011; Lee et al., 2015), and therefore the social importance of being seen to be environmentally friendly impacts product selection (Chua et al., 2010; Gsottbauer and Van den Bergh, 2011). Hence, while consumer opt for eco-friendly product for philanthropic reasons associated with the environment (Li et al., 2017), other factors, like positive and negative values also effect product acceptance. Moreover, these factors may effect in a different way in different market, depending on the economic condition and national culture, so that market behavior diverges, converges, or cross verges (Chu et al., 2018).

The researchers mainly focus the developed markets and highlight significance numbers of EFVs adoption in those markets (Robertson et al., 2015). Despite of very strong auto-market growth, the EFVs share is barely 3 % in UAE in 2018. There is a long way to go for mass adoption of EFVs in UAE. There exists a paradox in UAE: the administration trusts that the EFV signifies the trend prospect growth for its advantages energy efficiency, but wait-and-see state prevails as far as consumers are concerned. The study attempts to solve the paradox by investigation consumer intention to adopt EFV. The literature strongly supports the significant association between individual characteristics and consumer intention to adopt EFVs (Chua et al., 2010; Gsottbauer and Van den Bergh, 2011). However, the current study examines consumer perception and personal characteristics individually. This enables the study to presents conclusive view on the important determinants of EFV adoption separating two of them. Moreover, the study considers both positive and negative aspects of perceptions by including the acquisition of benefits and the payment of sacrifices in consumer perceptions, while earlier researchers ignore these two aspects. The study also incorporates demographics and personality in consumer characteristics. The literature support personality as comparatively stable determinant of consumer behavior (Robertson et al., 2015). Prior literature mainly focuses on relevance of demographics to EFV adoption (Witten et al., 2012; Piczak, 2015; Soltani-Sobh et al., 2017), the current study develops a personality-perception-intention framework composed of consumer perceptions and personality in order to highlight the antecedents of EFVs adoption intention in UAE. Moreover, based on the valence framework, the study considers both aspects (positive and negative utilities) of consumer perceptions. Since valence framework is a basic decision-making theory that consider positive and negative utility while explaining consumer behaviors. Specifically, the study relates the consumer intension to actual behavior based on theory of planned behavior (Han et al., 2010). This provides relation between intention to purchase and actual behavior of consumer, as intention may be miss-directing.

The rest of the study is organized as. Section 1.1 represents United Arab Emirate and sustainability. In section 2 research model and hypotheses are presented. Then study presents methodology in section 2, while section 4 represents results and discussion are presented. In section 5, theoretical implications are presented followed by practical implications in section 6. Finely, the limitations are presented in section 7.

United Arab Emirate (UAE) and Sustainability

As the mental images of the UAE time and again conjure up massive oil and gas fields and gas-guzzling vehicles and super-vehicles, but even the Middle East is affected by the concerns of international and local populations about the long-term effect of fossil fuels on the global environment and the need to prepare for a mixed energy future. Like other countries in the world, UAE are making substantial investment in technological solutions and government initiatives to help decrease their dependence on fossil fuels and their effect on the environment. In UAE, the people don't essentially trust in public transport system when it comes to travelling around. The intense heat and weather conditions make it very hard to walk even a small distance comfortably. Furthermore, it's very easy to get a finance car, that renting a car is expensive than buying. The car ownership is on the higher side and high rate of car usages significantly impact environment resulting air and noise pollution along with congestion.

Over the past decade, in response, government has taken number of measures to help solve this transportation issue. For instance, UAE Government launched a fully integrated Surface Transport Master Plan, followed by the Dubai Green Mobility Initiative and The Clean Energy Strategy. These programs are launched to upturn the share of clean energy from 25 % to 50% by 2050 and cut the carbon footmark of power generation by 70%. (Abu Dhabi Env. Policy Briefs). In addition, the authorities have introduced more immediate initiatives on the ground. In order to promote EFVs, Dubai's Roads and Transport Authority (RTA) offers 70 free parking spaces for eco-friendly vehicles in 40 paid parking zones across the UAE (Abu Dhabi Env. Policy Briefs). This measure encourages the take-up of eco-friendly vehicles and to help sustainability. Even as a government mandate 10 percent of its investments in new vehicles will cover EFVs by 2020, this encourages consumer to shift their investment in EFVs. At the same time, the government dictates banks to provide discounted 'green' auto loans to finance EFVs. For instance, Emirates Islamic announces a new promotion on its sharia-compliant Green Auto Finance product for cars financing of up to Dh1.5m. Without any doubt, even in the oil and gas rich country (UAE), government policies, advancement in technology and public awareness are the forces that are driving the demand for EFVs.

RESEARCH MODEL AND HYPOTHESES

On the basis of prior literature, the study develops a personality-perception-intention framework to explore the factors that determine consumer intention to purchase EFVs. Figure 1 below presents the research model for the current study. The consumer perceptions are divided into positive utility and negative utility following valence framework. The positive utility factors include perceived monetary benefit, perceived environment, and perceived symbol. These factors may have positive influence on consumer EFV purchase intention. In contrast, the negative utility factors include These factors may have negative influence of on consumer EFV purchase intention (Miles and Covin, 2000) . In addition to this, the study also purposes two personality traits (personal innovativeness and environmental concern) that may influence consumer EFV purchase intention directly or indirectly (through mediation). The study also includes demographics factors that may have significant impact on consumer EFV purchase intention. These factors are includes as control factors. Lastly, the study also correlates consumer EFV purchase intention to actual purchase behavior.

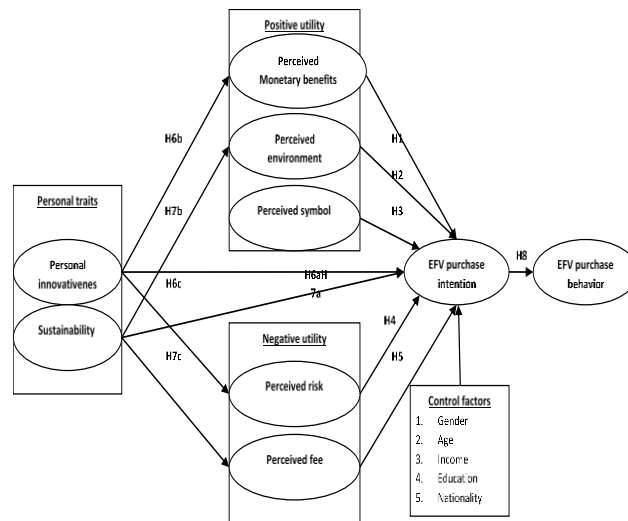


Figure 1 Research Model

Relationship Between Consumer Perception and EFV Purchase Intention

Positive Utility

This study includes positive utility as main factors that may influence consumer EFV purchase intention. Positive utility comprises of perceived monetary benefit, perceived environment and perceived symbol. Perceived monetary benefit represents consumer perception of monetary benefits from using EFVs. As EFVs are still in infancy stage, there are the governments that have ambitious goals for EFVs (Jugert et al., 2016). Many governments provided facility of free parking, no tolls and discounts on registration fees. At the same time, EFVs are highly fuel efficient and they can be powered by little cost electricity. At the same time, their EFVs maintenance is comparatively less expensive (Jiang et al., 2017). Consumers may save money on petrol, registration, ease of car leasing, free parking etc. the literature highlights government incentives as main determinant of consumer EFVs purchase intention (Delgado et al., 2015; Gallagher and Muehlegger, 2011; Langbroek et al., 2016). In this vein, (Wold and Ølness, 2016) highlights the economic gain from free passes through toll stations as an important factor for consumers' intention to EFVs adoption. Based on these relevancies, the study assumes that:

H1: There is a positive relationship between perceived monetary benefit and consumer EFV purchase intention.

Secondly, the study uses the as a measure of positive utility. Perceived environment is defined as consumers' perception of the positive results of driving EFVs for the environment (López-Gamero et al., 2000). A new era of sustainability is rising, and it's touching every corner of the world. Consumers in markets big and small are increasingly motivated to be more environmentally conscious and are exercising their power and voice through the products they buy and use (Lindenberg and Steg, 2007). But why do these shifts feel so urgent? There is mounting evidence to support that in many parts of the world, sustainability has become a life and death matter (Lindenberg and Steg, 2007). Hence, environmental features of sustainable innovations promote adoption of eco-friendly products (Chen et al., 2013). In this respect, EFVs as sustainable innovations potentially reduces CO2 emission and fuel consumption (Jiang et al., 2017). Ultimately, EFV adoption significantly impacts on reducing the influence of transportation to global warming. In this vein, Rezvani et al. (2015) report that consumer are more concerned to environment and willing to purchase EFVs because of the environmental benefits. Thus, the study proposes that:

H2: There is a positive relationship between perceived environment and consumer EFV purchase intention.

Consumer identity is the consumption pattern through which consumer describes themselves. In consumer culture, people no longer consume goods and services merely for functional satisfaction. Consumption has become increasingly more meaning-based; brands are often used as symbolic resources for the construction and maintenance of identity. Consumers use brands and products to express their identities (Noppers et al., 2014; He et al., 2018). As an example, car has symbolic meanings of self-expression of individuals. Instrumental attributes and symbolic value always attract consumer intention to purchase a car. As per Self-image congruence theory, consumer is more likely to have positive attitude towards a product that has image to be consistent with his self-image (Jamal and Goode, 2001). This results in his intention to buy that product and ultimately transforms into actual behavior. In this study, perceived symbol denotes to consumer perception of the development of his social image and status when adopting EFVs (Shukla and Purani, 2012). Consumer having EFVs is related to “green” image since of pro-environmental traits of EFVs. The literature highlights positive association between consumer perception of the symbolic features of EFVs and EV adoption decision (Noppers et al., 2016; Schuitema et al., 2013). Hence, the study assumes that:

H3: There is a positive relationship between perceived symbol and consumer EFV purchase intention.

Negative Utility

Secondly, the study used negative utility as determinants of consumer intention to purchase EFVs. Negative utility is composed of perceived risk and perceived fee. Perceived risk refers to consumer perception of the reservations that he exposes to when he is driving an EFV. As EFV is in its infancy stage, EFV technology is not mature, particularly battery technology (Noppers et al., 2014). The limited battery life and range may harm consumer, and thus, charging infrastructure for EVs and repairing battery of other vehicles are essential (Shukla and Purani, 2012). In most countries, the charging infrastructure is a serious concern (He et al., 2018). This is a cause of concern for consumers that EV power exhausts the power before reaching their destination. In addition, limited battery technology of EVs may also cause battery-fire incident that relates it to higher traffic risk (e.g. battery-fire incident). The literature highlights higher level of perceived risk as negative determinant of lower purchase intention (Agarwal and Teas, 2001; Garretson and Clow, 1999). Similarly, there are studies those report perceived risk as negative factor of consumer willingness to adopt innovations (Meuter et al., 2005; Oliver and Rosen, 2010). Hence, the study assumes that:

H4: There is a negative relationship between perceived risk and consumer EFV purchase intention.

Secondly, the study uses perceived fee as a negative utility variables in order to test its association with consumer intention to purchase. Monetary cost refers to actual financial expense on obtaining or using a product (Meuter et al., 2005). It's a natural phenomenon that a consumer usually compares the price of innovation with that of the substitutes when deciding to accept innovation. Based on this comparison, he would form a perception of the additional cost of the innovation based. Prior studies relate negative association between perceived fee and consumer intention to adopt innovation (Egbue et al., 2017; Kaput et al., 2005). This study defines perceived fee as consumer perception of the money that he has to pay for adopting EFVs, like actual price of the EVs and the fee of home charging pile and repairing battery etc. there are evidences in literature that highlighted high purchase price of EFVs as negative determinant of consumer intention to purchase EFVs (Adepetu and Keshav, 2017; Zhou et al., 2014). Therefore, the study assumes that,

H5: There is a negative relationship between perceived fee and consumers' EFV purchase intention.

Personality Traits and EFV Purchase Intention

Personal Innovativeness

Hausman (2005) states personal innovativeness as a degree of adoption of innovations. Strong senses of curiosity and like to seek novelty are built in characteristics of innovative individuals. It is the level of

innovativeness that measures the willingness to adopt new ideas. Higher level of innovativeness is associated with higher probability of adoption innovation (Parveen and Sulaiman, 2008; Thakur and Srivastava, 2014; Zhang et al., 2012). Henceforth, innovative individual are easily attracted to EFVs as new transportation technology as it meets their psychological demand of curiosity.

In addition, they like to seek information (Kim et al., 2010), receptive to innovations, and definitely perceive benefits. The literature highlights positive impacts of personal innovativeness on perceived economic benefit (Xu and Meyer, 2013; Norena-Chavez, 2020; Norena-Chavez and Guevara, 2020). In the meantime, their high personal innovativeness enables them to face risk (Oliver et al., 2003; Lu et al., 2008), that is, they possess comparatively higher tolerance for risk. De Kerviler et al. (2016) conducted their research on the adoption of mobile payment services and report negative significant association between personal innovativeness and consumer perceived risk of the adoption behavior (Kim et al., 2008). On the basis of above mentioned facts, consumers with high personal innovativeness are expected to perceive that EFVs might be a trend in future to replace non-eco-friendly cars (Kim et al., 2008). Their economic benefits, like government subsidies (Rezvani et al., 2015). Similarly, these consumers fade the possible risk of adopting EFVs, such as range anxiety, battery replacement or failure. Hence, the study assumes that:

H6a: There is a positive relationship between personal innovativeness and consumer EFV purchase intention.

H6b: There is a positive relationship between personal innovativeness and perceived monetary benefit of EFV adoption.

H6c: There is a negative relationship between personal innovativeness and perceived risk of EFV adoption.

Environmental Sustainability

Environmental Concern

A new era of sustainability is rising, and it's touching every corner of the world (Pagiaslis and Krontalis, 2014) Consumers in markets big and small are increasingly motivated to be more environmentally conscious and are exercising their power and voice through the products they buy (Yeung et al., 2004). But why do these shifts feel so urgent? There is mounting evidence to support that in many parts of the world, sustainability has become a life and death matter (Smith et al., 2000). Health issues like asthma and typhoid have been linked to deteriorating air and water quality (Akehurst et al., 2012), and in extreme cases, decreased brain function and death (Tsutamoto et al., 2006). The World Health Organization estimates that 12.6 million people die from annually (Morello-Frosch et al., 2001), and that environmental factors in developing countries carry roughly 25% of the disease burden. Air and water pollution are top of mind for global consumers.

Consequently, consumers with environmental concern are more likely to care environment through their consumption behaviors. In line with these constructs, their EFV adoption intention may be a pro-environmental behavior for the reason that of EFVs' eco-friendly behavior (Sinnappan and Rahman, 2011). Furthermore, consumers' environmental concerns intuit them to evaluate the side effects of their products on the environment. They are also willing to pay a premium for (Hartmann and Apaolaza-Ibáñez, 2012), that is, they would deteriorate the cost of the products. Therefore, consumers' environmental concerns make them more aware about the impacts of gasoline cars to the environment (Degirmenci and Breitner, 2017). Such EFVs over gasoline cars because of attributes of EFVs, and are not concerned towards EFV price (Junquera et al., 2016). As a result, the study assumes that:

H7a: There is a positive relationship between environmental concern and consumer EFV purchases intention.

H7b: There is a positive relationship between environmental concern and perceived environment of EFV adoption.

H7c: There is a negative relationship between environmental concern and perceived fee of EFV adoption.

Demographic Control Factors

Even though the study does not mainly center on the effects that demographical variables may have on EFV purchase intention. The study includes several of demographical characteristics as control factor in the model. These demographic variables includes gender, age, income, nationality and education in order to test their impacts have been examined to have impacts on EFV purchase intention (Hackbarth and Madlener, 2016; Mohanty and Prakash, 2014; Yadav and Pathak, 2016). Thus, this provides a solid reason for their inclusion as controls in the model. Among these control factors, gender and education have established significant attentions. Based on earlier researches, gender diversity may be used as moderator (e.g. (Tseng et al., 2013; Müller-Seitz et al., 2009). Unfortunately, the study is unable to collect a reasonable data from gender in UAE due to lack of their presence in learning school. However, the study uses education and nationality as moderators because of their significance presence in the sample size, variation in education level and high presence of expatriates in UAE. People with more education tend not only to be more concerned about the environment (Bell, 2004; Haanpää, 2007), but also to engage in actions that promote and support decisions that protect the environment (Chekima et al., 2016; Latif et al., 2013). Such pressure is a vital way of pushing others towards the type of binding that is needed to reduce greenhouse gases and control emission levels (Dong and Jinsong, 2002). Education encourages people to use energy and water more efficiently and recycle household waste. By increasing awareness and concern, education can encourage people to reduce their impact on the environment through more efficient use of energy, especially in areas of resource scarcity (Truelove and Joireman, 2009; Gelissen, 2007). Literature highlights the significance of age and educational level in protecting environment. In this case, the younger individual with higher levels of education are more likely to be If the research pro-environmental (Engel and Pötschke, 1998; Gelissen, 2007; Marquart-Pyatt, 2007).

Consumer Purchase Intention and Actual Behavior

The Theory of Planned Behavior (TPB) predicts an individual's intention to involve in a behavior. The theory is intended to describe different behaviors over which individual have the ability to exert self-control (Stern, 2000). Behavioral intent is a key component to this model; behavioral intent is subjective to the attitude about likelihood to adopt the expected outcome and influenced by assessment of the benefits and risks attached to that outcome. Since, the TPB has served well in predicting and explaining a wide range of behavior and intention (Kotler et al., 2010), the current study also uses this construct to explain the relationship between intention to purchase and actual purchase behavior.

As per the TPB, perception influences the intention to purchase, so it's very important to highlight the existence of any significance association between both of them. Principally, purchase intention embody the extent to which consumer is expected to purchase. The individuals with intentions are expected to buy (Krug et al., 2001). According to Byrd and Brown, (2003) highlights that consumer with intentions to purchase will to buy certain product will buy product than those with having no intention to purchase. In literature, the study finds evidences in support of association between attitude components and intent (e.g., (Garbarino and Johnson, 1999), or self-reported behavior (Bansal et al., 2005; De Wulf et al., 2001; Homburg and Giering, 2001). However, the empirical evidences on measuring real behavior are rare and the influence of intentions on actual behavior is hardly investigated due to a lack of behavioral data (except Anderson et al., 2000; Lee et al., 2014). At the same time, theoretical insight advocate consumer intentions as the direct antecedent of actual behavior (Ajzen et al., 2009) and evidences highlights intention as a good predictor of actual behavior (De Cannière et al., 2010). In contrast, the correlation between intention and actual purchasing is not necessarily significant (Pino et al., 2012). In case of organic food, there is a big gap between intention and actual behavior (Ajzen, 2002). Wee et al., (2014) reports that 50% individuals showed their intention to purchase, but only 15% actually buy what they intent. Theory of Reason Action, significant correlation exists between intention to purchase and actual behavior (Ajzen, 1991). Nonetheless, though behavioral intention moderates the relationship; there is a need to confirm the association between intent to purchase and actual purchase (Choi et al., 2004). Based on these evidences, the study proposes:

H8: Individual Intention to purchase EFV has positive and significant impacts on the actual buying behavior of EFV.

RESEARCH METHODOLOGY

Measurement Development

Table 1 below presents the developments of measurements for different constructs of the study. In order to ensure the validity, the study adapts items for each constructs from earlier studies. Firstly, the study adapts items for EFVP-I from earlier study of Sardellitti et al. (2015). For item for perceived benefits and perceived environment, the study follows Ozaki and Sevastyanova (2011) and Barth et al. (2016). In addition, the study adapted items for perceived symbol from Noppers et al. (2016); while items for perceived risk are selected from earlier study of Jansson (2011) and Jansson et al. (2011). For items for perceived fee and personal innovativeness, the study follows Yang et al. (2012). Lastly, the study adapts items for sustainability from earlier study of He et al. (2018).

As the original version of the questionnaire is in English, the study uses back-translation method to convert the items into Arabic language. For review purpose, the questionnaire is consulted with four professors who are expert in Arabic language and changes are made accordingly. To conclude, the study conducts a pilot test to ensure scale's validity and reliability. The study collects 52 questionnaires from subjects who know EFVs. The data analysis shows that Cronbach's alphas are 80.78, which is above 0.70 benchmark implying strong internal consistency of the items used. However, the study made minor amendments to the questionnaire accordingly based on the feedback of pilot testing. The final version of the questionnaire is presented in Table 1 below. The study measures all items on seven-point Likert scales. Seven-point Likert items have been shown to be more accurate, easier to use and a better reflection of a respondent's true evaluation. In light of all these advantages, even when compared to higher-order items, 7-point items appear to be the best solution for questionnaires such as those used in usability evaluations.

Table 1 Final construct of the questionnaire

Construct	Items	References
Perceived monetary benefits	Driving eco-friendly vehicle will save my fuel spending	(Ozaki and Sevastyanova, 2011)
	I can enjoy other government incentives while driving eco-friendly vehicle	
	If I consider all costs, driving eco-friendly vehicle is comparatively less expensive than driving conventional cars	
Perceived environment	Driving an EFV reduces the effects of climate change	(Ozaki and Sevastyanova, 2011)
	Driving an EFV reduces the carbon footprint	
	Driving an EFV preserves the environment	
	Driving an EFV reduces pollution level	
Perceived symbol	Driving an EFV reduces the consumption of natural resources	(Poortinga et al., 2013); (Rezvani et al., 2015)
	Compared to a normal car, eco-friendly cars is not suitable for my lifestyle (Reverse)	
	I would feel proud of driving an eco-friendly car	
Perceived risk	The eco-friendly car shows who I am	(He et al., 2018)
	The eco-friendly car enhances my social status	
	I am afraid that the cruising range of EFV cannot meet my expectation	
Perceived fee	I am afraid that eco-friendly cars often break.	(Yang et al., 2012)
	I am afraid that EFVs mean a higher traffic risk for me	
	It would cost a lot to use an EFV	
Personal innovativeness	There are financial barriers (e.g., having to pay for charging pile) to my using an EFV	(Yang et al., 2012)
	If I heard about a new product, I would look for ways to experiment with it	
	I like to experiment with new products	
	Among my peers, I am usually the first to explore new products	
Environmental concern	In general, I am hesitant to try out new products (Reverse).	(Fujii, 2006)
	I think environmental problems are very important	
	I think environmental problems cannot be ignored	
EV purchase intention	I think we should care about environmental problems	(Fujii, 2006)
	Next time I buy a car, I will consider buying an electric car	
	I expect to drive an eco-friendly car in the near future	
	I have the intention to drive eco-friendly car in the near future	

Data Collection

As it is not possible to collect data on intention to purchase and actual purchase decision simultaneously, the study used different methods to collect data. Two stage procedures are adopted to collect the data from respondents. At first stage, a structured questionnaire is distributed among the respondents and study obtains

758 responses after dropping those with no personal information, completed in less time, or has the same answer to all questions. In the second stage, the study uses a follow-up procedure to collect information on the actual behavior of each respondent. Individual private information is used to obtain the actual purchase decision. The study obtained the data for each individual from registering vehicles and fine inquiry's websites (<https://www.moi.gov.ae/en/default.aspx>). This site represents the data of each individual who has a car registered against his name in UAE.

The data collection procedure has been started since October 2018. Once, the response is received, the study visits the above mentioned website to collect actual response and individual who actually purchases the EFV is assigned value of 1 otherwise 0. However, it will be worth-mentioning that only those respondents included in final sample that purchase either EFV or other car. This makes study more logical, because it captures the capacity to purchase and intention simultaneously. The inclusion of intended to purchase responses may be miss-leading, as they still have an option to purchase EFV in future. Moreover, the questionnaire includes several responses explaining the reverse effects, the study assign the value accordingly (as 1=7, 2=6, 3=5 so on). After scrutinizing, the study finds 312 valid responses up to July 20, 2019 and the analyses are based on these responses.

Demographics Characteristics

The demographic characteristics of the sample are presented in Table 2 below. According to the demographics results, about 60.576% are the male respondents, and 36.858% respondents are aged between 31 and 40 years; while 33.974% belong to age group between 41 and 50 years. Moreover, most of the respondents have bachelor degree (68.269%), and are from working class (71.474%). As far as the monthly income is concerned, the study finds 28.525% of the respondent falling in class of income from AED10, 000 to 20,000 and 33.33% from 20,000 to 30,000 United Arab Emirates Dirham (AED). These demographics highly resemble with overall population characteristics. As per survey of the UAE Ministry of Economy, the majority of the population falls in age group between 25 to 55 years old with an average monthly household income of AED18, 248.60. In addition, there is a significant numbers on expatriates in UAE and the demographics also represent that in Table 2. Gender representation is on the lower side as the study represents only 39.423% as female respondents. These demographics may be able to highlight the true picture of population with respect to determinants of eco-friendly car adoption in UAE.

Table 2 Demographics of the respondents

Demographic characteristics of the sample.			
Measure	Item	Number	Percentage
Gender	Male	189	60.576
	Female	123	39.423
Age	≤20	8	2.5641
	21-30	55	17.628
	31-40	115	36.858
	40-50	106	33.974
	51-60	21	6.7307
	≥ 60	6	1.9230
Education	High school or below	5	1.6025
	Associate degree	45	14.423
	Bachelor's degree	213	68.269
	Master's degree or above	48	15.384
Occupation	Student	23	7.3717
	Working	223	71.474
	Unemployed	41	13.141
	Others	21	6.7307
Monthly income (AED)	<5000	10	3.2051
	5000-10000	35	11.217
	10000-20000	89	28.525
	20000-30000	104	33.333
	>30000	73	23.397
Nationality	UAE National	132	42.30
	Expatriates	180	57.66

RESULTS AND DISCUSSIONS

The study uses partial least square (PLS) regression, which is a powerful to examine the model having latent variables. PLS regression is also an efficient regression used on covariance methods. It is the most efficient regression in case of high numbers of explanatory variables and there is high probability that explanatory variables are significantly correlated (Chin et al., 2003). The study firstly tests the validity and reliability of the instruments, and then uses the structural model in order to examine research hypotheses.

Measurement Model

The study uses different indicators for the effectiveness of the model. For the purpose, the study analyzes four indicators—constructs validity, convergent validity, discriminant validity, and reliability to confirm the validity of the questionnaire survey. Factor loading and cross loading are the two parameters that reflects the construct validity. Similarly, the study also uses factor loading, combined reliability, and average variance extracted to reflect the convergent validity of the questionnaire. Moreover, the study also calculates the differences between extracted average variance and the correlation coefficients between variables to highlight to discriminant validity. Cronbach's alpha coefficient and combined reliability reflect the reliability of the questionnaire. For the purpose of calculations, the study uses Smart PLS (Partial least squares) 3.0 software (SmartPLS GmbH, Boenningstedt, Germany). Similarly, the standardized path coefficients and their significance level are calculated to test the hypotheses and their validity. In case, the level of t-test is <0.05 significance level, the hypothesis is accepted. Lastly, the study uses SPSS (IBM, Armonk, NY, USA) macro INDIRECT and the bootstrap method to test the mediation role and its significance.

Results

Construct Validity

For representing overall true score, the construct validity reflects the confidence level of the sample measurements. The results show that the factor loading is greater than the cross loading. Based on Hair et al. suggestion, in case factor loading value of the item <0.50 , the item needs to be deleted. As per results in Table 3, the factor loading values of all the items are >0.50 suggesting high construct validity of the questionnaire.

Convergence Validity

To test reliability and validity of the model, the study performs confirmatory factor analysis (CFA). In Table 3, the values of standard loadings and Cronbach's alpha of items are above 0.7. These results confirm the reliability in line with earlier findings of Yang et al. (2012). Moreover, the values of the average variance extracted (AVE) and the composite reliabilities (CR) for each construct are also above 0.6 and 0.80 respectively. This indicates good validity of the scales (Bagozzi and Yi, 1988; Ko and Stewart, 2002).

The study presents correlation and square roots of the average variance extracted (AVE) of each construct. These results indicate the good discriminant validity of the construct. Lastly, the study also conducts Harman's one-factor test (Podsakoff et al., 2003) in order to examine the likelihood of the common method bias, because the data are self-reported and self-collected from a single source (Chang et al., 2010; Podsakoff et al., 2003). As per results, the largest explained variance of factors is 38.62%, which indicates that the common method bias is not a problem in this study.

Table 3 Scale properties

Construct	Symbol	Standard loadings	Cronbach's α	Combined Reliability	Average Variance Extracted
Perceived monetary benefits	PMB1	0.812	0.831	0.869	0.784
	PMB2	0.787			
	PMB3	0.889			
Perceived environment	PE1	0.782	0.750	0.783	0.814
	PE2	0.779			
	PE3	0.816			
	PE4	0.785			
	PE5	0.831			
Perceived symbol	PS1	0.882	0.852	0.901	0.777
	PS2	0.832			
	PS3	0.892			
	PS4	0.721			
Perceived risk	PR1	0.820	0.853	0.902	0.782
	PR2	0.841			
	PR3	0.871			
Perceived fee	PF1	0.724	0.791	0.820	0.792
	PF2	0.765			
Personal innovativeness	PI1	0.804	0.822	0.875	0.782
	PI2	0.772			
	PI3	0.811			
	PI4	0.805			
Sustainability	Sus1	0.882	0.843	0.881	0.742
	Sus2	0.892			
	Sus3	0.872			
EFV purchase intention	EFVP-I1	0.782	0.882	0.921	0.800
	EFVP-I2	0.807			
	EFVP-I3	0.777			

Discriminant Validity

Discriminant validity specifies the degree to which a single variable is distinguished from other variables. It's very important that there should not be high correlation between variables. It is very important that square root of AVE has to be greater than the correlations between the variables. The results are presented in Table 4 below. The results show the square root of the average variance extracted for each variable is higher than the correlation between variables. The bold text on the diagonal represents the square root of AVE for each variable. These measurements justify discriminant validity of the current study.

Table 4 Correlation coefficient matrix and square roots of AVEs

	PMBr	PE	PS	PR	PF	PI	Sus	EFVP-Intention
PMBr	0.842							
PE	0.564	0.821						
PS	0.437	0.400	0.896					
PR	-0.150	-0.132	-0.236	0.919				
PF	-0.375	-0.140	-0.139	0.316	0.862			
PI	0.451	0.372	0.552	-0.216	-0.268	0.878		
Sus	0.487	0.523	0.240	0.240	0.176	0.423	0.827	
EFVP-Intention	0.526	0.426	0.666	-0.290	-0.314	0.528	0.388	0.892

Results of Structural Model

The results of the hypothesis test are presented in fig.2 below. The total variance of EV purchase intention explained by consumer perception and personality is 57.1%. As per results presented in Table 5 below, the finding finds significance support for all the hypotheses except H3. With respect to perception, two dimensions of positive utility-perceived monetary benefit ($\beta = 0.176$, $p < 0.01$) and environment concern ($\beta = 0.176$, $p < 0.01$) have positive significance associations with EFV-purchase intention in UAE, thus confirming the acceptance of H1 and H2. At the same time perceived symbol ($\beta = 0.196$, $p > 0.05$) on EFV-purchase intention, thereby does not support H3.

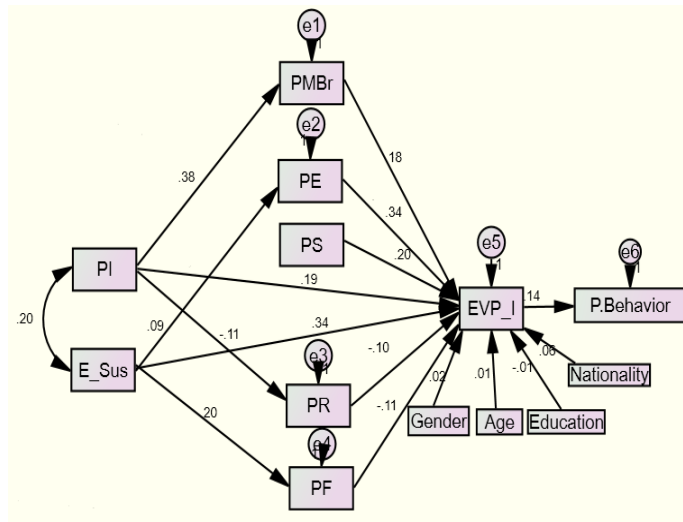


Figure 2 Structure Equation Modeling

Meanwhile, the results show that both dimension of negative utility of perception- perceived risk ($\beta = -0.104, p < 0.01$) and perceived fee ($\beta = -0.108, p < 0.05$) have negative significant impacts on EFV-purchase intention, thereby confirming the acceptance of H4 and H5. As far as personality is concerned, personal innovativeness ($\beta = 0.187, p < 0.01$) positively impacts consumer EFV-purchase intention and perceived monetary benefit ($\beta = -0.378, p < 0.05$, and negatively effects perceived risk ($\beta = -0.112, p < 0.01$), hence confirming the acceptance of H6a, H6b and H6c. The results highlight the sustainability ($\beta = 0.341, p < 0.01$) positively affects consumer’s EFV-purchase intention, perceived environment ($\beta = 0.088, p < 0.01$) and perceived fee ($\beta = 0.208, p < 0.01$). These evidences support H7a and H7b but reject H7c. Importantly, the study finds a strong association between consumer EFV-purchase intention and purchase behavior ($\beta = 0.137, p < 0.01$).

In addition, the study also considers some demographic factors as control variables that may have impacts on consumers EFV-purchase intention in UAE. These factors Include gender, age, education and nationality. As per results presented in Figure 2 and Table 5, gender ($\beta = 0.078, p < 0.01$) has significant positive impacts on EFV purchase Intention in UAE. However, the other demographic do not impact EFV-purchase intention in UAE.

Table 5 Action path coefficients between variables and their analysis results

Hypotheses	Relationship	Estimate	S.E	CR	P-Value	Supported
H1	PMBr→EFVP- Intention	0.176	0.057	3.087	***	YES
H2	PE→EFVP- Intention	0.136	0.056	6.071	**	YES
H3	PS→EFVP- Intention	0.196	0.034	5.764	0.07	NO
H4	PR→EFVP- Intention	-0.104	0.022	4.727	***	YES
H5	PF→EFVP- Intention	-0.108	0.041	2.634	**	YES
H6a	PI→EFVP- Intention	0.187	0.036	5.194	***	YES
H6b	PI→PMBr	0.378	0.032	11.81	***	YES
H6c	PI→PR	-0.112	0.068	1.647	***	YES
H7a	Sus→EFVP- Intention	0.341	0.028	12.17	***	YES
H7b	Sus→PE	0.088	0.045	1.955	***	YES
H7c	Sus→PF	0.208	0.044	4.727	***	NO
Demographics						
	Gender → EFVP- Intention	0.078	0.057	0.315	***	YES
	age → EFVP- Intention	0.009	0.031	0.29	0.741	NO
	Education→ EFVP- Intention	-0.011	0.047	0.234	0.211	NO
	Nationality→ EFVP- Intention	0.048	0.022	2.181	0.863	NO
H8	EFVP Intention→P- Behavior	0.137	0.093	1.473	***	YES

Note: Chi-square=52.48; p=0.00; Chi-Square (or Discrepancy)/df = 3.087; NFI=0.912; GFI=0.922; IFI=0.910; AGFI=0.899; TLI=0.911; RMSEA=0.052

The study also explores the mediation effects of the basic research model by three steps suggested by Baron and Kenny (1986): 1) there should be a significant relationship between independent and dependent variable; 2) the independent variable also has significant impacts on mediators; 3) there is a need to include both independent and mediator as predictor to dependent variable in case the independent variable has insignificant

relation while mediator does have significant. From this, the study concludes full mediation effects: whereas, in case both independent variable and mediator are significantly associated, this is known as partial mediation.

The results of mediation effects are presented in Table 6. As the results show, there is a significant positive relationship between both independent variables and mediator and dependent variable. So, it is concluded that the relationship between personal innovativeness and EFV-purchase intention is partially moderated by perceived monetary benefit. Secondly, the study also tests the moderation effects of perceived environment and perceived fee with respect to sustainability. The results confirm the existence of mediation effects of perceived environment for association between sustainability and EFV-purchase intention. However, the study does not find any mediation for perceived fee.

Table 6 Results of mediation effects testing

IV	M	DV	IV →DV	IV →M	IV+ M →DV	
					IV	M
PI→	PMBr→	EVP-intention	0.378***	0.192***	0.102**	0.151**
Sus→	PE→	EVP-intention	0.106**	0.171**	0.085**	0.098**
PI →	PR →	EVP-intention	0.167***	-0.162***	0.094**	-0.106
Sus→	PF→	EVP-intention	0.182**	-0.092**	0.081**	-0.013

Note: **p < 0.01, ***p < 0.001. IV= independent variable, M=mediator and DV=dependent variable.

Lastly, the study also tests the effects of gender on each relation based on proposed hypotheses following the technique proposed by Reynolds et al. (2005). For the purpose, the study divides the sample into female and male groups. For moderation effects, the study analyzes the moderation effects of gender by comparing path coefficient between male and female groups. As per summarized results presented in Table 7 below, it is observed that path coefficients from perceived monetary benefits and personal innovativeness to EFV-purchase intention for men are significantly different and larger than female, which indicates that perceived monetary benefits and perceived symbol are the factors that generate a desire in men to purchase EFVs in UAE. Further, the path coefficient from perceived environment and sustainability are significantly different and larger for women indicating that perceived environment and sustainability are the factors that positively lead women EFV-purchase intention in UAE. At the same time, the path coefficient from perceived symbol is significantly for both group but has larger coefficient for men, which means that men intention to purchase EFVs in UAE is also lead by perceived symbol. At the same time, the study does not find any significant difference for men and women in case of perceived risk and perceived fee. Lastly, the study finds the path coefficient from EFV-purchase intention to purchase behavior significant for both group but larger coefficient value for women, which means that women with EFV-purchase intention are more likely to purchase EFVs in UAE than men.

Table 7 Results of gender as moderator

hypotheses	Male (n = 189)	Female (n =123)	Statistical comparison of paths (t-value)
H1: PMBr→EFVP-intention	0.1486***	0.0322	5.9435***
H2: PE→ EFVP-intention	0.0921	0.2133***	-6.9824***
H3: PS→ EFVP-intention	0.0322**	0.1991	1.052
H4: PR→ EFVP-intention	0.1621	0.0372	1.2032
H5: PF→ EFVP-intention	0.0882	0.1072	-1.3213
H6a: PI→ EFVP-intention	0.2627**	0.1460	4.9212**
H7a: Sus→ EFVP-intention	0.2380**	0.4321***	-12.839***
H8: EFVP-intention →EFV-PB	0.20762**	0.49382***	-10.2839***

Note: *p < 0.05, **p < 0.01, ***p < 0.001

Discussion

The study aims to explore the impacts of consumers’ perception and personality influence on their EFV-purchase intention in UAE with an established personality-perception-intention framework. Valence framework proposes that consumers do take into consideration the positive and negative effects of their behavior before finalizing their choices. For the purpose, the study considers positive utility and negative utility in order to test their association with EFV-purchase intention in UAE. There are key findings that make the study more useful for different stakeholders and these are discussed as under.

First, the results show two types of positive utility (perceived monetary benefits and perceived environment) significantly impact consumer EFV-purchase intention in UAE (H1 and H2), which are in line with the findings of earlier studies that financial benefits (Langbroek et al., 2016) and environmental concerns (Noppers et al., 2016) positively influence consumer EFV-purchase intention (Langbroek et al., 2016).

Expectedly, the consumers in UAE do consider environmental concerns while making decisions with respects to EFVs because they believe that individual effort could contribute in addressing environment concerns. In contrast to earlier findings (Noppers et al., 2016), the study finds that symbolic attribute are not important for consumer EFV-purchase intention thus rejecting H3. Hence, the consumers consider perceived monetary benefits and perceived environment while making their EFV-purchase decision.

Second, the results highlight both types of negative utility (perceived risk and perceived fee) have negative significant impacts on consumers EFV-purchase intention accepting H4 and H5. As per these results, perceived risk and perceived fee negatively impact consumer EFV-purchase intention in UAE in line with earlier findings (Lin, 2008)) and (Garbarino and Strahilevitz, 2004; Grewal et al., 1994). Luarn and Lin (2005) state that consumer are more concerned about the cost they are paying for adoption of EFVs and the risk attacked to EFV may change their intention to purchase. In addition, the negative effects of perceive risk are comparatively stronger than perceived fee (higher level of significance). This finding supports the argument that high risk is one of the key factors that negative influence EFV-purchase intention as the consumers are more concerned to risk (battery charging, replacement etc. (Egbue et al., 2017)).

Third, the study finds significance of one dimension of personality (personality innovativeness) directly and indirectly in EFV-purchase intention. Consistent with earlier findings of Nilsson et al. (2014), personal innovativeness is a key factor that induces consumer EFV-purchase intention accepting H6a. Remarkably, personal innovativeness also indirectly boosts the consumer EFV-purchase intention by increasing perceived monetary benefit or dropping perceived risk (H6b and H6c). This argument may be due to the view that consumer with higher level of personal innovativeness could simply foresee monetary benefits, which have a tendency to weaken risks.

Besides, sustainability directly strengthens consumer EFV-purchase intention supporting H7a in line with earlier findings of Sinnappan and Rahman (2011). In the meantime, sustainability indirectly does not encourage intention by dropping perceived fee (H7b). This result may be due to un-willingness of to pay more for eco-innovations, which marks the cost view strong.

As a final point, the study also examines the moderation effects of gender. The relationship between personality and purchase intention is moderated by gender and the moderation effects are significantly different for both the groups (female and male). The positive effects of perceived monetary benefits and personal innovativeness on EFV-purchase intention are significantly greater for males, which are in line with previous findings of Müller-Seitz et al. (2009) and Barro and Lee (2013). In contrast, perceived environment and sustainability effects on EFV-purchase intention are stronger for females than for males. This indicates those females are more directed by environmental concerns than males (Davidson and Freudenburg, 1996). Furthermore, gender significantly moderates relationship between behavioral beliefs and EFV-purchase intention in UAE. Specifically, the study highlights mix finding for both the groups. Perceived monetary benefits is the factor of positive utility that impacts male EFV-purchase intention; while perceived environment is more prominent for female in EFV-purchase intention. In contrast, the study does not find any significant difference for both the groups in respect of negative utility. However, the females have more prominent role when it comes to care environment. At the end, the study also tests the moderating role of gender between consumer EFV-purchase intention and actual behavior. As per finding of the study, gender moderates the relationship between EFV-purchase intention and actual behavior. The literature has shown the evidences supporting significance association between intention to buy eco-friendly product and actual behavior (Michaelidou and Hassan, 2008; Wandel and Bugge, 1997). Importantly, as the greater coefficient value suggests, the females are more inclined to purchase EFVs in UAE that from males.

THEORETICAL IMPLICATIONS

There are several important theoretical implications. First, the study develops a personality-perception-intention research framework integrating consumer perception and personality traits to have a general view on the determinants of EFV-purchase intention unlike previous researches that observed the effects of consumer perception and individual characteristics individually. The results strongly support the influence of consumer perception and personality on EFV-purchase intention. Explicitly, personality also affects consumer EFV-purchase intention by some perceptions indirectly. For that reason, the study adds to a philosophical

understanding of the literature on EFV-purchase intention. Second, unlike preceding studies those have explored how both utilities (the positive and negative utilities) influence consumer intention to purchase eco-friendly products, the study highlights the impacts of positive and negative utilities on EFVs established on the valence framework. As per valence framework, both utilities (positive and negative utilities) are individual factors with perceived benefit and perceived risk, separately. However, consumer perceptions comprise of monetary and non-monetary aspects, and therefore, the study divides the positive feature into three extents (perceived monetary benefit, perceived environment, and perceived symbol), and measured the negative feature using two dimensions (perceived risk and perceived fee). Interestingly, the study explores the two types of positive utilities (perceived monetary benefits and perceived environment) are positively associated to EFV-purchase intention, while both dimensions of negative utility (perceived risk and perceived fee) are negatively correlated to EFV-purchase intention. These findings have significant contribution to a broad understanding of the effects of consumer perception on EFV adoption. In addition to this, the study also includes the personal innovativeness and sustainability concerns as dimension of personality traits and finds significant impacts. Though the existing literature highlights the impacts of demographic characteristics on EFV-purchase intention, but personality traits are completely neglected. The personality reflects consumer emotions and feeling to the product (Hirschberg, 1978). In order to fill this gap, the study examines the impacts of personal innovativeness and sustainability concern on consumer EFV-purchase intention. In innovation adoption research, personal innovativeness is one of the most examined factors, and sustainability is highly correlated with eco-innovation. The results provide a strong support to both these factors in UAE context. At the end, the study also examines the association between consumer EFV-purchase intention and actual behavior. This is in line with Fishbein and Ajzen (2011), who assert that intentions will specify the determination the individual will employ in performing the specific behavior. In addition to this, the study also finds that female are more concerned with sustainability than males and they are more likely to adopt EFVs in UAE.

PRACTICAL IMPLICATIONS

Along with theoretical implication, the study also provides significant practical implications. First, the study discovers the positive impacts of perceived monetary benefit and perceived environment on EFV-purchase intention. So, it's very important to take measures that should increase consumers' perception on monetary benefit and environmental concern of adopting EFVs. For instance, the government could announce more financial incentives (like subsidy, tax exception, and cutting leasing cost) and at the same time, industry could offer specific rebate and coupons to increase their perceived benefits. Similarly, government needs to address environment concerns among consumer, so that they could switch to EFVs. Secondly, the negative utilities (perceived risk and perceived fee) are also a cause of concerns for government and industry, and the measures are required to decrease negative perceptions. For example, the government needs to invest in battery charging stations, or replacement of battery) and industry should considerably advance into research and development battery technology and the enlargement of charging infrastructures to alleviate indecisions and consumers' concern of EFV adoption. To address consumer perceived fee, the industry is required to reduce cost of battery replacement and provide free installation of home charging piles of the EFV is fully electric. Third, the study also highlights personality as one of the most important factors that influences EFV-purchase intention. The industry is required to disseminate novel technologies applied in EFVs to attract the innovative consumers. Sustainability has stronger impacts on EFV-purchase intention and female are more pronounced in caring environment. There is a need to launch public awareness campaign to stress the importance of the environment. At the end, the study also shows significance association between EFV-purchase intention and actual behavior of consumers. This highlights that building intention is a significant step to adoption and government and other concerns authorities need to address the measures that increase consumers' intentions to purchase EFVs.

LIMITATIONS AND FUTURE RESEARCH

It's very important to note several limitations while interpreting the results of current study. First, the study surveys only those individuals who are striving for obtaining license in UAE. These findings may be sample

biased because study does not consider those consumers who may be potential buyers. So, it is very important to generalize the study for new car users. Secondly, the study only considers those consumers who never have EFVs experience. It will be worth mentioning that a study can be conducted on consumers who are actual users of EFVs. Besides, UAE is an oil exporting country; the results may be different for oil importing country due to significance of oil prices for non-EFVs. Finally, the findings might be specific to UAE. Given the difference among economies, thus a comparative analysis will be more reliable and useful for generalizing the findings and policy implication.

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