

Potential Customer Attitudes towards The Adoption of Electric Cars In North Cyprus

Badr Eddine Bennis

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Approval of the Institute of Graduate Studies and Research

Prof. Dr. Ali Hakan Ulusoy
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Arts in Marketing Management.

Assoc. Prof. Dr. Burak Erkut
Chair, Department of Business
Administration

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Arts in Marketing Management.

Asst. Prof. Dr. Mehmet İslamoğlu
Supervisor

Examining Committee

1. Prof. Dr. Sami Fethi

2. Asst. Prof. Dr. Galip Erzat Erdil

3. Asst. Prof. Dr. Mehmet İslamoğlu

ABSTRACT

The car industry is prominent around the world, it is also rapidly growing and developing, taking into consideration an increasing population, increasing need for car transportation, and increasing demands on car design and capabilities.

Leading car manufacturers are now at a crossroads, having to balance between traditional gasoline cars and hybrid or pure electric cars. They need to know what customers' needs will be and how they will perceive new technologies, including electric cars in each continent, in each country, and also across various customer segments in each country. Following a fresh study carried out in North Cyprus on the potential customers' perceptions of a sample of general population on the adoption of electric cars, this study breaks new ground by observing if potential customers with knowledge on high level technologies differ from the general population in terms of their perceptions on electric cars. The study selected twenty university students who are knowledgeable on technologies, they were randomly selected from electronics, mechanical, computer, and information technologies disciplines, and carried out semi-structured interviews with them. The study shows that most participants did indeed cluster around three reasons that favour electric cars: namely, fuel economy, efficiency, and environment. Those who did not look favourable on electric cars cited three common reasons, lack of infrastructure for charging and servicing, lack of knowledge, and higher taxes on electric cars.

Keywords: electric cars, north Cyprus, customer attitudes.

ÖZ

Otomotive endüstrisi dünya çapında en büyük endüstrilerden bir tanesidir, aynı zamanda hızlı bir şekilde büyümekte ve gelişmektedir. Artan nüfus, beraberinde artan araba taşımacılığı ihtiyacı, ve araba tasarımı ve özellikleri hakkında artan talepler bu gelişimin itici gücüdür. Önde gelen araba üreticileri şu anda geleneksel petrol arabalar ile hibrit ve tam elektrikli arabalar arasında değişen talebi karşılamak adına büyük bir seçim yapmak durumundadırlar. Bu sebeple, müşteri ihtiyaçlarının neler olacağı ve yeni teknolojileri nasıl algıladıkları hakkında bilgi sahibi olmaları gerekecektir. Hangi kıtalarda, ülkelerde, ve müşteri katmanları arasında elektrikli arabalar hakkındaki bilgi ve algıları bilmek, öğrenmek durumundadırlar.

Elektrikli arabaların tercih edilmesi konusunda kuzey Kıbrıs'ta genel halkın içinden seçilen örnek potansiyel müşterilerin algıları üzerine yapılan bir araştırmayı takip ederek, bu araştırma literature katkı yapmak amacıyla potansiyel müşterilerin yüksek teknolojiler hakkında bilgileri olması halinde elektrikli araba hakkındaki algılarının genel nüfusa göre farklı olup olmadığına bakıyor.

Bu araştırma, elektronik, mekanik, bilgisayar, ve enformatik alanında üniversite eğitimi gören ve dolayısıyla teknolojiler hakkında oldukça bilgili olan yirmi DAÜ öğrencisi seçerek, onlarla yarı-yapılanırlmış görüşmeler gerçekleştirmiştir. Katılımcıların söylemlerini analiz ederek çoğu katılımcıların elektrikli araba hakkındaki olumlu görüşlerinin altında şu ortak noktalar olduğunu gözlemlemiştir: yakıt ekonomisi, verimlilik, ve çevre. Diğer yandan, elektrikli arabaya karşı olumsuz

görüşlerin ortak paydaları ise, şarj ve servis konularında altyapı eksikliği, elektrikli arabalar hakkında bilgi eksikliği, ve yüksek vergilerdir.

Anahtar Kelimeler: elektrikli araba, kuzey Kıbrıs, müşteri algıları.

DEDICATION

To my family and friends

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Chapter 1

INTRODUCTION

For a long time, fossil energy has been used since it was seen as the only reliable energy source. But in today's world, changes and revolution have happened in many fields and industries, population levels, energy demands, customer habits and attitudes have also changed. Furthermore, rising energy demand in developing economies and countries has expanded the need for fossil energy. In addition, the daily use of oil and gas created more problems that should be treated in the long term. Many natural resources started to become rare, hard to find and costly to extract and use to produce energy. Creating and finding a new source of energy was vital as it will bring security and benefit the economy in the short and long term by ensuring growth and development. Alternatives needed to be found to ensure sustainability.

The new energy sources have been given the name of renewable, endless, sustainable, environmentally friendly and can be found in nature. This solution comes up as the old or classic energy resources known and used before were harming the environment and nature, in fact, many problems started to emerge such as the degradation of the ecosystem, destruction of living spaces, air pollution which lead to severe climate change all around the world, experts stated that the latter's became more a problem than a solution to satisfy the needs of producing energy. Alternative energy sources allow high energy production without any of the negative effects mentioned above. Geothermal and hydro energy, waterpower, wind, sunlight, and biomass energy are

cheap, stable, and efficient in both the short and long term. Using renewable energy sources reduces prices and allows production of more energy. Furthermore, apart from being green, less costly, alternatives ensure security. In fact, it has become a protection from high electricity bills. We cannot ignore the fact that the use of petrol cars increases the emission of CO₂, electric cars are seen as a vital and sustainable alternative to decrease the emissions and reduce the air pollution. Also, the people's demand around the world for energy have highly increased the use of solar panels and wind energy.

Cars running on electricity have a long history adding to it the numerous advantages discovered by humans during the 20th century. The petrol car industry was born in Europe in France and Germany and were developed shortly after by the USA. The petrol car industry existed for more than 100 years, when car brands around the world first started producing automobiles. In the time of World War 1 most cars produced were commercial ones, but the sector kept developing due to an increasing demand which led to the production of more automobile vehicles (Bedir, 2002, p2). With time and technological advances, electric cars were gradually developed to fix many problems that the fuel types vehicles have caused with time, also, they are made to facilitate the daily lives of consumers by having developed software, smart applications, and new features such as AI-enabled self driving and self parking. Adding to this, electric cars have been through many changes and updates with every specific design, car type, in fact, the major change has been the EV charging batteries. The appearance of new cars and the customer's desire to purchase them helped contribute highly to many manufacturing sectors and industries.

The car industry in general has always been important to the economy, being particularly a key factor to lead specific sectors such as iron and steel, glass, rubber, and textiles, so that these industries and sectors are enabled to advance their processes and products helping them to reach new and high levels of innovation. In fact, more employment opportunities are created with high export potential, as transportation make it possible for businesses to move their goods and merchandise from point A to point B in shorter time and in better conditions which lead to the maximization of the profits. That's why any change in the automotive sector can highly affect numerous industries (ISO, 2002, p 1).

In this research, North Cyprus potential electric car customers and car industry were chosen and discussed in detail to better understand how the car industry affects the economic system. A literature review was conducted to make sure the research has a systematic flow, detailed, understandable and stays within the boundaries of electric cars industry. The current situation on the island was presented and discussed to better highlight the use of cars in general and electric vehicles specifically for aiming to reach new goals and some solutions have been highlighted so that the automotive industry at North Cyprus is well developed and satisfy all the necessary needs.

1.1 Basis of the Research

Nowadays, there are a lot of concern and discussions about the toxic effects on the environment caused by petrol cars, which has led to many regulatory restrictions and related engine design changes in the automotive industry. Electric cars are vital today for transportation due to low emission and high energy efficiency. In small island countries especially, governments tend to regulate the carbon emissions due to low natural resources combined with high energy production demands. In such countries,

electric cars are the best answer for long-term sustainability, more efficiency, and less harmful effects on the environment. Changing the transportation habits and norms at the Turkish Republic of North Cyprus calls for research studies on many subjects and topics that can be discussed and analyzed from different perspectives, such as the use and the adoption of electric cars. Understanding the topic and how it is developed on the island and what the customers think about is important to have a clear idea about sustainability and the transportation infrastructure. In this study, the public opinion about the adoption of electric cars by university students with high levels of technology knowledge was observed and discussed in detail.

1.2 Purpose of the Research

The general purpose of the study is Eastern Mediterranean University electronic, mechanical, computer, and informatics student's perceptions regarding the adoption of electric cars in North Cyprus to see if people with a lot of high technology knowledge differ in their perceptions on electric cars. To do so this study interviewed 20 participants residing on the island and studying in different departments at Eastern Mediterranean University. Randomly selected individuals were reached during June-July months via different platforms to take part in the study. Some said they are busy, some refused to cooperate and at the end 20 individuals were interviewed usually in a cafeteria and during a time when they were free of time pressure. Free inexpensive drinks of tea, coffee, water or other beverages were offered to the participants and a friendly conversation took place for five or six minutes introducing the study and the topic before commencing with the interview. Open ended semi structured questions were asked and no recordings were made during the interviews so that participants could talk in a more relaxed manner. The main goal of the study is to understand fully the customers trends and habits regarding choosing or not to buy/use electric vehicles.

The use of electric cars at TRNC will not only benefit the environment by reducing carbon emissions but also making sure that the country is independent when it comes to producing energy. Low emissions and reducing the use of fossil energy significantly changed the transportation sector in the country. Based on that, this research aims to have a clear idea about the factor affecting the use of electric vehicles at North Cyprus, by evaluating the public opinion regarding this topic and discuss the extent of environmental friendliness of the island. Moreover, the research will come up with important findings related to electric vehicles by focusing on the specific needs of the area.

1.3 Research Limitations

This research aims to discover whether people with in-depth knowledge of high technology have a more favourable perception on adoption of electric cars than people selected from general population by following on the results of a recent masters study carried out on the topic by sampling interviews from the general population in Famagusta, North Cyprus. Our sample is selected again from same location and from EMU students studying technical subjects. So we are in a way using as similar a sample as we can but in order to select people with high-tech knowledge we focused not on general population but on EMU students. That may be considered as one limited sampling because of the age bracket to a certain age group and to specific students who were around in July at the Eastern Mediterranean University waiting for the graduation ceremony.

Another limitation of this master thesis is limited to a specific sample group, only 20 individuals will take part in the interviews. More interviews and perhaps group discussions would bring richer observations to analysis.

Another limitation of the study is that the participants may not feel comfortable to think clearly or explain themselves comfortably. We did our best to make the environment informal by using a cafeteria setting and providing as a host free hot or cold drinks prior to the interview so that they could take part in the study fully. The interviews were also scheduled at the pleasure of the participant so as not to rush them or to find the time when they are at their most convenient to talk. This spread the interviews over weeks and meant that we had to prepare separate interviews in many different places one by one. But hopefully it was worth it.

Interviewing only students creates another limitation, in fact, most of the participants did not have incomes to afford a car let alone driving an electric car. So all participants were potential customers not having actual experience of owning an electric car.

1.4 Importance of the Research

Today, the transportation sector is increasingly important in daily life, either for personal or professional reasons, leading to its rapid and significant development and evolution year after year. Such developments also increase the negative impacts such as emissions, air pollution, and noise pollution especially in big cities where such car traffic is heavily concentrated. Hence, electric cars are becoming more common and more used day by day. In fact, many car brands started to design and manufacture electric vehicles with advanced technologies, features and futuristic designs. It is reputed in advertisements that these vehicles consume less energy, use a cleaner one and are lower cost in usage after initial higher purchase costs. Because electric cars are getting used increasingly and gaining popularity in North Cyprus and as an island, the country is facing logistical difficulties in servicing and charging locations that can increase highly in the future. On the other hand, the population is getting bigger, which

will lead to electricity shortages. It is also known that North Cyprus have a public transportation issue, for individuals that do not have a personal car can face many challenges when doing their groceries. Therefore, having a vehicle is very important. Also, the extreme use of cars causes a lot of harm to the environment either by polluting the air, causing noise pollution and the high consumption of energy resources. So, what advantages the electric cars have? Are individuals at North Cyprus willing to buy electric cars? Are there any concerns about using it? How can we decrease these concerns and bring more solutions? This research will investigate similar questions and hopefully insights from this study will help bring solutions regarding electric cars on the island. The interviews that will be conducted during this research will give us a clear idea about the reasons to choose or not to purchase an electric car at North Cyprus.

The Technology Acceptance Model (TAM) is included in the literature review as a system theory that explains how individuals accept and choose how to use technology. In addition, people's behaviors and intentions are also included to better understand and have a clear idea about what exactly encourages them to become familiar with technology.

The methodology part includes details about the research model, population, sample, data collection tools, data collection and analysis. The results, findings and discussions are included in the 4th chapter. The results and recommendations section highlights opinions about the findings, results and limitations of the study. The conclusion is a summary of the research, more discussion and suggestions for possible future research.

Chapter 2

LITERATURE REVIEW

This chapter presents the relevant review of literature regarding electric cars and related developments around the world in general and specifically on potential customers perceptions on electric cars when these potential customers possess high knowledge on technology. The survey's participants are students from engineering departments at Eastern Mediterranean University. The aim is to see what future technicians think about the topic, what they know about it, and do they agree with all that is said as it will help us put in place hypothesis and arguments to develop the subject more.

2.1 Personality

The world we are living in today is constantly changing, thus, many individuals live in uncertainty. All the people around the world make sure that their environment is safe, warm... as they must fight the uncertainty and decrease its level during their daily life. Considering each one's needs, desire and wants, it is a must for them to find what makes them feel secure and protected to have the quality-of-life that makes them feel comfortable. Needs differ from one individual to another; a lot of factors must be taken into consideration to determine what each person prioritizes, in fact, studies show that perception levels are highly impacted by education, culture, society and personality traits. Perception is the level of awareness everyone has regarding what is happening around him/her, the ideas discussed, events and more... But the level can be high or low depending on the person's interests over the product/subject/person... also the

people's needs and wishes affects highly the level of interest (Altunisik and Islamaoglu, 2017, p 96). In addition, there is a motivational and behavioral relationship between what humans want and needs. Customer always sees what positive and negative he/she sees in the product(s) before buying it (Basaran and Aksoy, 2015, p 96). Other factors affect the purchase intention such as perceived symbol, perceived monetary cost, personal innovation, knowledge regarding the product... all can make the customer change his/her mind when shopping. Environmental concerns are also one of the main factors as many individuals care about the effects one of their purchases can have on nature. Many literature studies show that personal innovation indirectly affects the individual's purchase intention while considering the perceived symbol. Relationships between all these factors can be either positive or negative, in fact, the customer's innovation and their purchase intention is positive but negative when their innovation and perceived risk are related during a purchase, the same is true when perceived risk and purchasing behavior relationship are combined. Motivation plays a big role when the latters are combined, as it will determine and influence the results towards a goal, it is also the sum of all the efforts to motivate individuals/customers to one direction to influence their intentions (Ates, 2009). Motivational theories or scope theories must be mentioned as they activate how customers react, act, slow or stop their behavior. On the other hand, there are process theories that explain and go more in detail on how to activate, slow or stop the behavior. Scope theories were studied and analyzed firstly by Abraham Maslow, needs and behaviors are automatically put in a specific order by individuals. His article in 1943 named "A Theory of Human Motivation" stated that most humans get motivated by their own self's (internal factors), rather than the others or their environment (external factors). "Vroom's Expectancy Theory" (1964) answers the question "What really motivates people?". The answer is individuals most of the

time essay to achieve results that for them are achievable and that attracts them (Yucel and Gulveren, 2008).

2.2 Factors Affecting Personality Formation

For an individual to have his/her own personality traits, there are many factors to be considered that affect its formation. Four main groups of factors will be discussed in this part; the physical appearance of everyone, the role within the society, his/her environment characteristics and his/her skills to contribute. Generally, there can be similarities or differences in everyone's personality traits, their ability to contribute to their respective environment depending on their role and position. In fact, Freud states that many personality sides are influenced by the experiences a person will have and encounter at a young age. However, Jung affirms that it is influenced by the collective subconscious, but Adler theory is totally different as it says that human beings behave according to their higher or inferior position within the society, and this is what shapes their personality. On the other hand, Allport mentions that motivation, purpose and each one's personal independence. Fromm's theory has a different opinion; personality formation comes from the environment and his/her surroundings, but also the hereditary characteristics that play a big role. Personality traits are what differentiate one person from another, but it is not known how many can be found or defined, studies assume that there must be more than 10 000 traits. In today's world, marketing strategies are based on customer's personality traits, in fact, market segmentation, consumers need and wants are a must to define the brand and the service preferences (Kotler, Armstrong, Harris, Piercy 2005).

2.3 Consumption

It is important to mention that marketers, economists and scientists are always trying to innovate and change the individual's way and level of life. In fact, a lot of efforts

and new strategies are put in place to meet the people's needs and wants. To do so, many factors are put together and are taken into consideration such as geographical, personality, social and demographic aspects of everyone, all of them are important as the consumption and production are related.

The idea of consuming impacts social, economic and cultural purposes (Bocock, 1997). Consumption is defined as the process of selecting, buying and using different types of products and articles to satisfy the need (Solomon, 2011). In addition, consuming is vital for individuals as it is a must to have access to food, water and have a shelter, so that physical and psychological needs are also satisfied. It is also seen as the last part of the production process, in fact, it starts with the evaluation of resources to then produce different products made especially for consumers to satisfy them fully, so consumption is the most important part and the main reason why production is important and seen as a must. All the countries are aware of this, consumption is highly valued by economists, business owners, employers. In fact, it's the cause of economic growth and development. Also, the high level of consumption within a society reflects that citizens are rich and contribute highly to the economy. Consuming societies and individuals are a sign that poverty is decreasing, even though slightly, and shows that higher levels of development can be reached. The purchasing behavior of each consumer reflects what they need and how much they need it. Which explains in some situation's why customers buy specific products when and where. Needs and desires must also be addressed in this part, as they are considered very important to understand consumption in detail (Kotler, 2000).

The purchasing process or in other words consumption starts when a person feels a need and thinks that it is only by buying that his/her desire will be met. It is assumed

that consumers conduct all the buying processes that way, as they have many alternatives when shopping but choose the one(s) that looks for them the most interesting and needed. These reactions and decision making are what we call purchasing intention. Consumers tend to feel the need either internally or externally, in other words, individuals can see a product/article from another person and choose to purchase it, he/she felt that need externally then. In some situations, the desire to purchase can be subconscious, in fact, customers will start collecting information to be familiar with the features, price, durability by checking old customers opinion online, warranty duration, costs of repair and so on. The consumer knowledge is based on his/her old buying experiences and how good or bad it was. New research starts by visiting different social media platforms to get to know more about the product, brand and its services (Dod et al. 2005). On the other hand, product familiarity is all the information that consumers know or will try to gather regarding their purchase. Studies affirm that it is also based on old experiences. Nowadays, consumer behavior goes beyond all that, as it encompasses pleasure, social status, personal satisfaction (Dunn, 2008). In addition, the intention to purchase is the link/relation between consumers and the brand (Bouhlef, 2010). Technological advances made marketers create new needs and desires for customers without them knowing (Hayta, 2016). They can do so by analyzing individuals' behavior when shopping either online or physically so managers can predict exactly what product(s) are going to be purchased and then proceed to put it on the market with the adequate marketing strategies to reach the target consumers.

2.4 Globalization and Population Growth

During the last five decades, the world population has seen a major evolution. Technological advances made it possible that houses can be built in extreme weather

conditions, deserts can be transformed into agriculture fields and urban centers. For the world population to grow there must be reasons; the first one is when humans discovered how to make tools, as they have been used to live in difficult environments and fight wild animals, agriculture is also an important factor when it has been discovered 10 000 years ago, which resulted to population increase from 5 million to 300 million. The third factor is known to be the industrial revolution, in fact, in 1600 it was 500 million, increased to 1 billion in 1825 to reach 2 billion individuals around the world in 1957, today the world population is estimated to be around 8.2 billion. Technological developments also played a big role in humans' lives, in fact, the average lifespan has increased considerably. Studies showed that humans are the only living beings that do not need the ecosystem to reproduce, on the other hand it has been said that if the population continues to grow at the same rate, the world population will double in around 40 years.

Population growth means that consumption will reach new high levels, adding to it individuals need and wants. Technological advances are the perfect answer to satisfy most individuals, in fact, needs can be met in different ways, quickly and less costly (Konyar, 2001). Changes, evolutions and transformations are what best describe the 20th century, innovations that humans created and discovered impacted the daily life in terms of economy, demographics, laws, politics and socio-cultural aspects, which led globalization to gain more presence all around the world (AÖF, 2015). Globalization is a continuous flow of goods, services, capital, ideas and individuals across borders, impacting everyone around the world. That's why many products and services are available in the exact same way in two or more different countries, leading to high profit margins for businesses. Studies and researchers state that in 2024

considering the actual trends, world trade will reach \$32 Trillion (UN Trade and Development, 2024).

It is known that businesses have always struggled to stay in action for a long period of time to grow in the future and reach new horizons. But the world we are living in has changed a lot during the past 40 years, in fact, many innovations have affected multiple business models. This is due to the dominance of liberal economies, free trade and lower barriers to globalization. This led to companies being freer to operate, implementing new strategies that benefit their growth in the future (Robertson, 1992). The negative effects of companies growing, pollution and environmental issues due to industrial development, are included in the literature review in the following parts.

2.5 Global Impact

Studies show that population growth and evolution play a big role in the development of the world in different aspects. However, the growing number of humans on planet earth causes much damage and harm, in fact, some of the results of population growth can be cited as follows; unemployment, research project for food needs, wars, poverty, extreme use of natural resources, migration flows, and global warming. Moreover, destroying agricultural lands because of a high population causes even greater air pollution. Therefore, it is important to mention that due to the increase of humans on planet earth, businesses, employers, economies and states must come up with ways to ensure consumption can continue sustainably. Environmental issues for instance the decline of forests due to extreme tree cutting, floods, decline of living species pose great threat to our presence on the planet.

Studies that show how humans can save the planet and how emissions can be reduced must be shown more often as they raise awareness and show what should be done and what should not. There are current studies that highlights minimizing use of fossil energy can help. In fact, many scientists met to sign the Paris Agreement in 2015, which was applied in 2016. 175 countries signed and approved all the points discussed to make sure the environment is well protected and the climate change issue will be solved in a short time, with each country contributing to minimize the environmental crisis in their own unique way. The short-term vision was to keep the earth temperature does not increasing more than 2 degrees, but on the long-term at around 1.5 degrees. Türkiye, part of the Paris Agreement, affirmed that they will act to reach the main goals of all the countries to reduce emissions by 21% by 2030.

Fuel costs and oil prices continue to increase worldwide, countries and car brands believe that the only solution is the switch to electric cars as they will play an important role, also apart from being economic the electric car technology will reduce cars emissions and so save the environment from air pollution. In addition, electric cars have become a must as fuel prices are a global problem. It has been proved that in Europe carbon dioxide emissions come mostly from transportation. This led governments not only in Europe but all around the world to take decisions regarding air pollution. For instance, Paris have implemented severe rules for old cars, as they are likely the ones that pollute the air the most so the French capital allow these car owners to drive around in the city only during weekends and after 8 o'clock, and by 2030 according to the Paris Agreement only electric/hybrid cars will be allowed in the city (United Nations, 2015). In fact, car brands had started to produce electric cars years ago, and with the help of their governments many incentives are put in place for

consumers to consider switching from fuel type to electric vehicle. As a result, sales are increasing globally and other brands started also competing to make sure they have a growing share in the market.

2.6 Electric Cars

Even though the widespread appearance of electric cars is only recently, electric vehicles development goes back to 1800s. In fact, Stratigh a Dutch Professor worked on and designed the first electric car in 1835, but it was later reported that between 1834 and 1836 in the USA the first electric car was developed by Thomas Davenport. The vehicle produced consisted of three wheels and had non-rechargeable batteries, which means the car could only be driven for a small period and over short distances. In 1838 Robert Davidson produced the first electric locomotive. On the other hand, hybrid cars are not a new technology as they were produced years ago in 1901 by Ferdinand Porsche, the vehicle consisted of gasoline engines placed on each wheel.

Electric cars have many characteristics that convince individuals to give up petrol cars. First one is advanced technology that include driving distance, charging time and maximum speed limit. Secondly, consumers buy electric cars to avoid paying high taxes, benefit from subsidies, charging and parking permits. Third, individuals purchase electric cars to avoid paying high oil prices (Onder & Kaya, 2019). Even though the electric cars industry is developing and growing, many users complain about the lack of charging points. In order to increase charging points the European Union produced legislation whereby electric cars are monitored by the Alternative Fuel Infrastructure Directive (AFID) where all EU members must follow strict rules such as in 2020 there should have been around 114 charging points per 10 electric cars (0.1 rate).

In Türkiye and in many developed countries the automotive industry contributes a lot to the economy as it interacts and develops with many sectors such as iron, textile, electronics, steel among others (Uçar, 011). It can be said that it contributes to the import and export, thus automotive industry creates many employment opportunities around the world.

The automotive industry in Türkiye is among the most important sectors in the country, each year local companies produce high numbers of cars destined to be exported to many different markets. In fact, in 2021 the sector reached around 976 million dollars of profits and in 2023 the country registered 55.2% sales increase and an 8.6% increase in production. On the other hand, the Ukraine-Russia war in 2022 affected highly the automotive industry, prices became higher which explains the raise of profits in 2022 compared to 2021 and the Covid-19 era.

2.7 Electric Cars in Türkiye

In 2022 the electric car industry in Türkiye registered only 7540 sales, while in the following year this number went up almost ten fold to around 68 000 electric vehicles. According to Anadolu Ajansı in 2024 it's Togg's T10X a leading local electric car brand held 36.53% of the market share and sold 13 000 cars, surpassing global brands such as Tesla and BMW.

Electric cars started to get popular in 2015 and year after year Turkish citizens started to get more familiar with it and became used to it as part of their daily lives. With the apparition of local car brands, EV sales reached 82 000 units in 2023. This is partly because President Recep Tayyip Erdoğan unveiled in 2023 TOGG “Türkiye’nin Otomobili Girişim Grubu”, the local company gained popularity quickly and is today

a reference of electric vehicles in the country. Moreover, prices are cheaper than the other brands costing only 50 000 USD which encourages individuals to purchase it and trust it more. In fact, at the end of 2023 around 20 000 TOGG's units were sold and became the fourth most popular car brand in the country (duvaR English, April 2024). It is important to mention that apart from electric cars, Türkiye holds a high record of car sales within a year; in 2023 more than 1 million cars were sold surpassing the 2016 record (Distributors and Mobility Association). Below is a representation of electric car sales in Türkiye compared to other countries during 2021-2023 period:

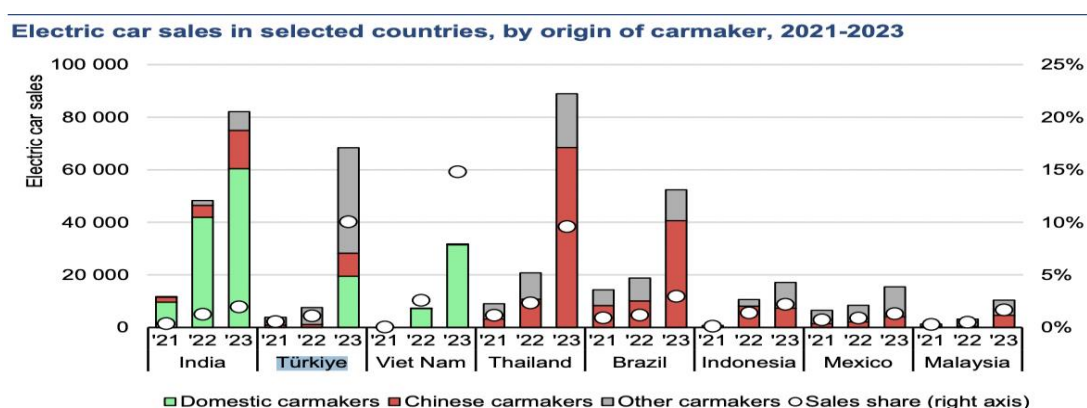


Figure 1 : a representation of electric car sales in Türkiye compared to other countries during 2021-2023 period

As the graph shows, year after year electric car buyers in Türkiye are trusting electric cars more. In fact sales in 2021 were around just 2000 units while in 2023 sales reached around 70 000 for a market share of 17%. In the other hand, Turkish citizens are more comfortable with local products than the others, in fact, it appears on the graph in 2023 local car makers sold more than 30 000 units, only Vietnam and India scored better results within the same year. It can be said that the data on the graph highlights the rapid turnover and switch from fuel type cars to electric ones, in 2 years. Türkiye is the third country with the highest sales this is since prices are lower and more local brands are showing up in the market, so there are no import costs, or high labor costs.

With the increase of electric cars usage Türkiye brought its own car to the market as there are a lot of profits margins, to do so several local companies from different industries collaborated in 2017 and had different shares to produce the first Turkish electric car by 2023; Anadolu Group (19%), BMC (19%), Kök Group (19%), Turkcell (19%) and TOBB (5%). The official start date of producing and manufacturing TOGG was in 2018 and was introduced as a prototype in 2019 in “Journey To Innovation” where the car’s features were firstly presented and includes two different model SUV and Sedan with the possibility to offer 5 new models in 2030, two engine types 200 and 400 horsepower, 2 option for distance covered 300 or 500 km, durability for high speed collisions, 30 minutes charging battery with 8 year warranty, and a regenerative braking system.

2.8 Situation in North Cyprus

Cyprus is the 3rd largest island in the Mediterranean region. Geographically located as a neighbor of Türkiye and very close to the Asian, European and African continents. The island is the safest island and the 5th safest country in the whole world.

To reach North Cyprus all transportation is done either by sea or air via Türkiye. In terms of culture and traditions TRNC and Türkiye are very similar, they do also share the same national holidays and have many bilateral agreements to ensure the flow of goods, people and services in the best possible way. North Cyprus economy is highly dominated by the public sector such as tourism, education and trade. The country’s government is trying during the last recent years to overcome political and economic embargoes imposed.

People's mobility is very important in the world we are living in, so transportation and the use of cars becomes more and more dominant. The automotive industry is one of the key sectors for several countries as it contributes to the world's economy. This causes car sales to also grow at North Cyprus, which made local companies to think about producing local cars, this will create an economic advantage and meet the car needs at the island. Also, domestic cars will make sure there will be no foreign dependency and helps the region's economy as all the neighboring countries will benefit from North Cyprus domestic cars by putting in place a distribution channel. Moreover, countries will be able to sell their cars at a competitive price in foreign markets while keeping prices low in their territory, cooperating will enhance technological advances and innovation to better produce and offer new type of features in the upcoming models.

Because of the population increase and the high number of students and foreigners at North Cyprus transportation is a must but there is no adequate solution, so individuals must have their own personal vehicle to move around, the island roads are more suitable for right hand drive cars and it's not very common to see left hand drive cars. Japan and United Kingdom, use right hand drive cars and are the major import sources for North Cyprus which import a high number of cars. For public transportation and when individuals want to travel from one city to another, they must use minibuses, but they only follow specific roads and do not reach some areas. On the other hand, for urban transportation the first choice is the use of taxis, but many prefer not to due to their high wages policies. The main sectors that contribute highly to the country's economy are education and tourism, in fact, tourists from different countries visit North Cyprus to get to know the natural and historical treasures and the experiences

of the island. The high season starts in April and goes on until November due to high temperatures, also hotels reach high occupancy rates in June-July-August and September.

Regarding education, each year thousands of foreign students choose North Cyprus in the aim of getting a high degree at one of most prestigious universities on the island. There are around 23 universities offering various undergraduate (Bachelor) and postgraduate (Mater/PhD) degrees. With all the information gathered about tourists and international students visiting the island it can be said that the population of the latter can be quite high on the island, and taking into consideration the public transportation issue at North Cyprus personal vehicles are genuinely necessities and are required. Here, electric vehicles can be an alternative to reduce the costs, be eco-friendly, reduce the foreign dependency and be a solution to the growing population.

In 2016 North Cyprus started to work on “Günsel” Electric Vehicules to be the first Cypriot electric car. The domestic company production facility is located in the capital Lefkosa and hold currently around 13 prototypes. Consumers interested in purchasing the model are welcome to participate and drive the cars; in fact, two models are being developed, B9 B-Segment type and J9 SUV type. The “Günsel” Electric vehicle B9 offers a wide range of innovative features and options including 350 km range, 0 to 100 km/h in 7.7 seconds, 150 km/h Maximum Speed, 30 min charging time. On the other hand, the “Günsel” J9 model presents also many features including 500 km range, 0 to 100 km/h in 5 seconds, a maximum speed of 200 km/h, double engine, 4 wheels drive and 30 min charging time. Since 2023 many medias in North Cyprus are highlighting the increase in the use of electric cars, in addition charging stations started

to be more common but still not enough to meet the needs of a rapidly growing technology as in other countries.

2.9 Electric Cars in Other Countries

The study that was published as “Understanding the Socio-Technical Relevance of North European Electric Vehicles Barriers: A qualitative discussion of range, price, charging and information” (Lance Noel, Gerardo Zarazua de Rubens, Johannes Kester, Benjamin K), highlights the use of electric cars in countries such as Denmark, Norway, Sweden, Finland by analyzing consumers experiences. Semi-structured interviews were conducted with the participation of 227 individuals. The main conclusions were that even though inhabitants of these areas are very aware of technological innovations, worrisome issues regarding price, charging time, range are still present. The study also underlines government role regarding the topic by pointing out issues related to energy infrastructure.

On the other, the article entitled “How do Consumers Become Aware of Electric Vehicles? A qualitative approach (Alma Meckler-Pacheco) is a deep analysis of Californian individuals' perception of electric cars and more precisely Tesla. The study includes 35 Tesla owners to raise awareness by looking at media, information on the web, word of mouth and how they help consumers to be more aware about news, technology, etc. The research also aims to give specific details about emissions in the transportation sector and how electric cars can be beneficial on the future. To be able to reduce emissions it is vital to understand consumer behavior and know all the driving factors affecting the increase in electric cars.

The adoption of electric cars comes with many difficulties and is discussed in detail in the article « Understanding and Identifying barriers to electric vehicle adoption through thematic analysis » (G.Krishna). The latter uses the electronic world of mouth on the internet to collect consumer attitudes, on topics such as technological issues, getting used to electric cars, and charging infrastructure. Addressing such problems shows that many issues related to electric cars are interdependent and make consumers change their mind and not consider purchasing one in the future as they don't really become convinced about the real benefits of having an electric car.

According to Taeseock and Chankook Park's article « A qualitative Comparative Analysis On Factors Affecting The Deployment Of Electric cars' qualitative comparative analysis is carried out to deeply analyze the main factors impacting the adoption of electric vehicles in some regions, while taking into consideration technological, political and environmental aspects. In addition, the research talks about specific strategies that have been implemented for each country and location, taking into consideration the reason(s) to adopt electric cars and how to overcome challenges such as prices, driving distance, and availability of charging stations. The conclusion of the research is that no rule or restriction is successful as many factors should be considered to ensure strategic growth of electric vehicle industry.

« Evaluation of customer perceptions and acceptance influences on purchase intention towards electric vehicles » by BÜsra Çakmak provides information regarding how consumers get convinced and accept to purchase electric vehicles. Quantitative analysis is used to measure consumer behavior and to calculate the strength of buying intentions. The research concludes that individual buying experience, satisfaction,

intentions and acceptance influence highly how consumers behave when buying electric vehicles.

The study « Qualitative research with electric vehicle drivers to understand the needs and experiences of electric vehicle drivers in the current user journey » written by Jonathan Mortimer in 2021 discusses consumer needs for electric car. It is an investigation that tracks the user's journey from getting the first information and details about electric cars to buying one and charging it. The results show that consumers are more likely to be unsatisfied about prices, getting confused about too much information on the net and not knowing which source they should trust, and they feel angry about high charges and unexpected changes in prices. The study has a critical aspect regarding the switch from fuel type cars to electric ones.

Even though each of the above studies highlight different perspective(s) and aspect(s) of the electric car industry they do share common points. In fact, weaknesses are infrastructure issues, lack of enough charging stations, inadequate ranging distances, not easy to know how to use it fully, lack of information about electric cars, and the incentives provided so far being not trustworthy for the long term. On the other hand, as strengths electric cars reduce noise and air pollution, and less emissions, and users can rely on the latest features of new technology.

Chapter 3

METHODOLOGY

3.1 Model

In this research qualitative method was adopted to better analyze the topic. Interviews are mostly used in social experiments as they make the research(s) get closer to the topic and ensure better results in observing the answers to why and how questions. To better conduct interviews some criteria must be taken into consideration, in fact, participants demographics information is a must to get the aimed results, details such as gender, profession and age are all vital for the best of the research. Data collection success highlights the interviewer's communication skills, while the researcher's knowledge of the subject is important as it gives him/her more credibility. In addition, interviews are conversations between the researcher and the participant to gather information about a specific topic (Berg and Lune, 2015), it is also to get to know what the participants think about the subject as interviews give them the chance to give their opinion, answer the questions in details, give examples, talk about their personal experience (Paton, 1987). There are many types of interviews and are all listed below:

- Unstructured open-ended questions and taking notes of the answers.
- Unstructured open-ended questions, with an audio recording of the interview.
- Semi structured questions, with an audio recording of the interview.
- Focus group interviews, and audio record the answers
- Different types of interviews can be conducted such as emails, face to face, focus group, online, focus group and phone interviewing (Creswell, 2021).

In this research we opted to have one to one interviews since the reasons to have group interviews, such as others reminding or raising issues, or feeling encouraged by the group to talk about very personal or intimate issues, were not the case here. Issues to talk about were half mentioned anyway through the semi structured component of the interaction. Since the specifics were not important and we did not want to stress participants, these semi-structured interviews were carried out without audio or video recording. notes were taken when conducting and asking the questions as they are much more easier to perform, on the other hand, with there is no recording participants are more likely to take part fully in the research, chances of getting good results get higher as individuals will feel more comfortable when answering the research questions. In addition, semi structured interviews are qualitative research with a set of questions that stimulates conversation which favors the interviewer to get more details, information and details from the interviewee.

In this study, 20 participants were interviewed. These were students at electronics, computers, mechanical, and informatics departments in EMU and hence were supposed to represent a sample of potential electric car consumers who were also very knowledgeable in high technology subjects. The meeting was face to face at the university campus, participants were asked 11 questions, easy to answer as they are general and are meant to provide cues and pointers that will encourage the participants to express themselves. The total time of the interview is around 30 minutes (around 3 minutes per question) and all the answers were noted for further analysis. The questions asked are included in the appendix.

3.2 Population and Sample

At the beginning of this research, it has been planned to interview individuals who lives in North Cyprus and study at EMU. Among the departments students enrolled in are Electrical and Mechanical engineering and computers and informatics students.

Even though the interviews as mentioned before are not recorded it is not an easy task to conduct it, in fact, time, place, getting the confirmation from participants, getting the right answers, having enough number of participants are all some drawbacks of the research but many of them cannot be controlled and solutions must be found quickly.

3.3 Data Collection Tools

The data was collected using semi-structured interviews without voice or audio recording; it was a friendly face-to-face meeting where participants answers were noted on paper or in the interviewer's mind for further analysis. The research questions asked during the interviews are as follow and are also at the attachments section of the study:

- What type of transportation do you usually prefer in your daily life? Why?
- What do you think about the potential energy resources of North Cyprus?
- What can you say about the advantages and disadvantages of vehicle fuel types?
- If you were to buy a new vehicle under today's conditions, what features would you consider?
- How much do you know about electric vehicle technology?
- What might be your reasons for choosing electric vehicles?
- Do you see electric vehicles in traffic in North Cyprus? What do you think about this?

- If you have driven an electric vehicle, what are your experiences of driving an electric vehicle?
- Imagine you have an electric vehicle. What difficulties would you encounter in North Cyprus?
- What advantages can be offered in government policies regarding electric vehicles?
- What are your expectations about the future of electric vehicle technology?

3.4 Research Results

This part of the study includes the participants' answers during face-to-face interviews and main answers and point of views are presented in detail below:

- Why could EMU students be considering purchasing an electric car in the future ?

1- Less negative effects on the environment: electric cars are not noisy so there is no noise pollution, plus there are no emissions compared to fuel type cars.

2- Following technological advances: Some of the participants who were very aware of electric cars technology stated that they can think about having one in the future as they expect the industry to develop more in the future as more features will be available and today's issues will not be the same in the upcoming models.

3- Low cost: owning an electric car means that fuel costs are reduced, in fact, many interviewees stated that they are looking to buy an economic car, and an electric one could be the answer and what they are really looking for.

4- Speed and performance: electric cars are known for their speed and many participants who are interested in owning a fast car said that they are thinking about switching to electric cars due to their good performance on the road.

5- Have many interesting features: normal cars are widely used and many cars enthusiast are happy with their performance, but the research participants answered that one of the many reasons that can make them switch to electric vehicle. In fact, features such as auto driving, fast charging, unique and futuristic design, IA system included, smaller so easy to park. All the points mentioned above are what influence and convince consumers to switch to electric cars.

6- Support local companies: A participant said that North Cyprus should produce electric cars, and government should help consumers purchase one as it's a win-win situation for all the included parties (country's government – The Company – Consumers).

On the other hand, the following points are the participants answers about why they are not interested in purchasing an electric car at North Cyprus:

1- Infrastructure issues: Many confirmed that even though the island presents many advantages for owning an electric car, the infrastructure is still not favorable for owning one, adding to this the small number of charging stations at Famagusta.

2- Electricity prices: Taking into consideration high electricity bills at North Cyprus it is not easy to own an electric car, in fact, many individuals who live far from the available charging stations are not able to charge their cars at their houses.

3- Difficult to repair: Most of mechanics at North Cyprus are used to repair fuel type cars as most car parts sold and the ones easy to find/repair are for these types of vehicles. Participants said that it is a real concern that after purchasing an electric car and in case of an accident/damage or an internal issue the car must be shipped to another country for repairs, which many confirm can be very costly.

4- Rules and policies: Many see that the North Cyprus government should consider putting in place more incentives for consumers willing to purchase electric vehicles either the domestic one or importing one from another country as it will help the country in many ways.

5- High prices: Participants see that electric cars are the future and include many features they can't wait to use daily, but due to high sale prices many cannot afford it and ask for a price reduction, but it is still not the case.

Chapter 4

FINDINGS AND DISCUSSION

4.1 Participants Choices

Table 1: The main reasons for not buying an EV at North Cyprus

Why not purchasing EV in North Cyprus	Participant	Total
Lack of Infrastructure	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20	13
Electricity Bills	2, 5, 8, 10, 12, 17, 18, 19,	8
Reparation Costs	5, 8, 11, 12,	4
Rules and Policies	8, 11, 15, 20	4
High Sale Price	8, 10, 3, 15, 16, 18	6
Country's weather	7, 8, 12, 15, 20	5
Lack of knowledge	7, 11, 13, 16, 18,	5

The table above is a representation of all the answers participants gave regarding why they would not consider purchasing an electric car at North Cyprus. There are 7 main reasons and factors that make individuals very reluctant to use an electric vehicle on the island. Most of them see that lack of infrastructure such as charging stations, good

roads are the main reasons as 13 out of 20 individuals taking part in the research gave that reason during the interview, they see that electrical energy is not very well used and many efforts can be done.

Electricity bills come second, in fact 8 out of 20 participants all said that buying an electric car is not possible as the island has high electricity bills, in fact, owners will not be able to charge their cars fully or as many times as they want. Which means in other words their investment will not be worth it and they will be obliged to resale their car at a lower price.

Looking at the table, high sale prices are third on the list as 6 out of 20 individuals stated that even though they like electric cars better than fuel type vehicles they still can't afford one due to its high prices on the market.

Following high prices comes country's weather and lack of knowledge by mechanics, 5 out of 20 participants says that they can't buy an electric car as they are afraid North Cyprus hot weather can damage the batteries and cause the cars to not work at full capacity, in addition, the lack of knowledge that 5 participants choose as a reason is related to fixing the cars, they think that the island does not have enough trained employees to fix an electric car.

Rules, policies and reparation costs come last on the table, only 4 individuals out of the 20 answered that at North Cyprus government rules and country's general policies does not favor purchasing an electric car as well as the repair costs taking into consideration what was said before regarding the lack of trained labor capable of repairing/fixing an electric vehicle.

Table 2: The main reasons to consider when buying an EV at North Cyprus

Why purchasing EV in North Cyprus	Participant	Total
Less negative effects on the environment	5, 6, 9, 14, 17	5
Following technological advances	1,2,3, 5, 6, 19	6
Low cost	3,6, 7, 8, 9, 10, 12, 13, 14, 17	10
Speed and Performance	1,5,19	3
New features	7,10, 18,19	4
Local companies	14	1

The table above is a representation of the main reasons that participants take seriously into consideration when thinking about buying an electric car at North Cyprus. There are 6 factors that encourage the 20 participants to buy an electric vehicle, the main reason is cost saving, in fact, 10 out of 20 participants answered that their main reason to switch from a fuel type car to an electric one is to save more money, as fuel and oil prices are highly increasing recently and consumers are not capable of affording many products and services, so they must look for alternatives for the short and long term. When compared to sample from general population from Yaman's master thesis, the participants in our study, with greater technical knowledge due to their university degrees in electronics, mechanics, and computers, were observed to put low cost as their first reason to buy electric cars but only about 50% of them did so whereas in the sample from general population in the previous study close to 75% thought electric

cars could be lower cost than petrol cars. We can conclude that the more educated students did not see cost as a big incentive to buy electric cars as the general population. One explanation for this may be that they are aware of the costs of battery replacements and how many ways things may go wrong with batteries. That would be for further research though.

The second reason given in favor of electric cars is protecting the environment, in fact, 5 out of 20 are concerned about our planet and are strongly motivated to protect it at all costs by making sure their daily movements and travels do not pollute the air more. The general population on the other hand had supported this with much greater enthusiasm, 75% citing this as a reason to favour electric cars. Here again we see that more knowledgeable participants do not get overexcited about electric car's contribution to protecting the environment perhaps because they know all about the toxicity of battery manufacturing and recycling that would be done in Africa or other poor countries, where some of our EMU student sample is from. The previous study sample of general population was almost all Turkish Cypriots from Famagusta.

Following technological advances and testing new features comes third as 4 out of 20 interviewees said that they are more likely to buy an electric vehicle to either own the latest technological updates and advances or test the new features these types of cars have such as auto driving, and futuristic design. Here again, the knowledgeable students did not show as much of a warm response to technological bells and whistles of electric cars, whereas the general population sampled from previous study responded positively to this with 35%. It is highly likely that electric car promotional advertisements have an easier time pulling regular people towards electric cars than pulling highly knowledgeable students to buy electric cars.

Few of the participants sees that their main reason is the electric car performance as they tend to be for some models to be faster than fuel type cars, they can also drive for very long trips without the need to recharge unlike fuel type cars that have only very limited distances to cover in some models. The general sampled population of Famagusta also thought similarly that electric cars are not to be preferred for performance. The knowledge difference between the participants in both studies did not make any difference in their opinions in this regard.

The last reason to buy an electric car is to support local companies at North Cyprus, only one participant talked about "Günsel" and that he will be motivated to purchase one of their models in the future. The general sampled population from Yaman's study also gave similar responses on this issue. So, no divergence of opinion was observed due to EMU student sample participants having higher technical knowledge regarding this issue.

4.1 Conclusion and Recommendations

This study aimed to discover whether potential customers contemplating about buying an electric car have significantly different perceptions because they possess or do not possess high levels of technology knowledge. This is a very critical issue for car manufacturers whether they are producing petrol cars or electric cars. Different types of advertising strategies would need to be developed for each of the two customer segments if it is observed that people with high levels of technical knowledge perceive electric cars differently and evaluate their characteristics differently than average people in the street.

Hence, following Yaman's master's thesis study on perceptions of potential customers about electronic cars in north Cyprus, which interviewed with randomly selected sample drawn from Famagusta residents (of all ages, gender, income level, and education), this study deliberately drew its sample from university students that are studying in electronics, mechanical, computer engineering and informatics. In fact, the timing of the interviews coincided with the graduation week, hence the sample contained more knowledgeable, graduating senior level undergraduates and master students than a normal EMU sample that would have been formed at any other time in the academic calendar at the university.

The results showed that compared to the average potential customer on the streets of Famagusta, the more knowledgeable potential customers selected from EMU engineering students were more likely to have more realistic and mature perceptions of the electric car batteries and the related issues around the long term cost of battery power and toxicity of manufacturing and recycling their batteries, especially in poor developing countries. Similarly, the more educated sample were also not impressed with clean air arguments since environmental benefits would accrue to major cities and towns of the developed countries and the land pits and rivers and lakes close to battery manufacturing and recycling facilities will experience devastating pollution of their water resources often on which much agriculture depends.

In short, this study uncovered that many of the arguments that reach the average potential consumers in the street are not convincing enough or strong enough to survive the critical questioning of the more knowledgeable potential consumers such as engineering students. The lesson to take away from this study is to invite a more informed argument about the pros and cons of electric car phenomenon that includes

their negative impacts. At present, there is too much hustling and advertising to sell electric cars, and it seems many people may shy away from them in the near future after buying one and finding out that the promises are not living up to real life experiences.

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