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**Factors Impacting Consumer's Adoption of Electric Vehicles
in Saudi Arabia 2030**

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Abstract

The shift towards clean transport is one of the most important issues currently in the world. Although Saudi Arabia is one of the world's wealthiest countries in oil, it is clearly geared towards electric transport through several initiatives and steps to equip the infrastructure for the production and manufacture of electric vehicles in the Kingdom and encourage their acquisition. Despite the many benefits provided to consumers, many interventions for the widespread adoption of EVs have not been overcome as customers' tendencies to resist new technology are one of the major barriers to the adoption of EVs in Saudi Arabia.

This paper provides an overview of the catalytic factors affecting consumer preference and adoption of electric vehicles in Saudi Arabia assuming equal and different prices between EVs and petrol vehicles. The study exhales insights into the impact of demographic variables, vehicle features and environmental factors. A survey-based study was conducted involving a sample of 205 people from Saudi Arabia. The data collected were analyzed utilizing the Statistical Package for the Social Sciences (SPSS), which found that different variables explore the factors influencing the electric vehicle's preference. Education and high incomes were found to have a positive impact on the adoption of electric vehicles. In addition, improving infrastructure and availability of information promotes the adoption of EVs, and applies an additional model to analyze consumer behavior by assuming the same prices for all vehicles. These results can help policymakers develop transport policies and recognize the economic benefits and functional characteristics of EVs, awareness and knowledge as important criteria, which have a direct impact on the purchasing behavior of fully electric vehicles.

Keywords: Electric vehicles (EVs) ;Charging infrastructure; Consumer behavior; Adoption; Pricing; Preferences; Sustainability issues; Environmental factor

CHAPTER 1

INTRODUCTION

INTRODUCTION

1.1. General Introduction

In recent years, the electric vehicle sector has gained more attention in Saudi Arabia, particularly with the policies of diversifying the economy and reducing oil dependence, where Saudi Arabia, as one of the world's largest oil producers, has recognized the importance of moving to less polluting and more sustainable modes of transport (Hofenk et al., 2017). Saudi government has taken several steps to encourage reliance on electric vehicles, including the Saudi Green Initiative and the Middle East Green Initiative, which were launched in 2021 (Almayani, 2022). These initiatives aim to combat climate change and promote environmental sustainability and include plans to increase the share of EVs among vehicles in the local market. In the past few years, we have witnessed how Saudi Arabia attaches great importance to the sustainable diversification of its economy and the development of various clean energy frameworks under the Kingdom's Vision 2030 (Sultan, 2023). Electric vehicles have become a vital component of the Kingdom's strategy, with the government announcing plans this year to buy 100,000 electric vehicles and establish three electric vehicle factories in the region (BOUBIR, 2021). The adoption of electric vehicles will bring a range of important benefits to Saudi Arabia, notably the reduction of fuel costs, which will turn into income available for expenditure in the local economy. As they have much higher efficiency than gasoline-powered internal combustion engines, these vehicles will provide significant cash revenues due to fuel savings across the country. Oil has undoubtedly become a limited resource, and electric vehicles are therefore capable of helping Saudi Arabia significantly to conserve its energy resources (Menzel, 1998). Therefore, many Arab countries seek to keep pace with the expansion of the electric automobile sector worldwide, by investing in this field locally, and by making plans to encourage citizens to consume these cars. Focusing on this sector also includes competition for its growing profits, trying to move to a productive economy, creating jobs and developing industrial supply chains. The sector's activities include not only the automobile industry, but also complementary activities such as maintenance, spare parts, and shipping stations. Specifically, study adds to the literature by providing insights into consumer behavior for EVs, specifically by studying customer behavior and preferences with equal and varied costs for EVs versus Internal Combustion Engine Vehicles (ICEV). Consistent with past research, it analyzes the sociodemographic features of EV buyers, emphasizing

experience while taking a structured and complete approach that includes environmental factors and car qualities.

The explanatory research is based on a solid theoretical framework for consumer behavior. Based on the theoretical framework and empirical research, we examine automotive characteristics, external factors, and environmental conditions that may influence EV preference. Current literature has investigated EV adoption characteristics, such as motivators and barriers; however, this study provides an overview of numerous EV adoption features, as well as a deeper understanding of consumer behavior and automobile preferences if EVs are priced similarly to other vehicles. The findings have substantial policy implications, underlining the need for EV information availability, enhanced EV charging infrastructure, and government incentives to encourage EV adoption in Saudi Arabia.

To accomplish the abovementioned objectives, the rest of the paper is organized as follows. First, in section 1 the conceptual model guiding this research is presented, followed by the hypotheses. In section 2 explains the variables extracted from the survey followed by a review of the literature is presented, then the method used for the review will be discussed in Section 3. Section 4 shows the empirical results of research questions. In this section, special emphasis is placed on consumer behavior in relation to associated factors. Finally, this section shows the main conclusions as well as the recommendations and future scope of research.

1.2. Problem Statement

The potential problems in Saudi Arabia that prevent the adopting for EVs, represented in scarcity of charging stations and related infrastructure, misconceptions about EVs persist, including concerns about maintenance and the higher initial price tag of EVs compared to traditional internal combustion engine vehicles. Furthermore, one of the primary impediments to EV adoption in Saudi Arabia is consumers' reluctance to accept new, unknown, or unproven technology, as well as major societal and technological constraints. Consumer purchasing decisions are also influenced by sustainability issues. Although the quantity of electric vehicles entering the Saudi market has fallen marginally, studies on customer perceptions and responses are still limited and lack the information and analysis required to understand and explain why electric vehicles are not proliferating as expected. Several constraints remain in Saudi Arabia that must be overcome before significant EV adoption can occur. One of the most significant challenges to EV adoption is customers'

resistance to new technologies. As a result, policy actions that highlight serious issues about EVs are more likely to succeed. The research project aims to gain insight into the preferences of technology enthusiasts when it comes to electric vehicles.

1.3. Study Purpose

In this paper, our specific purpose is to completely analyze the perception of electric vehicles in Saudi Arabia across diverse demographic groups, concentrating on how characteristics like age, gender, and high-income influence attitudes and discussions regarding EVs. It also aims to identify numerous influencing elements that influence customer purchasing behavior for EVs, as well as to understand the challenges to their adoption. The study also aims to identify the elements influencing EV buying behavior, construct a conceptual model that connects the numerous factors in connection to EV adoption, and extract implications that provide policymakers and EV design engineers with actionable recommendations.

1.4. Study Objectives

The main objective of this study is to deduce consumer Perception and behavior towards electric vehicles in the Saudi Arabia context. and to illustrate what are the different factors that affect the consumers to choose a vehicle or will convince a consumer to purchase an electrically operated vehicle in the coming future. To investigate what variables that limit consumers' ability to choose electric vehicles.

This study shed light on the issues associated with the adoption of electric vehicles in Saudi Arabia by giving evidence-based insights and recommendations. The study is a key step toward better understanding the obstacles and opportunities connected with electric car adoption and deployment. By using a mixed-methods approach, we were able to provide a knowledge of this complicated topic, as well as recommend viable solutions for its successful implementation.

1.5. Study Limitations

Although this research shows interesting results and therefore applicable measures to increase the adoption of EVs, some limitations should be considered when interpreting the results. In general, it should be borne in mind that it is a study of the relationships between various questionnaires that answer patterns and not a study of cause and effect. Regarding consumers' attitudes and behavior, further research is needed on the relationship between EVs and environmental concerns. It is important to bear in mind that people do not necessarily highlight and recognize the importance of symbolic subjective traits, such as

influencing self-identity and social status, when asked directly about factors important for the adoption of sustainable innovations, such as electric vehicles.

In line with (Herberz et al. 2020) and (Gleim and Lawson, 2014), consumers may recognize the importance of a sustainable approach to green products, but they don't always translate this attitude into actual behavior. Despite these limitations, our study suggests a path toward fruitful future research that can be built from the outcome of this paper.

1.6. Study Questions

The paper seeks to discover and analyze customer behavior toward electric vehicles as a sustainable innovation, as well as consumer preferences assuming all cars are priced the same.

Hence, this study refers the following research questions:

1. What are the factors that influence the preference and adoption of EVs? By answering this question, the research can answer the following:
 - a) What does a Saudi consumer of electric vehicles look like (sociodemographic variables)?
 - b) What influence do governmental support, information availability, and other car attributes have on electric vehicle preference?

In this case, the dependent variable focuses on a variable that includes whether a consumer prefers to purchase an electric or more traditional vehicle (1 = Yes, EV; 0 = No EV). This research question adds further evidence to the existing literature on potential consumers in Saudi Arabia.

2. To shed light on the importance of consumer behavior, reputation, and image-driven when adopting electric vehicles?
 - a) Concerning the different technologies of a car, if all types of car technology cost the same, would a consumer prefer to buy an electric or gasoline vehicle?
 - b) Are consumers rather driven by reputation when buying an electric vehicle?

In this case, the dependent variable focuses on consumer preferences if electric vehicles cost the same as other cars if all cars have the same purchase price, regardless of technological differences. This research question contributes to the development of conclusions about the significance of status and reputation.

1.7. Research Hypotheses

After reviewing the literatures, our hypotheses refer to the following categories:

- (1) Demographic factors:

- **Hypothesis-1:** Women are more likely to prefer EVs than men.
- **Hypothesis-2:** The younger the consumer, the greater the probability of preferring an EV
- **Hypothesis-3:** Advanced education leads to an encouraged probability of preferring an EV
- **Hypothesis-4:** Greater income leads to an increased likelihood of preferring an EV

(2) Car attributes:

- **Hypothesis-5:** A higher price for EV decreases the preference for EVs.
- **Hypothesis-6:** cheaper consumption and cheaper maintenance costs compensate for the higher purchase price of EVs, increasing the likelihood of preferring an EV.

(3) Environmental settings:

- **Hypothesis-7:** Better infrastructure (charging stations) leads to an increased probability of preferring an EV.
- **Hypothesis-8:** Governmental support for EVs leads to an improved likelihood of selecting an EV
- **Hypothesis-9:** Farther available information linked with the know-how of dealers, leads to an increased possibility of preferring an EV.

1.8 Theoretical Model

Following the literature review, our hypotheses refer to the following categories: (1) demographic factors including individual variables; (2) car attributes, such as price, lower maintenance, etc.; and (3) environmental settings, such as infrastructure, governmental support, etc. The theoretical model representing the factors considered in the present study is shown in Figure 1.

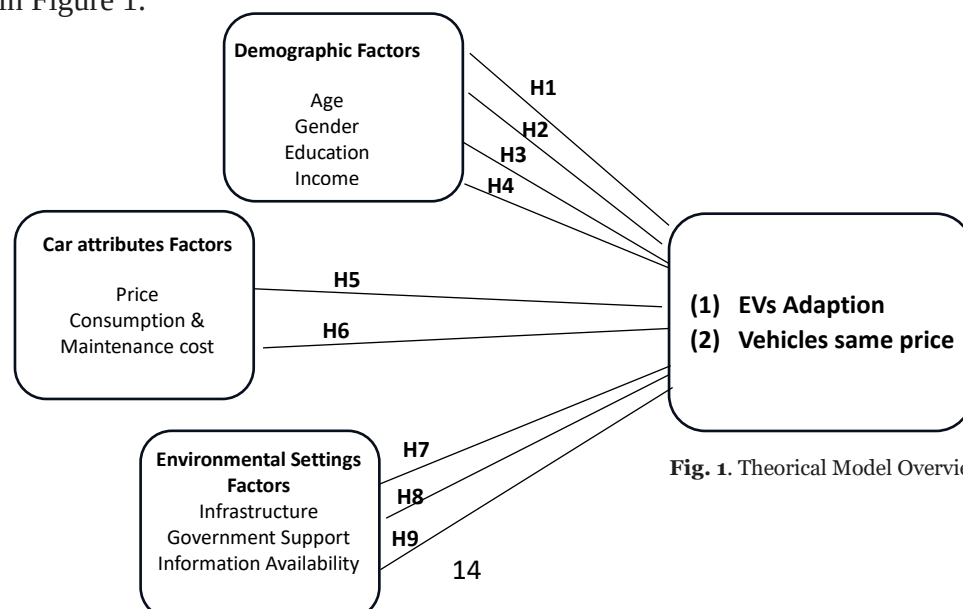


Fig. 1. Theoretical Model Overview.

CHAPTER 2

REVIEW OF LITERATURE

REVIEW OF LITERATURE

2.1. Introduction

A literature review was undertaken to find relevant papers that will help to achieve the research objectives. Keyword combinations such as Electric Vehicles, preference, adoption, consumer behavior, and consumer attitudes were used to find research publications published in peer-reviewed journals. It is vital to highlight that the purpose of this study is to analyze consumer behavior for EV choices from a marketing and managerial perspective, hence engineering publications and other topics irrelevant to this research will be excluded.

2.2. Dependent Variables:

The dependent variable identified is (1) Electric vehicles adoption and (2) Vehicles same price.

2.3 Independent Variables

The independent variables identified are Demographic factors, which are determined by four variables gender, age, education, and income.

Then under car attributes factors perception of high purchase price and lower consumption and maintenance costs can offset a higher purchase price are considered. Environmental settings, better infrastructure along with government support and more available information are also identified in the research model.

2.4. Summary of Past studies

Several studies have studied the factors affecting the adoption of EVs from the customer's perspective. For example, examine customer motivation for pro-environmental behavior and the integrated impact of pleasure factors, gains, and standards on customers' intention to adopt EVs. The experimental results show the importance of all three factors of pleasure, normative and gains in customers' intentions to adopt EVs (Rezaei et al., 2019). The literature also showed contradictory results of EV consumers' demographic variables. Previous studies have provided evidence that females are more interested in the environment than males and therefore more willing to buy EVs (Johansson-Stenman & Martinsson, 2006, Knez et al., 2014, Yang et al., 2019). There is also evidence in the literature that highly educated individuals are most willing to buy electric vehicles (Hidrué et al., 2011, Mukherjee and Ryan, 2020, Olson, 2013). Regarding the variable age, the findings of the current literature are inconsistent. On the one hand, existing literature indicates that green consumers are relatively young (Hidrué et al., 2011; Knez et al., 2014).

Other authors have discovered that senior buyers are eager to buy an EV (Jansson et al., 2017, Zhang et al., 2011). Plötz et al. (2014) and Peters and Dütschke (2014) discovered that middle-aged men are the most likely to purchase private electric vehicles. Johansson-Stenman and Martinsson (2006) stated that age has a favorable influence, claiming that older individuals purchase this type of environmentally friendly product. recharge time, purchase price, performance and operating costs, and all factors had a significant impact on the intention to adopt EVs (Kumar and Alok, 2020; Schuitema et al., 2013). For the income variable, different effects were found in various studies (Bjerkkan et al., 2016) that concluded that income levels are important to consumers only when the costs of using and the cost of purchasing an electric vehicle and gasoline vehicle are similar, low-income people prefer the option with lower usage costs. In line with this, Plötz et al., (2014), found that high-income consumers are more likely to adopt EVs. In contrast, Nayum & Klöckner (2014), found that family income had a negative impact on the purchase of a fuel-efficient car.

Many researchers investigated the precedents of an individual's intention to adopt EVs from a point of view. The mainstream stressed that the possible adoption of EVs would depend on the perception of functional characteristics such as reliability, Studies also highlighted the importance of self-image when buying green products as Hahnel et al., (2014) was explained that consumers use products to determine their self-image and match it with "value-expressed features of products. Johansson-Stenman & Martinsson (2006) explained that individuals often want others to have a good impression of them with social consent and appreciation, in other words, to use products to make people think they are more environmentally friendly and more socially responsible than they already are. This literature review provides a comprehensive overview of current studies analyzing variables that stimulate or hinder the adoption of EVs. Therefore, it is important not only to include social and demographic factors, but also psychological factors to avoid misinformation in industry and policy decisions. Several authors have demonstrated the importance of developing charging infrastructures to promote EVs, concluding that the availability of a functional charging infrastructure is significantly related to BEV markets (Barkenbus, 2020; Hardman et al., 2018 and Sierczula et al., 2014). To overcome other barriers to EV adoption, information concerning low-emission vehicles must be made more widely available and distributed. Some writers have demonstrated that customers are frequently averse to new technologies due to their novelty, unfamiliarity, and uncertainty (Egbue and Long, 2012, Hidrue et al. 2011, Turcksin et al., 2013).

This literature review gives a detailed summary of existing studies that investigate the factors that encourage or discourage EV adoption. According to Nayum and Klöckner (2014), it is critical to include both sociodemographic and psychological aspects in order to avoid misguided industrial and policy decisions.

2.4.1. Infrastructure of Electric Vehicle in Saudi Arabia

Electric vehicles are a key technology in mitigating greenhouse gas emissions in transport, and many governments have set ambitious targets for the adoption of EVs by 2030 and beyond (Filho & De Andrade Guerra, 2021). Rolling out EV charging infrastructure is vital in achieving this goal, as the absorption of EVs is linked to the level of coverage of EV chargers. The public and private sectors have so far been involved in the provision of charging stations, and the time has come to consider the roles of the market's various actors (Tsang et al., 2012). We consider whether EV charging infrastructure is a public good or a private asset and address future charger location problems, deployment models needed to develop, operate and own charging infrastructure, and finally the policy context for charging infrastructure development. We find that clear roles should be assigned to individual public and private actors and financiers in order to effectively develop the infrastructure required for the widespread deployment of EVs. It seemed clear to us today after considering Vision 2030 in recognizing the risks expected before it occurred, in shifting from oil as the sole source of income, to diversifying the sources of state revenues. Saudi Arabia's interest has expanded in recent years to include various promising sectors, such as tourism, sports, mining, leisure and logistics, to include the electric vehicle sector itself (Niblock, 2008). This was reflected in the Saudi Public Investment Fund when it invested in Lucid Electric Car Maker, as well as in Aquapower International, a Saudi company that spends heavily on renewable energy. All this suggests that the vision of Crown Prince Mohammed bin Salman has been built on sustainability, ensuring a dignified life and a promising future for the Saudi people, should future demand for oil fall due to electric vehicles or other vehicles (Al-Atrush, 2023). After 6 months of announcing the construction of the Lucid plant in Riyadh, Saudi Crown Prince Mohammed bin Salman announced in November 2022 that Saudi Arabia would officially enter the world of electric vehicle manufacturing and development by launching the Kingdom's first electric vehicle brand under the name of CEER will manufacture a variety of sedans and SUVs with state-of-the-art technology (Mihalascu, 2022). Actual production will begin in 2025 at Sir's facility now being built in King Abdullah Economic City as well (Ahmed et al., 2024).

Over the next 10 years, CEER will be able to provide 30 thousand direct and indirect jobs, most of which will be for citizens, and will hold training and academic programs that will be able to graduate 10 thousand of Saudi citizens, along with SAR 562 million as a foreign direct investment by 2034 (Awsat, 2022).

Saudi government aspires to produce and sell the first electric vehicle by 2025 at most. Two agreements have been signed with BMW and Volkswagen to take advantage of their experience in the automotive industry (Allam, 2022). The industry is expected to boost the Kingdom's GDP by about 30 billion riyals (Krivevski, 2022).

2.4.2. Challenges of Electric Vehicle Industry in Saudi Arabia

Consumer adoption of electric vehicles has become more popular. Many studies are conducted on the use of EVs and the challenges and benefits of EVs. Based on these studies, factors such as battery charge time, charging infrastructure, battery cost, distance per charge, capital cost are factors in the adoption of electric vehicles and connecting them to the network. Despite all these investments, and despite the Saudi government's official support in this sector, there are clearly challenges to expanding sales of electric vehicles in Saudi markets in the same large proportions as in Western economies.

2.4.2.1. Maintenance and spare parts

One of Saudi Arabia main challenges is the inability to attract the automotive feeder industry, from car doors to engines, in the absence of a large domestic car industry to feed them (WALID, 2023). CEER is scheduled to receive components from "BMW", including batteries, the most expensive part of an electric vehicle (Amariei, 2022). An executive in Saudi automotive manufacturing said the company's approach of maintaining the supply chain and automotive manufacturing within the United States could incentivize other companies to set up regrouping sites for Saudi incentives dedicated to supporting industry localization (Tausif & Haque, 2019). But the executive added that this approach could hinder the expansion of domestic manufacturing, as the country will continue to import manufactured cars abroad. Today, the reluctance of most insurance companies in the Arab region, and their fear of setting up special programs that cover electric cars (Randheer et al., 2017). The main reason is the novelty of this type of car, the insurance companies' lack of knowledge of the risks of these cars and the cost of cutting them off, the quality of the breakdowns and the costs that can result from their events.

2.4.2.2. Charging Stations

Electric vehicles in Saudi Arabia need huge infrastructure and investments in charging stations as well as the development of various charging systems especially in homes to save time and costs (Mukherjee & Ryan, 2020). According to the production plans of these vehicle manufacturers, we could see more than 50 million electric vehicles on roads around the world over the next five years. Upgrading shipping infrastructure is therefore key to scaling up the industry (Rehman, 2017). The most important problem in Saudi Arabia is the limited deployment of available charging stations to date, despite all efforts to expand the infrastructure network of these stations. This crisis will have an impact on consumers' decisions as the Kingdom has open and wide spaces, and its citizens are used to crossing long distances with their cars (Vatsa, et al., 2016). The average distance that can be crossed after charging the electric vehicle battery for one time is approximately 349 kilometers (LaMonaca & Ryan, 2022).

It is therefore generally clear that the availability of charging is a critical enabler for the deployment of EVs. Electric vehicle charging is also available at different speeds, costs and locations and must be designed to suit drivers' needs (Hall, & Lutsey, 2017). The strategic roles of different shipping patterns, in particular home shipping, publicly available shipping, and fees at work are important considerations for policymakers and market actors to improve fee dissemination. This subsection, we provide results on how and where different types of shipping are used by residential EV customers (Dudley, 2022).

2.5. Theoretical Framework of the Study

Based on the literature studies, we identified three pillars that aggregate several aspects that influence EV preference: (1) the consumer, (2) car attributes, and (3) the environment. By doing so, we want to answer the research questions stated above in a comprehensive manner. Li et al., 2017, used a systematic structured approach and classified their systematic literature review into three categories: (1) Demographic, (2) situational, and (3) psychological variables. Similarly, Lane and Potter (2007) highlighted the elements for the adoption of EV with situational and psychological aspects. Environmental conditions, such as legislation or infrastructure, are examples of situational components, whereas psychological aspects include attitudes, symbols, and influences, among others.

CHAPTER 3

THE METHODOLOGY

Research Methodology

3.1. Introduction

The methodology of the study and its procedures are considered a major focus in which the applied side of the study is accomplished, and through it the data required to be analyzed statistically are obtained and then the results that are interpreted considering the literature of the study are reached, and thus the study achieves its objectives. This chapter deals with a description of the methodology used, the community and sample of the study, as well as the management of the study used, the method of organizing it, how to build and develop it, and the degree of its validity and stability. It also includes a description of the procedures taken by the researcher in designing the study tool and its technology. And the tools that were used to collect the study. The chapter ends with the statistical treatments that were used to analyze the data and draw conclusions.

3.2. Research Design

The quantitative research method employed in this research and study involves acquiring primary data from the community. A designed questionnaire was planned for respondents using the Google Form platform. The survey questionnaire was divided into two parts- Demographic Information and factors of adoption of electric vehicles. The primary data will be used to examine the factors and how these are relevant to the respondent. The material used in this research consists of one questionnaire, in which the participants filled out the questionnaire without revealing their identity. Consent was granted automatically by the participants agreeing to start and end the survey whenever they wished to do so. No time restrictions were placed on completing the questionnaire. The entire questionnaire (Appendix .1) was created in English and Arabic, the scale consisted of (13) paragraphs in 2 sections. Some questions were in multiple-choice format, giving a respondent little latitude to be descriptive. In most of questions a close-ended question was used, with mostly expecting an answer of either "yes" or "no." to measure based on a percentage of the population of how acceptable or unacceptable a proposition. All elements of the questionnaire were examined to ensure the correct wording, and some words and phrases were reformulated.

The two primary sections present in the questionnaire were as follows:

- (1) Demographic information:

The survey begins with demographic variables. Questions such as age, gender, education, and salary were asked.

- (2) Adoption of electric vehicles: including the consideration of current purchase of electric cars depending on following traits: same purchase price; brand reputation; Low Consumption and maintenance; higher list price; Government support; available information; environment Pollution; and charging stations.

3.3. Population of the Study

The study is targeting Saudi Arabia consumers (both genders) with age group 20 to over 50. And examining their income and education level and how these elements would affect their preferences toward EVs.

3.3.1 Study Area

The study was undertaken in the Kingdom of Saudi Arabia, a country in West Asia and the Middle East as showing in (Figure 2), it covers the bulk of the Arabian Peninsula and has a land area of about 2,215,000 km², making it the fifth-largest country in Asia and the largest in the Middle East.



Figure 2. Map showing the position of Saudi Arabia

3.4. Sample Characteristic

The sociodemographic characteristics of the sample are generally shown in Table (3.1). The sample (N = 205) consisted of 69.8% men and 30.2% women. The age distribution was as follows: 20 – 29 years 18.5%, 30- 39 years 55.6%, 40-50 years 17.1%, and older than 50 years 8.8%. Regarding education, 13.2% of the respondents finished high school, 17.6% with Diploma, 44.4% Bachelor, 22.4% master's degree, and 2.4% Doctorate.

Finally, 44.8% of the respondents reported a net household income of less than 10,000 SR per month, 34.1% had incomes between 10,000 and 19,000 SR per month, 10.7% had incomes between 20,000 and 30,000 SR per month and 10.2% reported an income of more than 35,000 SR per month.

Variable		Frequency	%
Gender	Male	143	69.8
	Female	62	30.2
Age	20 – 29 Years	38	18.5
	30- 39 Years	114	55.6
	40-50 Years	35	17.1
	Over 50	18	8.8
Education	High school	27	13.2
	Diploma	36	17.6
	Bachelor's degree	91	44.4
	Master's degree	46	22.4
	Doctorate degree	5	2.4
Salary	Below 10,000 SR	92	44.8
	10,000 -19,000 SR	70	34.1
	20,000 -30,000 SR	22	10.7
	Over 30,000 SR	21	10.2

Table 3.1. Basic information obtained from the respondents.

3.5. Sample Size Determination

This section is used to determine the number of samples on which the research study should be done. We ran a preliminary survey to determine the sample size. We used the sample size determination approach for population proportion.

We used the questionnaire to determine whether a consumer is interested in electric vehicles. This was an important criterion because the entire research was based on it to determine consumer perceptions of electric vehicles and ensure that the intended results were obtained.

Formula:

$$n = \frac{\hat{p} \times (1 - \hat{p}) \times z^2}{MOE^2}$$

with:

n: sample size

$\hat{p}$: sample proportion

z: found by using a z-score table

MOE: margin of error (to be divided to get a decimal)

Calculations:

1- Calculate the critical value:

With a 85% confidence level, $(100 - \text{minus } 85) \div 2 = 7.5$ is the area in each tail of the standard normal curve. $100 - \text{minus } 7.5 = 92.5$ indicates the cumulative area up to the second tail. Find $92.5 \div 100 = 0.925$ in the z-table to get a z-score of $1.4 + 0.04 = 1.44$.

2- Substitute inputs and round up to the nearest whole number:

$$n = \frac{0.5 \times 0.5 \times 1.44^2}{0.05^2}$$

sample size without correction equals the quantity 0.5 times 0.5 times 1.44 squared all over the decimal 0.05 squared and rounded up to the nearest whole number.

$= 207.36 \rightarrow$ which rounds up to 208

3- Conclusion

With a margin of error of $\pm 0.05\%$ and an expected sample proportion of 0.5, the sample size would need to be 208.

3.6. Data Collections Procedures

There are several ways of conducting a survey and all these approaches have their advantages and disadvantages. Thus, there is a need to carefully choose the right instrument based on the nature of our investigation. Survey communication instruments can include telephone interviews, web-based surveys, self-administered surveys, and one-on-one interviews. A web-based survey method was employed in this study due to its low cost, efficiency, and the short amount of time available for research. The survey was conducted using (Google Forms (and the survey was run from 20 to 29 February 2024. The questionnaire web link was spread to the respondents by email, and WhatsApp, creating a snowball sampling approach.

3.7. Method of Analysis

This study is an exploratory study with the main goal of understanding how consumers view electric vehicles as an innovation that enables dual transitions, i.e. digital greening. In the absence of measures or preconditions in previous literature, as evidenced by the

extensive review of the literature presented above, the choice of a qualitative approach is appropriate. The questionnaire was devised to gather primary data to obtain new knowledge to determine consumer's perception towards the electric vehicle and the various factors which influence them to purchase a vehicle. The investigation of the data was done using correlation Analysis. The extraction method is Principal Component Analysis (PCA) using IBM SPSS Statistics tool. The data collected from the customer are transcript to the worksheet and analyzed by using Excel to illustrate the data as tables from which inferences were drawn. Based on consumer behavior principles, study findings were analyzed, and recommendations were produced.

To assess respondents "adoption of electric vehicles" questions were rated according to closed questions (Yes / No) and Single-Selection questions. Q1, Q2, Q3, Q5, Q6, Q8 and Q9 were classified into Yes = 1 and No = 0. Where Q4 with a Single-Selection questions that classified with Electric Vehicle = 1 and Gasoline Vehicle =2. Finally, Q7 answers classified with Low Consumption and maintenance costs = 1, Charging stations Availability = 2 and Preserving environment Pollution = 3. (Table 3.2).

Variable	Code
adoption of electric vehicles	Have you had an experience with test-driving an electric vehicle?
	Q1
	Are you desire to purchase an electric vehicle in future (as a next car)?
	Q2
	If you purchase an electric vehicle, are you intending to keep your gasoline vehicle
	Q3
	if all types of vehicles technology cost the same, you would prefer to buy:
	Q4
	Does the higher list price of electric vehicles compared to gasoline vehicles influence your decision on buying an electrical vehicle?
	Q5
	If you decide to purchase an electrical vehicle, are you driven by brand reputation?
	Q6
	What factors might motivate you more to buy an electric vehicle?
	Q7
	Governmental support for EVs (procedures, defined policies, infrastructure, consumer rights, etc.) may motivate you more to buy an electric vehicle.
	Q8
	More available information combined with the know-how of dealers, leads to increase the probability of your preference to Electrical vehicles.
	Q9

Table 3.2. Questions that Measure adoption of electric vehicles.

The responses to the closed-ended survey questions were converted to percentages based on the total number of responses for that specific question, which related to a perceived obstacle to the adoption of electric vehicles in Saudi Arabia.

3.7.1 Chi-square test

The Chi-square test was performed to examine the significance between demographic characteristics and factors that influence the preference of EVs at 5% confidence levels. When the beta coefficient approaches 1, it indicates that the independent variable is likely to have a significant influence on the dependent variable. However, if it is near to 0, the dependent variable will have little influence on the research. The strength of each independent variable's impact on the dependent variable is represented by its absolute value, which increases with the beta coefficient (Mujiatun and Ferina, 2021).

Table 3.3 Chi-square tests between demographic factors and factors that influence electric vehicle preference.

Factor	a +	b +	c +	d +	e +	f +	g +
Age	0.019	0.315	0.740	0.969	0.202	0.073	0.448
Gender	0.232	0.147	0.913	0.262	0.371	0.285	0.920
Education	0.047	0.983	0.205	0.364	0.676	0.375	0.298
Income	0.047	0.250	0.231	0.342	0.147	0.955	0.444

+ a = desire to purchase an electric vehicle in future; b = Purchasing an electric vehicle, with keep gasoline vehicle; c = with different purchase price, would prefer to buy gasoline car; d = higher list price influence decision for buying an electrical vehicle; e = driven by brand reputation; f = Governmental support motivate to buy an electric vehicle; g = Available information increase probability of preferring Electrical vehicle. * (significant at 5%).

Based on (Table 3.3, column a +) the independent variables within this research where age factor ($P = 0.019$), education factor ($P = 0.047$) and income factor ($P = 0.047$) are considered significant as the p-values < 0.05 and could become consumer's adoption on electric vehicles factors. Conversely, the gender factor with a p-value of 0.232 is greater than 0.05, signifies that the independent variable is not statistically significant.

3.7.2 Correlation between variables

Most studies investigate the interaction of individual-related variables and preference parameters independently, without accounting for the association between different types of individual-related variables. One exception is the relationship between psychological elements and other variables. Kim et al. (2014) determined that psychological characteristics are associated to socioeconomic features, Daziano and Bolduc (2013) with mobility patterns, and Jensen et al. (2013) with car condition.

To confirm the internal consistency of the statements of the variable measurement tools in the questionnaire, A correlation coefficient was calculated for the paragraphs that measure

each of the study variables which is a number that expresses the strength of the relationship between variables. Table 3.2 shows the factor loading as per the analysis performed, note that Q1(Have you had an experience with test-driving an electric vehicle?) and Q3 (If you purchase an electric vehicle, are you intending to keep your gasoline vehicle) do not correlate with variables, for that, these questions will be removed.

Correlations											
		overall score	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
overall score	Pearson Correlation	1	.028	.556**	.055	.447**	.441**	.263**	.567**	.652**	.561**
	Sig. (2-tailed)		.694	<.001	.431	<.001	<.001	<.001	<.001	<.001	<.001
	N	205	205	205	205	205	205	205	205	205	205
**. Correlation is significant at the 0.01 level (2-tailed).											
*. Correlation is significant at the 0.05 level (2-tailed).											

Table 3.4. Correlation between variables.

3.8. Ethical Considerations

A cover letter outlining who I am, and the intent of the research project is included for the questionnaire. An ethical consideration was that the knowledge must be maintained secret and used strictly for academic purposes. Answering the survey anonymously, no names or addresses were requested. Only personal data that serve the analysis were obtained, such as gender, age, education, and salary.

CHAPTER 4

Practical Study

Practical Study

4.1. Research Findings

4.1.1. Demographic details of respondents

The demographic distribution shown in (Table 3.1) gives an understanding of the characteristics and distinctive features of respondents. As the demographic distribution provides an idea about the respondent's background and details which provides strength to the conclusions, which are drawn through the data. The complete sample size in this study was 205 in number. Males with 69.8% and 30.2% females in this research dominated gender distribution. Most of the respondents belonged to the age group of 30–39 years (55.6%). Looking at the educational qualifications of the respondents, most of them hold a bachelor's degree (44.4%) followed by respondents with master's degree (22.4%). This characterizes the respondents were well eligible and knowledgeable. In the income point of view, the common of the respondents have an income below 10,000 SR per month (44.8%) followed by those who have an income between 10,000 – 19,000 SR (34.1%).

		Age				Total
		20 – 29 Years	30- 39 Years	40-50 Years	Over 50 Years	
Gender	Female	20	36	5	1	62
	Male	18	78	30	17	143
Total		38	114	35	18	205

		Education					Total
		Bachelor	Diploma	Doctorate	High school	Master's degree	
Gender	Female	21	9	1	12	19	62
	Male	70	27	4	15	27	143
Total		91	36	5	27	46	205

		Salary				Total
		Below 10,000 SR	10,000 - 19,000 SR	20,000 -30,000 SR	Over 35,000 SR	
Gender	Female	43	17	0	2	62
	Male	49	53	22	19	143
Total		92	70	22	21	205

Table 4.1. Gender * Age*Education* Salary Crosstabulation

In the above (Table. 4.1.) we find the majority of “female” respondents with an income category below 10k SR combined with bachelor education level is similar to the majority of

the “male” respondents who located in the same range. Thus, the greater part come from a demographic known as millennials, who are potential EV customers and capable of providing the necessary information in qualitative as well as quantitative formats. Furthermore, the respondents are mature and well-qualified.

4.1.2 Adoption of Electric Cars

Respondents were provided with major parameters influencing EV adoption and asked how likely they were to purchase an electric car in specific conditions (Table 4.2.). It should be noticed that the second question took a positive tone, which was likely to influence the following responses.

Table 4.2. Percentages of respondents showing the degree to which they were likely to purchase an electric vehicle based on the current status.

Factor	1	0
Have you had an experience with test-driving an electric vehicle?	26.8	73.2
Are you desire to purchase an electric vehicle in future (as a next car)?	68.3	31.7
If you purchase an electric vehicle, are you intending to keep your gasoline vehicle	82.9	17.1
Does the higher list price of electric vehicles compared to gasoline vehicles influence your decision on buying an electrical vehicle?	79.0	21.0
If you decide to purchase an electrical vehicle, are you driven by brand reputation?	94.6	5.4
Governmental support for EVs (procedures, defined policies, infrastructure, consumer rights, etc.) may motivate you more to buy an electric vehicle.	88.3	11.7
More available information combined with the know-how of dealers, leads to increase the probability of your preference to Electrical vehicles.	85.9	14.1
Average	75.12	24.88

*1= Yes; *0 = No

Over 73% of the respondents showed that they had no experience driving an electric vehicle, However, more than 68% expressed a desire to acquire an electric vehicle. On the other hand, more than 82% reported that while they want an electric vehicle, they will keep their gasoline vehicles, this may give the impression that respondents do not yet have confidence to dispense gasoline for electric vehicles.

Respondents were likely not to purchase an electric vehicle given their current cost as 79% reported, while 20% of the respondents were likely to buy at the current price. The study is in line with the outcome gained in China by He et al. (2018), which showed that high-price EVs negatively affect consumer purchases. It can be discussed that because gasoline cars of the same size and features are relatively cheaper and less expensive, consumers find

owning an electric vehicle prohibitively expensive. The main explanation for this cost discrepancy is the price of rechargeable battery packs (Ye et al., 2021).

The dependent variable "car same price" assuming equal prices which provided further statistical relevance, meaning that if prices were the same for all vehicles, the probability of preferring an electric vehicle over a gasoline vehicle would increase. we asked our respondents "Q4" that, if all types of vehicles cost the same, would they prefer to buy which of the vehicle types? both genders male and female (over 52% on total) would prefer purchasing gasoline vehicles (Table. 4.3.), meaning that if prices were the same for all vehicles, the probability of preferring an EV over gasoline vehicle would decrease.

		Electric Vehicle	Gasoline Vehicle	
Gender	Female	30	32	62
	Male	68	75	143
Total		98	107	205
Percent		47.8	52.2	100

Table. 4.3. Q4. If all types of vehicles technology cost the same

As previously stated, the variable "price" has a substantial impact on the purchase intention of EVs and is thus vital to study. We asked our respondents "Q7" which would be more factors that might motivate them more to buy an electric vehicle, this question helped to provide evidence on consumer behavior toward price. (Table 4.4.) showed that both genders male and female (over 52% on total) would be motivated by low consumption and maintenance cost. This leads us to conclude that one of reasons that consumers might not prefer electric vehicles if have same price as gasoline vehicle due to the high cost of consumption and maintenance cost.

		Charging stations Availability	Low Consumption and maintenance costs	Preserving environment Pollution	Total
Gend e	Female	16	33	13	62
	Male	38	75	30	143
Total		54	108	43	205
Percent		26.3	52.7	21.0	100

Table. 4.4. Q7. Factors might motivate more to buy an electric vehicle.

It is noteworthy that reputation-driven consumers "over 94%" showed positive statistical relevance on factor "reputation-driven," that is, the more the emphasis on reputation, the higher the likelihood of preferring an EV over a gasoline vehicle as the next future car.

Thus, status-driven consumers were more likely to choose and buy EVs than non-status-driven ones. continuously, more consumers are driven by reputation, the less they opt for an EV in the situation that EVs cost the same, (remember 47.8% chose gasoline vehicles over EVs if it cost the same) which is an interesting finding. It is worth considering whether “reputation drive” does not capture the socially desirable aspects of cars other than EVs since high-status cars are usually more expensive.

Consumers are more willing to purchase EVs if governmental support such as (procedures, defined policies, infrastructure, consumer rights) "over 88%" and available information "over 85%" the better these data were for the vehicle, the higher the probability of preferring an EV (Table. 4.2.).

4.1.3 Hypotheses Findings.

4.1.3.1. Demographic Hypothesis

Holding Hypothesis 1 “Females are more likely to prefer EVs than men”, this statement can be rejected, as in this sample men seemed more likely to prefer EVs. As it is important to consider that men percentage who filled the survey more than females. If this finding is accepted with caution, Hypothesis 1 should be rejected, and this outcome is consistent with (Plötz et al. 2014). As for the variable age, our result suggests rejecting Hypothesis 2 "The younger the consumer, the greater the probability of preferring an EV", as the single largest age group of respondents (55.6%) comprised those between the ages of 30 and 39 which is showed a positive sign, meaning that the older the consumers were, the higher the probability of preferring an EV (Table.3.1). This result supports the findings by Plötz et al., (2014), Jansson et al., (2017), Johansson-Stenman and Martinsson (2006), Peters and Dütschke (2014).

Hypothesis 3 "Advanced education leads to an encouraged probability of preferring an electric vehicle" can be accepted since most respondents having bachelor’s degrees (44.4%) or post-graduate qualifications (22.4%). Thus, a higher level of education led to a higher probability of preferring an EV (Table. 3.1), which is in line with the current literature (Olson, 2013, Jansson et al., 2017, Mukherjee and Ryan, 2020). The same applies for Hypothesis 4, which states that having a higher income increases the likelihood of preferring an electric vehicle, in accordance with Bjerkan et al., (2016), Plötz et al., (2017) and Junquera et al., (2016).

4.1.3.2. Car attributes hypotheses

Hypothesis 5 states that a higher price for EV decreases the preference for EVs, and this is to be accepted, respondents felt strongly (79%) that the high price would influence their decision on buying electric vehicles (Table 4.2). The study is in line with the results attained in China by He et al., (2018) which proved that high-price EVs negatively affect consumer buying. Hypothesis 6, stating that lower consumption and lower maintenance of an EV can compensate for the higher purchase price, this evidence is in line with question 7 (Table 4.4) which supported this finding, respondents were presented with key factors that affect adoption of EVs and were asked what might motivate them more to buy an electric vehicle, about 52.7% expressed that they would be to buy an electric car due to low consumption and maintenance costs. In general, the hypotheses about the different car attributes helped to better understand consumer behavior and the factors that influence their preferences for EVs.

4.1.3.3. Environmental settings hypotheses

Hypothesis 7 analyzes the impact of an electric vehicle charging infrastructure, our results for this variable showed no statistical significance, only 26.3% of respondents showed interest in the availability of charging stations as motivators for purchasing an electric vehicle (Table 4.4). Therefore, Hypothesis 7 is to be rejected based on what was found. Hypothesis 8 concerns if government support increases the preference for an electric car, which has been explored in various research papers with favorable confirmation (Gallagher and Muehlegger, 2011), (Turcksin et al., 2013) and (Hardman et al., 2017). in Q5 we showed that 79% of respondents consider electric vehicle prices important which affect their choice to EVs, in turn, 88.3% of respondents (which is close percentage to the previous one) stated that Governmental support for EVs may motivate them more to buy an electric vehicle (Table 4.2). Hence, that price-conscious car buyers may also tend to the government support for electric vehicles, and this is consistent with the hypothesis that governmental supports would increase the desire for an EV comes from their tendency to minimize the initial purchase price. Since the factor "price of EV" showed statistical significance in Hypothesis 5. Therefore, Hypothesis 8 can be accepted, according to which government support contributes to increasing the preference for an EV.

Hypothesis 9 analyzed the impact of information availability to support the positive relationship between information availability and EV preference, as found by Egbue and

Long (2012), Hidrue et al., (2011) and Turcksin et al., (2013). However, it was statistically significant since 85.9% of respondents express that available information combined with the know-how of dealers, leads to increase the probability of their preference to Electrical vehicles and therefore the hypothesis can be confirmed and accepted based on (Table. 4.2.).

4.2. Summary

This paper presents the impact of different variables influencing the preference for EVs with a strong emphasis on consumer behavior. It includes consumers' sociodemographic variables, car attributes, and environmental settings, such as governmental support and infrastructure development on the preference for EV, additional to the findings of how consumer preferences would change if purchase prices were the same for both electric vehicles and gasoline vehicles. This study examines the role of reputation and image in deciding whether a person will prefer an EV over another vehicle. By emphasizing the value of reputation, it provides useful information regarding consumer behavior. In terms of socioeconomic factors, the current literature produces inconsistent results. At the same time, it is widely recognized that sociodemographic characteristics have a substantial impact. In summary, we could show that a higher education as well as higher salary are positively reflected in the preference for an EV. This research may lead to the conclusion that people prioritize reputation and social acceptance over environmental considerations and Most people are aware of electric vehicles and are considering getting one in the future.

4.3. Research Recommendations

The majority of the customers 73.2 % (Table 4.2) not had an experience to drive an electric vehicle, for that, there is a high chance that if car manufacturers provide the best features with good demo and give some attractive schemes, they can attract more customers. Furthermore, EVs are innovative products, marketing tactics must emphasize relative benefits, compatibility, and observability. Therefore, analysis of the heterogeneity of a consumer's willingness to purchase an EV is important and useful for public decision-makers, such as governments, to implement correct measures by understanding the market and consumers. Although the study sample is representative of the population of Saudi Arabia with respect to age and gender, it is still useful to take the results into account for decision-making. Given the low penetration of EVs in Saudi Market, support is believed to be a prerequisite to eventually change consumers' behavior, as Governments should also encourage the availability of information on EVs to clarify confusions about their

performance. Furthermore, an efficient infrastructure system should be pushed and implemented. Most consumers have a budget of less than 10,000 SR. Hence, new car manufacturers should launch their Electric vehicles with this price range to target this segment of the population. Although the result of this research has shown that availability of charging station did not really reflect significant influence towards consumer adoption of electric cars in Saudi Arabia. Policy makers, government, and car manufacturers should still continue to look into as the low availability of charging stations in Saudi Arabia will result in low adoption of electric vehicles in the kingdom. The lack of publicly accessible charging stations, which can cause discomfort or even unavailability for EV owners, emphasizes the need of a well-planned strategy for selecting the quantity of charging stations to install as well as the timing and places for their implementation.

Finally, future studies might examine the various car brands' roles in detail. While "brand" is a factor in the factor analyses in this study, it would be interesting to find out if consumers prefer electric vehicles of a particular brand when adopting luxury brands that could indicate social status (i.e., do consumers behave differently when adopting luxury brands like Porsche, Mercedes, Audi compared to Renault, KIA, etc.).

Research References

- Ahmed, I., Mehrez, K., Socci, C., Deriu, S., Mathkur, N. M., & Casasr, I. P. (2024, January 6). Disaggregated effect of construction investments on the Saudi economy: a dynamic computable general equilibrium model of Saudi Arabia. *Financial Innovation*, 10(1). <https://doi.org/10.1186/s40854-023-00530-1>
- Al-Atrush, S. (2023, February 12). Saudi Arabia goes electric to launch homegrown car industry. *FINANCIAL TIME*. <https://www.ft.com/content/30d7f721-94e7-41d5-9d5b-a3ba85b93373>
- Allam, N. (2022, November 6). Saudi's PIF launches "Ceer" the first Saudi electric vehicle brand. *WAYA*. <https://waya.media/saudis-pif-launches-ceer-the-first-saudi-electric-vehicle-brand/>
- Almayani. (2022, November 7). السيارات الكهربائية بالسعودية.. خطة اقتصادية بصبغة مناخية. *سكاي نيوز عربية*. Retrieved March 17, 2024, from <https://shorturl.at/oqtzT>
- Amariei, F. (2022, November 3). Ceer Is Saudi Arabia's First Homegrown EV Brand, Will Use Licensed BMW Components. *Autoevolution*. <https://www.autoevolution.com/news/ceer-is-saudi-arabia-s-first-homegrown-ev-brand-will-use-licensed-bmw-components-202900.html>
- Awsat, A. A. (2022, November 3). Crown Prince Launches Ceer, the 1st Saudi Electric Vehicle Brand. <https://english.aawsat.com/home/article/3967641/crown-prince-launches-ceer-1st-saudi-electric-vehicle-brand>
- Barkenbus, J. N. (2020). Prospects for electric vehicles. *Sustainability*, 12(14), 5813.

Bjerkan, Kristin Ystmark, Tom E. Nørbech, and Marianne Elvsaa Nordtømme. "Incentives for promoting battery electric vehicle (BEV) adoption in Norway." *Transportation Research Part D: Transport and Environment* 43 (2016): 169-180.

BOUBIR, N. (2021, October 1). https://www.ijherjournal.com/journaldetail/strategic-behaviour-in-the-service-of-comprehension-of-texts-in-frensh-as-foreign-language_120#:~:text=STRATEGIC%20BEHAVIOUR%20IN%20THE%20SERVICE%20OF%20COMPREHENSION%20OF%20TEXTS%20IN%20FRENSH%20AS%20FOREIGN%20LANGUAGE. *International Journal of Humanities and Educational Research*, 03(05), 234–239. <https://doi.org/10.47832/2757-5403.5-3.21>

Daziano, R. A., & Bolduc, D. (2013). Incorporating pro-environmental preferences towards green automobile technologies through a Bayesian hybrid choice model. *Transportmetrica A: Transport Science*, 9(1), 74-106.

Dudley, D. (2022, June 15). Powering up electric vehicles in Saudi. AGBI. Retrieved February 28, 2024, from <https://shorturl.at/cirwB>

Egbue, O., & Long, S. (2012). Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. *Energy policy*, 48, 717-729.

Filho, W. L., & De Andrade Guerra, J. B. S. (2021, January 5). *Water, Energy and Food Nexus in the Context of Strategies for Climate Change Mitigation*. Springer Nature.
http://books.google.ie/books?id=KXgSEAAQBAJ&pg=PA112&dq=https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf&hl=&cd=1&source=gbs_api

-
- Gallagher, K. S., & Muehlegger, E. (2011). Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology. *Journal of Environmental Economics and management*, 61(1), 1-15.
- Gleim, M., & J. Lawson, S. (2014). Spanning the gap: an examination of the factors leading to the green gap. *Journal of Consumer Marketing*, 31(6/7), 503-514.
- Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: status, reputation, and conspicuous conservation. *Journal of personality and social psychology*, 98(3), 392.
- Hafner, R. J., Walker, I., & Verplanken, B. (2017). Image, not environmentalism: A qualitative exploration of factors influencing vehicle purchasing decisions. *Transportation Research Part A: Policy and Practice*, 97, 89-105.
- Hahnel, U. J., Gölz, S., & Spada, H. (2014, March 14). How does green suit me? Consumers mentally match perceived product attributes with their domain-specific motives when making green purchase decisions. *Journal of Consumer Behaviour*, 13(5), 317–327. <https://doi.org/10.1002/cb.1471>
- Hall, D., & Lutsey, N. (2017). Emerging best practices for electric vehicle charging infrastructure. The International Council on Clean Transportation (ICCT): Washington, DC, USA, 54.
- Hardman, S., Chandan, A., Tal, G., & Turrentine, T. (2017). The effectiveness of financial purchase incentives for battery electric vehicles—A review of the evidence. *Renewable and Sustainable Energy Reviews*, 80, 1100-1111.

He, X., Zhan, W., & Hu, Y. (2018). Consumer purchase intention of electric vehicles in China: The roles of perception and personality. *Journal of Cleaner Production*, 204, 1060-1069.

Herberz, M., Hahnel, U. J., & Brosch, T. (2020). The importance of consumer motives for green mobility: A multi-modal perspective. *Transportation Research Part A: Policy and Practice*, 139, 102-118.

Hidrue, M. K., Parsons, G. R., Kempton, W., & Gardner, M. P. (2011). Willingness to pay for electric vehicles and their attributes. *Resource and energy economics*, 33(3), 686-705.

Hofenk, D., Van Birgelen, M., Bloemer, J., & Semeijn, J. (2017, June 27). How and When Retailers' Sustainability Efforts Translate into Positive Consumer Responses: The Interplay Between Personal and Social Factors. *Journal of Business Ethics*.
<https://doi.org/10.1007/s10551-017-3616-1>

Jansson, J., Pettersson, T., Mannberg, A., Brännlund, R., & Lindgren, U. (2017). Adoption of alternative fuel vehicles: Influence from neighbors, family and coworkers. *Transportation Research Part D: Transport and Environment*, 54, 61-73.

Jensen, A. F., Cherchi, E., & Mabit, S. L. (2013). On the stability of preferences and attitudes before and after experiencing an electric vehicle. *Transportation Research Part D: Transport and Environment*, 25, 24-32.

Johansson-Stenman, O., & Martinsson, P. (2006, June 1). Honestly, why are you driving a BMW? *Journal of Economic Behavior and Organization*.

<https://doi.org/10.1016/j.jebo.2004.08.006>

Junquera, B., Moreno, B., & Álvarez, R. (2016). Analyzing consumer attitudes towards electric vehicle purchasing intentions in Spain: Technological limitations and vehicle confidence. *Technological Forecasting and Social Change*, 109, 6-14.

Kim, J., Rasouli, S., & Timmermans, H. (2014). Expanding scope of hybrid choice models allowing for mixture of social influences and latent attitudes: Application to intended purchase of electric cars. *Transportation research part A: policy and practice*, 69, 71-85.

Knez, M., Jereb, B., & Obrecht, M. (2014). Factors influencing the purchasing decisions of low emission cars: A study of Slovenia. *Transportation research Part D: Transport and environment*, 30, 53-61.

Krivevski, B. (2022, November 4). Saudi Arabia Launches First Electric Vehicle Company. <https://electriccarsreport.com/2022/11/saudi-arabia-launches-first-electric-vehicle-company/>

Krupa, J. S., Rizzo, D. M., Eppstein, M. J., Lanute, D. B., Gaalema, D. E., Lakkaraju, K., & Warrender, C. E. (2014, June 1). Analysis of a consumer survey on plug-in hybrid electric vehicles. *Transportation Research Part A: Policy and Practice*.
<https://doi.org/10.1016/j.tra.2014.02.019>

-
- LaMonaca, S., & Ryan, L. (2022, February 1). The state of play in electric vehicle charging services – A review of infrastructure provision, players, and policies. *Renewable & Sustainable Energy Reviews*. <https://doi.org/10.1016/j.rser.2021.111733>
- Lane, B., & Potter, S. (2007). The adoption of cleaner vehicles in the UK: exploring the consumer attitude–action gap. *Journal of cleaner production*, 15(11-12), 1085-1092.
- Li, S., Tong, L., Xing, J., & Zhou, Y. (2017). The market for electric vehicles: indirect network effects and policy design. *Journal of the Association of Environmental and Resource Economists*, 4(1), 89-133.
- Menzel, D. C. (1998, September). *www. ethics. gov: Issues and Challenges Facing Public Managers*. *Public Administration Review*, 58(5), 445.
<https://doi.org/10.2307/977553>
- Mihalascu, D. (2022, March 1). Lucid Confirms Saudi Arabia Plant, Construction To Start In H2 2022. *InsideEVs*. <https://insideevs.com/news/570609/lucid-confirms-new-saudiarabia-plant/>
- Mujiatun, S., Rahmayati, R., & Ferina, D. (2021, February). Effect Of Profitability And Asset Structure On Capital Structure (In Sharia Based Manufacturing Companies In Indonesia Stock Exchange In 2016-2019 Period). In *Proceeding International Seminar Of Islamic Studies* (Vol. 2, No. 1, pp. 458-468).
- Mukherjee, S. C., & Ryan, L. (2020). Factors influencing early battery electric vehicle adoption in Ireland. *Renewable and Sustainable Energy Reviews*, 118, 109504.

Nayum, A., & Klöckner, C. A. (2014, December 1). A comprehensive socio-psychological approach to car type choice. *Journal of Environmental Psychology*.

<https://doi.org/10.1016/j.jenvp.2014.10.001>

Niblock, T. (2008, June). Saudi Arabia's Economic Development: Ambitious Visions, Difficult Dilemmas. *Journal of Middle Eastern and Islamic Studies (in Asia)*, 2(2), 13–31. <https://doi.org/10.1080/19370679.2008.12023114>

Olson, E. L. (2013). It's not easy being green: the effects of attribute tradeoffs on green product preference and choice. *Journal of the Academy of Marketing Science*, 41, 171-184.

Peters, A., & Dütschke, E. (2014). How do consumers perceive electric vehicles? A comparison of German consumer groups. *Journal of Environmental Policy & Planning*, 16(3), 359-377.

Plötz, P., Schneider, U., Globisch, J., & Dütschke, E. (2014). Who will buy electric vehicles? Identifying early adopters in Germany. *Transportation Research Part A: Policy and Practice*, 67, 96-109.

Randheer, K., Trabulsi, H. U., Al Ajmi, H. A., & Al Jasser, H. K. (2017, July 10). Emerging Industry: A Case of Automobile Manufacturing in Saudi Arabia. *Journal of Marketing Research and Case Studies*, 1–17.

<https://doi.org/10.5171/2017.799336>

Rehman, A. U. (2017). Green values and buying behaviour of consumers in Saudi Arabia: an empirical study. *International Journal of Green Economics*, 11(2), 154.

<https://doi.org/10.1504/ijge.2017.089017>

Rezaei, R., Safa, L., Damalas, C. A., & Ganjkanloo, M. M. (2019, April 1). Drivers of farmers' intention to use integrated pest management: Integrating theory of planned behavior and norm activation model. *Journal of Environmental Management*. <https://doi.org/10.1016/j.jenvman.2019.01.097>

Sanitthangkul, J., Ratsamewongjan, A., Charoenwongmitr, W., & Wongkantarakorn, J. (2012). Factors affecting consumer attitude toward the use of eco-car vehicles. *Procedia-Social and Behavioral Sciences*, 40, 461-466.

Saudi Arabia Map. (n.d.). [countryreports.org](https://www.countryreports.org).
https://www.countryreports.org/cdn_image.http?type=image&format=exW_1200&file=images/maps/en/sa/sa-area&ext=gif

Schuitema, G., Anable, J., Skippon, S., & Kinnear, N. (2013, February 1). The role of instrumental, hedonic and symbolic attributes in the intention to adopt electric vehicles. *Transportation Research Part A: Policy and Practice*.
<https://doi.org/10.1016/j.tra.2012.10.004>

Sierzchula, W., Bakker, S., Maat, K., & Van Wee, B. (2014). The influence of financial incentives and other socio-economic factors on electric vehicle adoption. *Energy policy*, 68, 183-194.

Sultan. (2023, November 6). Accelerating Forward: The Electrifying Surge of Saudi Arabia's Electric Vehicles (EV) Industry. Misk Foundation. Retrieved March 12, 2024, from <https://shorturl.at/blrU9>.

-
- Tausif, M. R., & Haque, M. I. (2019). Changing Market Scenario of Automobile sector in Saudi Arabia. *International Journal of Innovative Technology and Exploring Engineering*, 8(9), 1-8.
- Tsang, F., Pedersen, J. S., Wooding, S., & Potoglou, D. (2012, February 17). Bringing the electric vehicle to the mass market: a review of barriers, facilitators and policy interventions. RAND. https://www.rand.org/pubs/working_papers/WR775.html
- Turcksin, L., Mairesse, O., & Macharis, C. (2013). Private household demand for vehicles on alternative fuels and drive trains: a review. *European Transport Research Review*, 5(3), 149-164.
- Vatsa, M., Chakrabarti, M., & Kumar, R. (2016). Analysis of Green Marketing Trend in Passenger Car Segment of Indian Automobile Industry. *International Journal of Management (IJM)*, 7(6), 181-188.
- WALID, R. (2023, April 8). Saudi Arabia's 160 vehicle plants reshaping the Kingdom's industry. Arabnews. <https://www.arabnews.com/node/2283656/business-economy>
- Yang, S., Cheng, P., Li, J., & Wang, S. (2019). Which group should policies target? Effects of incentive policies and product cognitions for electric vehicle adoption among Chinese consumers. *Energy Policy*, 135, 111009.
- Zhang, Y., Yu, Y., & Zou, B. (2011). Analyzing public awareness and acceptance of alternative fuel vehicles in China: The case of EV. *Energy Policy*, 39(11), 7015-7024.

Appendix

Appendixes

(1) Questionnaire

Dear all, I seek your support to participate in this survey which is an integral part of my continuous dissertation project of the MPM program. this questionnaire is to study Consumers' preferences for electric vehicles in Saudi Arabia. It will take less than 3 minutes to respond to this survey. Thank you for your cooperation and your support.

مرحباً، أود دعوتكم للمشاركة في هذا الاستطلاع الذي يعتبر جزءاً لا يتجزأ من مشروع الرسالة البحثية لدراستي لماجستير إدارة المشاريع، يهدف هذا البحث إلى دراسة تفضيلات وسلوك المستهلكين نحو المركبات الكهربائية في المملكة العربية السعودية. سيستغرق الوقت للإجابة على هذا الاستبيان أقل من 3 دقائق. شاكرة لكم تعاونكم ودعمكم.

Demographic Information

Gender / الجنس

- ☐ Male \ ذكر
- ☐ Female \ أنثى

Education / المستوى التعليمي

- ☐ High school \ ثانوية
- ☐ Diploma / دبلوم
- ☐ Bachelor's degree \ جامعي
- ☐ Master's degree \ دراسات عليا
- ☐ Doctorate degree / دكتوراه

Age / العمر

- ☐ 20 – 29 Years
- ☐ 30- 39 Years
- ☐ 40-50 Years
- ☐ Over 50 Years

Salary/ الدخل

- ☐ Below 10,000 SR \ أقل من 10,000 ألف ريال
- ☐ 10,000 -19,000 SR \ 10,000 إلى 20,000 ألف ريال
- ☐ 20,000 -30,000 SR \ 20,000 إلى 30,000 ألف ريال
- ☐ Over 35,000SR \ أكثر من 35,000 ألف ريال

Factors that influence the preference and adoption of EVs

العوامل التي تؤثر على تفضيل واعتماد السيارات الكهربائية

1. هل سنحت لك فرصة تجربة قيادة سيارة كهربائية من قبل؟
Have you had previous experience with electric vehicles?

- ☐ Yes/ نعم
- ☐ No / لا

2. هل لديك الرغبة في شراء سيارة كهربائية مستقبلاً (كسيارة أخرى)؟
Are you desire to purchase an electric vehicle in future (as a next car)?

- ☐ Yes/ نعم
- ☐ No / لا

3. في حال شرائك لسيارة كهربائية، هل ستحتفظ بسيارتك التي تعمل بالوقود؟
If you purchased an electric vehicle, are you willing to keep your gasoline vehicle?

- ☐ Yes/ نعم
- ☐ No / لا

4. فيما يتعلق بالتكنولوجيات المختلفة للسيارة وسعر الشراء، إذا كانت جميع أنواع تكنولوجيا السيارات تكلف نفس التكلفة، فأنت تفضل شراء:
Concerning the different technologies and the purchase price, if all types of vehicle technology cost the same, you would prefer to buy:

- ☐ Electric Vehicle / سيارة كهربائية
- ☐ Gasoline Vehicle / سيارة وقود

5. هل ارتفاع سعر السيارة الكهربائية مقارنة بسيارة الوقود قد يؤثر على قرارك بخصوص شرائها؟
Does the higher list price of electric vehicles compared to gasoline vehicles influence your decision for buying an electrical vehicle?

- ☐ Yes/ نعم
- ☐ No / لا

6. في حال قررت شراء سيارة كهربائية، هل سمعة ومكانة العلامة التجارية تهمك؟

If you decide to purchase an electrical vehicle, are you driven by brand reputation?

- ☐ نعم / Yes
- ☐ لا / No

7. ما هي العوامل التي قد تحفزك أكثر لشراء سيارة كهربائية؟

What factors might motivate you more to buy an electric vehicle?

- ☐ انخفاض الاستهلاك وتكاليف الصيانة
- ☐ توفر محطات الشحن
- ☐ الحفاظ على البيئة من التلوث

8. توفر دعم حكومي للسيارات الكهربائية (إجراءات، أنظمة محددة، بنية تحتية، حقوق المستهلك..الخ) قد يحفزك لشراء سيارة كهربائية.

With Governmental support for EVs (procedures, defined policies, infrastructure, consumer rights, etc.) may motivate you to buy an electric vehicle.

- ☐ نعم / Yes
- ☐ لا / No

9. توفر المزيد من المعلومات المتاحة إلى جانب دراية الوكيل، يؤدي إلى زيادة احتمالية شرائك لسيارة كهربائية.

More available information combined with the know-how of dealers, leads to increase the probability of preferring an Electrical vehicle.

- ☐ نعم / Yes
- ☐ لا / No

شكراً لك للإجابة على الاستبيان الخاص ببحثي. وأنا ممتنة جداً لوقتكم وإجاباتكم الصادقة.

Thank you for answering the survey questionnaire for my research. I am very grateful for your time and honest feedback.

المستخلص:

يعد التحول نحو النقل النظيف من أكثر القضايا التي تشغل العالم في الوقت الحالي، وعلى الرغم من أن المملكة العربية السعودية من أغنى دول العالم في النفط إلا أنها تتوجه نحو النقل الكهربائي بشكل يّمن من خلال عدة مبادرات وانتقالات تتمثل في تجهيز البنية التحتية لإنتاج وتصنيع المركبات الكهربائية في المملكة العربية السعودية والتشجيع على اقتنائها. وعلى الرغم من الفوائد العديدة المقدمة للمستهلكين إلا أنه لم يتم التغلب على العديد من التدخلات لاعتماد المركبات الكهربائية على نطاق واسع حيث تعدّ ميول العملاء لمقاومة التكنولوجيا الجديدة أحد العوائق الرئيسية في اعتماد المركبات الكهربائية في المملكة العربية السعودية .

تقدم هذه الورقة نظرة عامة للعوامل التحفيزية التي تؤثر على تفضيل وتبني المستهلكين للسيارات الكهربائية في المملكة العربية السعودية بافتراض أسعار متساوية بين المركبات الكهربائية ومركبات الوقود. توفر الدراسة رؤى حول تأثير المتغيرات الديموغرافية، سمات المركبة والعوامل البيئية. أجريت دراسة قائمة على الاستقصاء شملت عينة من 205 شخصا من المملكة العربية السعودية. وقد تم تحليل البيانات التي تم جمعها باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS)، والتي وجدت أن المتغيرات المختلفة تستكشف العوامل المؤثرة على تفضيل المركبة الكهربائية فقد أظهرت بأن التعليم والدخل المرتفع له أثر إيجابي على تبني السيارات الكهربائية. إضافة إلى أن تحسين البنية التحتية وتوافر المعلومات يعزز من هذا التفضيل، كما يطبق نموذجًا إضافيًا لتحليل سلوك المستهلك من خلال افتراض نفس الأسعار لجميع المركبات. يمكن أن تساعد هذه النتائج صانعي السياسات في تطوير سياسات النقل وإدراك الفوائد الاقتصادية والخصائص الوظيفية للمركبات الكهربائية والوعي والمعرفة كمعايير مهمة، والتي لها تأثير مباشر على سلوك الشراء للمركبات الكهربائية بالكامل.

الكلمات /مفتاحية: المركبات الكهربائية؛ هياكل الشحن الأساسية؛ سلوك المستهلك؛ التبني؛ التسعير؛ التفضيلات؛ مشاكل الاستدامة؛ السيارات الكهربائية؛ العوامل البيئية

العوامل التي تؤثر على اعتماد المستهلك للمركبات الكهربائية في المملكة العربية السعودية 2030

إعداد الطالب/

فاطمة يحي علي نجعي

إشراف/

الدكتور وليد سليمان

الدكتور الفيصل عبد الحميد

العام الدراسي:

2024