Influence of Perceived Risk Dimensions on Consumers' Attitudes towards Buying Electric Vehicles (EVs) in Jordan

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ABSTRACT

The current study aims at investigating the effect of perceived risk dimensions on consumers' attitude toward buying EVs in Jordan. The study methodology is based on quantitative approach to collect the primary data. The questionnaire of this study was adapted and developed from previous studies. Two hundred (200) buyers were targeted in the car market in Jordan called "ALHARAJ". After receiving the responses, one hundred and ninety-four (194) questionnaire forms were analyzed. SPSS, v.18 program was used to conduct some tests, such as those of outliers, normality, reliability, validity and multicollinearity. AMOS, v.12 was used to test the study hypotheses. The findings of this study showed that one hypothesis related to physical risks was unsupported and had negative and insignificant impact on consumers' attitude toward buying EVs in Jordan. Further, this study indicated that four hypotheses related to financial risk, functional risk, social risk and time risk were supported and accepted and had negative and significant effects on consumers' attitude toward buying EVs in Jordan. Finally, some recommendations for practitioners and academics were presented to enrich this field with some empirical studies.

Keywords: Perceived risk dimensions, Consumers' attitudes, Electric vehicles, Jordan.

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تأثير أبعاد المخاطر المدركة في اتجاهات العملاء نحو شراء السيارات الكهربائية في الأردن

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ملخص

تهدف الدراسة الحالية إلى البحث في تأثير أبعاد المخاطر المدركة في اتجاهات العملاء نحو شراء السيارات الكهربائية في الأردن. اعتمدت الدراسة المنهج الكمي لجمع البيانات الأولية من خلال استبيان بني اعتماداً على الدراسات السابقة. وُزع استبيان هذه الدراسة على 200 عميل كانوا موجودين في سوق السيارات في الأردن الذي يطلق عليه "الحراج". بعد استعادة الإجابات، وُجد أن 194 استمارة كانت صالحة لمرحلة التحليل الإحصائي النهائي باستخدام برمجية SPSS، النسخة 18؛ بهدف القيام ببعض الاختبارات مثل اختبار الحالات الشاذة والتوزيع الطبيعي وثبات العبارات ومصداقيتها والارتباط بين المتغيرات، بالإضافة إلى استخدام برنامج نموذج SEM المسمّى AMOS، النسخة 12؛ بهدف اختبار فرضيات الدراسة. أشارت نتائج هذه الدراسة إلى أن هناك فرضية واحدة فقط رفضت، كانت تتعلق باختبار أثر المخاطر المادية في اتجاهات العملاء نحو شراء السيارات الكهربائية؛ فقد كانت ذات تأثير سلبي في اتجاهات العملاء، ولكن لم تكن ذات أهمية. ومن جهة أخرى، أكدت نتائج هذه الدراسة أن أربع فرضيات اختبرت في هذه الدراسة كانت تتعلق بالمخاطر المالية والمخاطر الوظيفية والمخاطر الاجتماعية ومخاطر الوقت كانت مقبولة وذات أهمية في اتجاهات العملاء نحو شراء السيارات الكهربائية في الأردن. وأخيراً، قدمت هذه الدراسة مجموعة من التوصيات للمطبقين وللباحثين لإثراء هذا الحقل بعددٍ من الدراسات التطبيقية.

الكلمات الدالة: أبعاد المخاطر المدركة، اتجاهات العملاء، السيارات الكهربائية، الأردن.

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1. INTRODUCTION

Increasing the population number around the world requires sustainable developments in the industry sector to satisfy the customers' requirements and to keep our environment far away from pollution. These reasons encourage car organizations to find new generations to keep up with customer desires. Therefore, car organizations produce new cars that use electricity energy only without petroleum derivatives. They are completely powered by their rechargeable batteries. These cars ae known as Electric Vehicles "EVs". EVs are more suitable than internal combustion engine cars in terms of preserving the environment, as they do not produce harmful residues to the environment. This type of cars works through an internal generator in the car that takes electricity from the station without the combustion process as in motor vehicles; both hybrid and gasoline vehicles, which helps users drive for about 300 miles (Mi & Masrur, 2017).

In this manner, governments around the world are applying policies that aim at supporting EVs to decrease dependence on oil in order to protect the atmosphere (Slowik, Pavlenko & Lutsey, 2016). International reports in the past few years showed that the global sales of EVs have been on the upswing, from just a few hundreds in 2010 to more than 500,000 in 2015 and more than 750,000 in 2016 to reach 2 million electric vehicles in January 2016 (Slowik, Pavlenko & Lutsey, 2016).

According to Zou et al. (2015), there are many advantages and disadvantages of electric vehicle that are represented in:

A. Advantages of EVs

1) No need for fuel, thus saving more money.
2) Some governments give tax exemtions, rewards and incentives when buying electric cars, in order to encourage people to invest in them.
3) EVs are eco- friendly and do not emit smoke or exhaust residuals, contributing to a healthy and green environment.
4) Their popularity increases over time, and with the development and improvements that are added, negative aspects will begin to decline after treatment.
5) EVs are safe to the driver, with airbags and can cut electrical supplies to turn off the battery and protect other passengers.
6) Their cost goes down steadily, unlike regular cars. You do not need many maintenance operations, hence less maintenance costs have to be paid. They are quiet with no engine sound, no noise and no pollution as well.
7) The world's largest automakers invest and participate in the modernization and development of electric vehicles, such as: Nissan, Tesla and others. The world has also begun to move towards alternative-energy vehicles, hoping to reach safe cars to the environment.

B. Disadvantages of EVs

1) Lack of battery recharge places: Such stations are rare to exist, due to lack of adequate development of cars and spread in parallel to normal cars, which requires more effort, time and money to reach.
2) High electricity price: The price of electricity is constantly increasing and here, the person offering the purchase of electric cars has to do a feasible work to determine the most appropriate option. Electricity is not free.
3) Limited speed and range: Since EVs are not suitable for long trips, you need to recharge the battery repeatedly.
4) Taking a long time when recharging: It may take 5-6 hours to fill the battery, unlike normal cars

that need a few minutes.

5) Small size: An EV can accommodate only 2 people, or 4 for some companies. However, smaller size is an advantage when lining up or passing through the street case of intense in traffic.
6) EVs require full battery change every 3-10 years, depending on the battery.
7) The cost of purchasing an EV is relatively high.

The latest statistics show that the total number of EVs in the world (2012-2016) was about one million and two hundred cars. They pointed out that there is acceptance by customers to buy such cars. Manufacturers race to produce this type of vehicles, including Tesla's Model S, Nissan's Leaf and Toyota Prius plug-in hybrid. Tesla is situated in California. It ranked first among other manufacturers engaged in manufacturing electric cars. This company built the first and largest battery factories in the world in the United States of America, with sales in the first quarter of 2017 amounting to about 25,000 cars all over the world. Statistics also indicated that China is the largest market for this type of vehicle, as the Chinese government encourages the purchase of such innovations through government incentives, custom exemptions and exemption from any charges related to this vehicle. Moreover, statistics presented global electric vehicle sales between January and September 2017 by brand. During the first nine months of 2017, Japan's Toyota sold almost 40,000 electric vehicles globally (Statista, 2017). According to figures issued by the Drivers and Vehicles Licensing Department in Jordan, the number of vehicles registered until the end of February, 2017 is equivalent to 61% of the total holders of driving licenses from different categories. In addition, the number of vehicles of all types until the end of February was (1,583,458) vehicles compared to (2,327,378) driving licenses of all categories. Also, the figures pointed out that about 17,448 new vehicles entered the licensing administration records for the first time since the beginning of 2017, while the licenses were renewed to about 163,037 vehicle licenses at a daily rate of 3,977 licenses (Public Security Directorate, 2017).

In this manner, Jordan in 2015 was the first Arab country to import this type of cars. And give the customers full custom exemptions, as well as exemptions from sales tax and registration and licensing fees, thereby encouraging customers to use this car type. For example, in the same year, Amman Municipality in Jordan has launched a taxi service under the name of "Tawsilah" using a fleet of cars of the kind Nissan Leaf. This service provides parking in specific locations in the capital Amman, to transport passengers to any place in their service area. However, sources indicated that the number of these vehicles was about 1200 moving on the streets of Jordan (Almarafee, 2016).

Jordan is the first Arab country that imported EVs. The government provided incentives and custom exemptions to encourage citizens to buy such vehicles. On 16 September 2015, the Jordanian government decided to approve the exemption of EVs in full and exempt the batteries of EVs from the registration fees for the first time. This amounts to 8-9 thousand dinars (Petra, 2015). The decision aimed at encouraging citizens to obtain EVs, because they save fuel bills and protect the environment. Also, the government has taken all the necessary decisions to encourage the use of EVs completely by the private sector and citizens after the development of EV technology to reduce the cost, which is still high so far. The Council of Ministers pointed out that the license fees for electric vehicles paid annually to the Drivers and Vehicles Licensing Department amount to about 16% of 7.5%; equivalent to about 1,000 dinars to be paid as annual license fees and for road and infrastructure services (Petra, 2015).

The Jordanian government also replaced a large part of the vehicles used in the public sector, estimated at about 20 thousand vehicles, gradually by EVs. This contributed to annual savings in the state treasury estimated at 25-28 million dinars. The next phases of the project include the transformation of public transport into EVs. Fuel-powered vehicles will be sold and revenues will be used to purchase EVs. In accordance with the government's vision, the Greater Amman Municipality has signed an agreement with Jordan Transport Company "Taxi l-Momayz" within the next phase of the project to replace 100 vehicles with distinctive electric vehicles. The gradual shift in the public sector towards electric cars follows the project launched at the World Economic Forum at the Dead Sea, which was hosted by the Kingdom last May and witnessed the signing of memoranda of understanding with a number of advanced companies, such as Tesla, BMW, Renault and Mercedes. As mentioned above, the Municipality of Amman has launched a taxi service under the name of "Tawsilah" using a fleet of Nissan Leaf, which is not officially available through the agent until now. The service is available in specific parking areas, such as King Faisal Square, for a lump sum of - half a dinar – passengers to any place in the service area (Addustour, 2015).

With the little spread of using of EVs in the Kingdom, many of the fuel stations and companies prepared infrastructure services through the provision of points of charging. The government announced the price per month. A number of users equip points of charging for electric cars in homes, called home freight. Therefore, the Ministry of for Energy and Minerals issued a special price for t charging EVs. The government has recently arranged its deployment on a wider scale in the Kingdom. Al-Manaseer Group, Total and Jordan Petroleum Refinery are working together with Greater Amman Municipality to provide the appropriate infrastructure for EVs in different regions of the Kingdom. Al-Manaseer Group will provide free charging service for public sector vehicles, reflecting the principle of partnership between the public and private sectors (Zaidan, 2015). The Board of Commissioners of the Energy and Minerals Sector Regulatory Authority approved the tariff of charging EVs from the electrical system and private sources of energy. The price of general charging stations licensed by the Authority and supplied by the electrical system was set at 110 Fils per kilowatt hour for the period from November 15, 2015 until the end of December 2016 (the cost of supplying electricity). The general charging station receives 25 Fils per kilowatt hour, so that the final price becomes 135 Fils per kilowatt hour (Zaidan, 2015).

According to the Jordanian Drivers and Vehicles Licensing Department manager, the total number of EVs in Jordan, cleared during 2016, increased to 163% compared to 2015. Jordan's total imports of EVs in 2016 were 885 cars compared to 336 cars in 2015, while they were only 9 cars in 2014. Also, the statistics showed that the total value of imports of EVs in 2015 (336 cars) was about five million dinars compared to the value of the total imports of this kind of vehicle in 2014 amounting to about 900 thousand dinars (Alqamaz, 2017). Despite the fact that the government has adopted a new policy three years ago to facilitate the purchase of electric cars, statistics still indicate very few figures compared to the total number of cars in Jordan, where the figures related to EVs are very modest, which indicates that there are many questions from Jordanians about this car. We will raise these questions in this study.

2. Problem Statement

In general, despite the fact that EVs solve several environment problems related to storing petroleum sources and preserving the environment by

eliminating pollution, usage is still quite low and only a small number of car manufacturers have already introduced EVs at a low production level (Bessenbach & Wallrap, 2013). Moreover, this area has high intentions from sustainable mobility solutions' side, but low intentions in terms of consumers' willingness to adopt EVs (Farhar et al., 2016).

In Jordan, the government exempted EVs from registration fees due for the first time. These amount to approximately JD 8.000-9.000 (about $11.000-14.000). EVs are also exempted from customs and sales tax on batteries and spare parts. The demand for this type of cars is still very limited. According to the latest statistics of the Drivers and Vehicles Licensing Department of Jordan, the number of vehicles registered in Jordan for 2017 is (1,583,458) (Public Security Directorate, 2017). compared to (4000) EVs registered for the same year according to the latest statistics of the Jordanian Free Zone Investors Association (Reham, 2017). Some of traders started to import limited quantities of them, because the demand is still weak by customers. However, understanding why people do not use such cars is debatable and at least as important as knowing who do not use them. Also, understanding the major factors that cause failure of inventions and why customers resist EVs in Jordan are of importance. Moreover, little research has been done on this field and few scholars have examined why consumers resist some innovations in Jordan. Researchers should be encouraged to examine factors that influence customers' attitudes to resist buying this invention or what perceived risk types cause resistance toward EVs in Jordan.

3. Research Questions

Based on the research problem statement discussed above, five questions are addressed in this research. The main question is: what is the effect of perceived risks on consumers' attitude to buy EVs in Jordan? This research tries to examine several forms of perceived risk. These are physical, financial, functional, social and time risks; therefore, the following sub-questions will be answered:

Q1: What is the effect of physical risk on consumers' attitude to buy EVs in Jordan?

Q2: What is the effect of financial risk on consumers' attitude to buy EVs in Jordan?

Q3: What is the effect of functional risk on consumers' attitude to buy EVs in Jordan?

Q4: What is the effect of social risk on consumers' attitude to buy EVs in Jordan?

Q5: What is the effect of time risk on consumers' attitude to buy EVs in Jordan?

4. Research objectives

This research aims at investigating the effect of perceived risk forms on consumers' attitude to buy EVs in Jordan, as well as achieving the following sub-objectives:

1. To investigate the effect of physical risk on consumers' attitude to buy EVs in Jordan.
2. To investigate the effect of financial risk on consumers' attitude to buy EVs in Jordan.
3. To investigate the effect of functional risk on consumers' attitude to buy EVs in Jordan.
4. To investigate the effect of social risk on consumers' attitude to buy EVs in Jordan.
5. To investigate the effect of time risk on consumers' attitude to buy EVs in Jordan.

5. EV Background

5.1 EV Development

This section will present some elaborations and facts about EVs, to inform readers of this invention and enhance their knowledge and awareness related to EVs. This paper is interested in giving readers some

facts about EVs and how this invention was developed through the time until now.

According to Anderson & Anderson (2010), EVs have gone through three major stages since their discovery until now.

1- The first stage (1980-1929)

The discovery of EVs dates back to 1890, when it was just a concept not yet developed and proposed by the German company Benz in 1885. After that, this concept was translated into reality in France when this invention was realized in small numbers of about 5600 EVs and 265 electric charging stations in 1900. In 1905, this car became a success story and an interesting discovery to run 130 miles with one battery charge. Anderson & Anderson (2010) expressed this invention as follows: "It was clean, silent, free of vibrations, thoroughly reliable, easy to start and control (no shifting required) and produced no dirt or odor. The disadvantages were short range and high initial cost. Interestingly enough, electric vehicles outsold all other car types in America in the years 1899 and 1900."

2- The second stage (1930-1989)

The second phase came after World War II, when countries were suffering from poor economic conditions and limited potential, in addition to lack of oil derivatives and natural resources in the 1960s and 1970s, which emphasized the need to focus on the invention of EVs.

3- The third stage (current era) (1990 until now)

In the last phase of the development of EVs, administrative and commercial concepts have been developed. These are based on the concepts of preserving wealth, protecting the environment from pollution and production of products that satisfy customers. Since 2002, governments have encouraged organizations, through financial support, to do research that helps producing cars that are environmentally friendly and less fuel-demanding. Governments provided these organizations with many facilities and exempted them from taxes and customs to help them introduce new inventions in this area. Until 2008, the number of EVs was limited and quite small. Only thirteen EV models were produced around the world to reach 119 models in 2012. These inventions are still uncertain, but they have been confirmed by (Brown et al., 2010) when they said that "the future of electric vehicles [...] remains to be written".

Nowadays, as mentioned above, there are many factors that have contributed to and encouraged the existence of new inventions, such as EVs. These include economic forces which contributed to the high prices of oil, technological factors which contributed to keeping abreast of technological developments accelerating the need to create inventions, in addition to the new environmental factors and concepts. These factors motivated organizations to promote the production of environmentally friendly products because of the increasing global pollution. Moreover, the issue of EVs attracted high attention by many researchers, who tried to identify the factors that contributed to the spread of such invention. For example, in March 2011, the International Geneva Motor Show has organized an automobile event to discuss this new innovation and the future that awaits it. It carried the name of the Green Vision and came out with a series of recommendations that stress the importance of this industry and the opportunities that contribute to the success of such innovation (Anderson & Anderson, 2010).

5.2 Types of EVs

Many experts, like Offer et al. (2010), pointed out

that EVs can be classified into three main types that are driven by electric motors and get their energy from a battery: hybrid electric vehicles, plug-in hybrid vehicles and battery electric vehicles as follows:

A. *Battery Electric Vehicles(BEVs)*

In these types, known as "pure electric vehicles", the electric motor pulls the energy needed to run completely through the battery. It is loaded electronically and is the only source of energy in the car. EVs powered solely by an electric motor and having no internal combustion engine with a capacity of 20kWh or more than 50kWh are considered as high-performance models for example, Tesla Roadster, Mitsubishi i-MiEV and Nissan Leaf (Howey et al, 2011; Perujo et al., 2011).

B. Plug-in Hybrid Electric Vehicles(PHEVs)

Plug-in hybrid electric vehicles include two electric systems that charge the battery for the meter and the combustion system. The car is able to run on electric power alone, at urban speeds, for short distances. When the electric charge goes off, the vehicle can combine the electric motor and the battery with the combustion engine. Examples include Toyota Prius Plug-in Hybrid 5 and Chevrolet Volt (Perujo et al., 2011).

C. Hybrid Electric Vehicles(HEVs)

These vehicles are known as Hybrid Electric Vehicles (HEVs) or full hybrid vehicles. This car has a battery, which is loaded by ICE and regenerative brake, but not from an external source of electricity. This type is capable of driving on pure electric power at low speeds and for a limited time and has batteries with capacities up to 30 kWh (Lytton, 2010). The main difference between PHEVs and HEVs is that PHEVs draw electricity from the grid, while HEVs don't. Some common examples of HEVs are early releases from Honda Civic Hybrid and Toyota Prius (Perujo et al., 2011).

6. Literature Review and Previous Studies

To investigate the reasons why customers, resist the electric car innovation in different countries, Bessenbach and Wallrapp (2013) examined three factors that influence customers' perception; buying incentives, innovation exposure and consumer characteristics. The findings of their study showed that the previous factors had high effect on customers' perception on the one hand and on the other, the results indicated that most of the customers resist the EV innovation, because they feel risky toward this technology and are not ready to buy EVs.

Kimoto and Cooper (2014) showed that EVs represented new abnormal diffusion area which added several values for humanity and disappeared from the market twice before. Kimoto and Cooper's study indicated that the EVs' innovation adoption is affected by factors that influence the rate of using such vehicles by the people of Ohio. These factors include lack of social vigor, better range, superior infrastructure and lower costs. Findings of the study showed that the cost factor includes costs of all operations, maintenance and fuel costs, infrastructure support costs, as well as social factors and governmental policies being influential on EV adoption and diffusion. Sierzchula et al. (2014) conducted a study to explore the factors related to the level of adoption of EVs. The study results showed that charging infrastructure is the main adoption obstacle that influences customers' attitude toward EVs. In addition, the study indicated that the government plays a good role by promoting this kind of innovation to the population. Moreover, financial factors influenced positively and significantly the rate of EV adoption playing an important role in using this

innovation (Sierzchula et al., 2014). In addition, the results of the study showed that demographic variables, such as education level and income, were not good predictors of adoption levels. Finally, the study concluded that social factors were not good predictors of adoption levels of EVs.

Coffman, Bernstein and Wee (2015) examined the factors that influence customers' attitude toward EV adoption. They found that those factors fall into two types; internal and external. The internal factors are related to characteristics of EVs which include driving range, charging time, battery cost and purchase price, while the external factors are related to customers and come from outside including vehicle diversity, policy incentives, consumer characteristics, public visibility, availability of charging stations, fuel prices and travel distance. Moreover, the study found that the adoption of EVs was influenced by policy mechanisms available which support EV usage and adoption. In addition, supporting infrastructure and awareness raise the usage of such technology type. Finally, the study indicates that the social factors play an important role in affecting customers' adoption of this innovation.

In the United Kingdom, the diffusion of Electric Vehicles (EVs) means the adoption of a low-carbon mobility system which indicates the reduction of using fuel cars. Morton et al. (2016) investigated the demand for electric cars in the UK market and examined several factors that affect customers' attitude to buy EVs. The findings of their study showed that customers' attitudes in the UK are affected by sociological cohort and psychological factors which determine the customers' preferences towards the functional performance of EVs. Slowik, Pavlenko and Lutsey (2016) indicated that the sales' volume of electric vehicles has increased in Europe, China and the United States, because the governments of these countries encourage customers and support them to buy and use this type of innovation. Their study targeted the US market and described it as a main electric vehicle market around the world. The authors reflected that in terms of some processes, the US government employed them to increase the rate of buying this type of cars, such as climate change, industrial development, local air quality and energy preservation. By using the theory of planned behavior, Chen et al. (2016) investigated the role of social factors in determining Chinese customers' behavior toward adopting EVs. Results of the study showed that the subjective norm influenced significantly and positively customers' intention to buy EVs. On the one hand, the results indicated that renewable energy knowledge and supporting renewable energy policies had a positive impact on customers' intention to adopt EV innovation. Wang et al. (2016) analyzed the customers' readiness to adopt EVs in China. They conducted a study to examine the most important factors that influence customers to buy EVs, which are marketing effectiveness, social influence, government policies, charging infrastructure, performance attributes, perceived risks, financial benefits, demographic factors, customer personality and customer characteristics. The results of their study showed that customers are not willing to buy EVs in China in general and they had to investigate the factors that influence car users to encourage them to buy EVs. In addition, the results of the study showed that small groups of customers are willing to buy EVs who are those with high income, those who like to buy an EV as a second vehicle or who like to buy new things which are environmentally friendly. Moreover, the study indicated that when customers feel less risky towards this innovation, their willingness to buy EVs will increase especially if they find that their society encourages them to use this innovation.

A study conducted by Madina (2016) showed that the total cost of charging station (CS) usage has a

negative impact on customers' attitude toward EV usage while the EV price still lets EV consumers have a cost comparable to that of traditional vehicles. Moreover, findings of the study indicated that using private home charging stations encourages customers to buy this kind of innovation, but it seems to be costly for them. Therefore, a public charging infrastructure will still be needed. Findings of the study also showed that lack of customers' experiences has a negative impact on the level of EV adoption, Therefore, electro-mobility promotion measures have to consider both private and convenience charging, which have different support requirements. Silvia and Krause (2016) developed a model to simulate the factors that encourage customers to adopt electric vehicles in an urban community. These factors contain expanding the local public charging system, reducing the price of EVs through subsidies and increasing the number of full-battery EVs on the roadway through government navy purchases. Findings of the study indicated that the previous factors aimed to help customers adopt EVs. Also, they may help encounter the idea that BEVs are not a viable alternative to gasoline-powered vehicles. Another study conducted by Cartenì et al. (2016) addressed three main issues which are considered to be good factors to adopt EVs. These issues are: (i) investigating and modeling the tendency to select car hiring as a transport option within a neighborhood housing car hiring business models; (ii) estimating the impact as well as having an EV alternative available; (iii) measuring the "pure preference". Findings of this study indicated that the option of car hiring services provides general behavior insights, making it possible to measure the "pure preference" for EVs and the demand elasticity with view to dissimilar pricing strategies of car hiring services.

Moreover, the adoption of EVs is considered an environmentally friendly innovation to society (Adnan et al., 2017a). In spite of positive environmental implications for adopting EVs' adopters of EVs numbers are quite low, which guided the researchers to conduct a study to outline the difficulties for consumer adoption of EVs. This study aimed to investigate the consumers' emotions as well as the emotions of other people toward their behavior concerning the adoption of EVs. The results found that the customers' emotions and the emotions of others have a positive and significant influence on the intention to adopt EV diffusion (Adnan et al., 2017a). Adnan et al. (2017) showed that the public attitude toward using EVs is still a challenge. The Theory of Planned Behavior (TPB) model has been used to explore the influence of customers' attitudes: Subjective Norm (SN) and Perceived Behavioral Control (PBC) on customers' intention to adopt the EV innovation, beside the affect of carbon emissions as harmful wastes on adopting this type of diffusion. The findings of this study showed that the customer's attitude, self-efficacy, the government and the technological support influence positively customers' intention to adopt EVs, while the social factor has no significant impact on customers' intention. On the other hand, the benefits of EV diffusion in terms of decreasing harmful issues play an important role to encourage customers to adopt EVS.

Liao et al. (2017) indicated that the adoption of EVs came as an excellent solution for a lot of social problems, such as oil dependency, global warming and environmental pollution. Despite problem solving, market penetration of EVs is relatively low and is still in the infancy stage. The study investigated the effect of financial, technical, infrastructure and policy attributes on customers' attitude toward using EVs. It categorized the significant causes for consumer preference into groups, such as social influences, psychological factors, mobility conditions and socio-economic variables and examined their

effects on customers' behavior. The results showed that social and economic factors were important to determine the adoption of EVs. Andwari et al. (2017) explained that European countries are gradually considering options to conventional road transport technologies. One of these alternatives was the EV technology, which might lead to the decrease of carbon emissions of light duty vehicle fleet and reduce oil dependence. However, it is still required to defeat some significant obstacles to increase social approval and get substantial market dispersion. The paper evaluated the technological and economic issues which are connected to the improvement of EVs. Finding of the study showed that economic issues, such as purchasing operation cost and station charging fees, have a highly significant effect on European customers to adopt such innovation, whereas social factors had a secondary role in the spread of this innovation. Jansson, Nordlund and Westin (2017) showed that the adoption of EVs is necessary, because transportation accounts for a large and growing part of carbon dioxide emissions and increasing private car usage is becoming a big problem which needs urgent attention. The study aimed to focus on studying consumers' opinion leading and opinion seeking as two examples of interpersonal influence attitudinal constructs which affect the customers' attitude toward adopting EVs. The study results confirmed the significance of personal norms, opinion leading and opinion seeking on customers' attitude toward adopting EVs. Moreover, findings of the study indicated that the importance of both interpersonal influence and attitudinal factors is a main driver for EV adoption.

To explore the relationship between the customers' attitudes and their readiness to buy EVs, Bennett and Vijaygopal (2018) examined the effects of gamification factors on purchasing environmentally friendly products such as EVs. The findings of the study indicated that customers' willingness to buy EVs was not significantly affected. Also, the relationship between the customers' attitudes and their willingness to buy EVs was very weak. There are several advantages of the environmental implications of EVs in our world which are considered as good keys for the future of technology revolution in the car industry. Some of these benefits include decreasing the current dependence on fuel energy and decreasing greenhouse gas (GHG) emissions. Palmer et al. (2018) conducted a study that aimed to present an extra wide whole cost of ownership evaluation of conventional, hybrid, plug-in hybrid and battery electric cars in three developed countries: Japan, the UK and the USA. The results of comparing the three developed countries showed that the financial factors have a positive and significant influence on customers in these countries and play an important role concerning the rate of EV diffusion. In another study conducted by Ruiz et al. (2018), the safety factor was discussed and examined through the hazards of chemical, electrical, mechanical and environmental nature. The study showed that safety is dominant to ensure pervasive levels of EV adoption in our world.

6.1 Customers' Attitude

Attitude factor is a very important element in behavioral theories. It is the main driver of customer behavior. Many researchers rely on studying how this factors affects the intention of clients to make purchasing decisions in different sectors. For example, attitude was used before in the Theory of Reasoned Actions (TRA): Fishbein and Ajzen (1981), Theory of Planned Behavior (TPB) Ajzen (1991), Theory of Technology Acceptance Model (TAM): Davis, Bagozzi and Warshaw (1989) and in the Decomposed Theory of Planned Behavior (DTPB): Taylor and Todd (1995). It is still included in several

studies as an important factor that indicates the extent to which customers are likely to adopt behaviors.

Fishbein & Ajzen (1981) defined attitude as "an expression to communicate the aspects of a person's social identity and world view". (p. 352). According to researchers, attitude has several definitions. For example, Thurstone (1928) affirms that attitude denotes "the total sum of a man's inclinations and feelings, prejudice or bias, pre-conceived notions, ideas, fears, threats, and convictions about any specified topic" (p. 531).

These definitions show that attitude is considered as the amount of positive and negative feelings one has towards an object and how these factors are influenced by the antecedents to shape the people's attitudes. This study tries to investigate the consumers' attitude towards EVs in Jordan and to understand the factors that make the consumers adopt them. According to the study problem statement, the percentage of buying EVs in Jordan is quite low which means that consumers are still afraid of buying EVs, which suggests that they have some purchasing risks related to loss of money or that EVs are not performing well or are still socially unacceptable. In this study, we will investigate the impact of the perceived risks that customers feel towards the purchase of EVs, examine the impact of each of these risks on the consumers' attitude and measure the effect of each of them on the Jordanian consumers' attitude towards buying this type of car. In addition, the study tries to determine what types of risk make consumers resist buying EVs in Jordan.

6.2 Perceived Risk Dimensions

Several literature fields have repeatedly discussed the concept of risk and its impact on consumers' attitude toward behavior (Cunningham et al., 2005). Moreover, consumers have certain feelings that make them afraid of buying products and uncomfortable with the behavior which may influence their decision to buy (Littler & Melanthiou, 2006). Therefore, perceived risk was defined as:

"Uncertainty which primarily relates to potential technological sources of errors and security gaps" Grabner-Krauter and Faullant (2008, p.488).

By reviewing previous studies as shown previously, there are many studies that were conducted in different countries around the world. These studies discussed many factors related to social, financial and behavioral aspects and some of them referred to some factors that sometimes encourage and sometimes hinder the adoption of EVs in these countries. It is worth remembering here that there are few studies that have attempted to gather, discuss and test the perceived risks that customers perceive when purchasing EVs in one model (Gerrard, Cunningham & Devlin, 2006). However, perceived risk includes a number of dimensions or types that influence the consumers' behavior, such as physical, economic, functional and social risks, in addition to loss of time. These were identified as drivers of consumer resistance (e.g. Mitchell & Pulvino, 2001). All these dimensions' influence consumers' decisions to stay far away from innovations, especially in terms of accepting a new technology which is usually subject to hacking and committing mistakes (Thomas, 2009). In addition, one can note the weakness and poverty faced by the research environment in terms of applied studies in the field of buying EVs in the Arab world in general and in Jordan in particular. Therefore, this study is intended to fill the gap by trying to examine the effect of perceived risks on the behavior of customers in Jordan towards the adoption and purchase of EVs based on the perceived risk theory (Mitchell, 1992). In the following part, different types of perceived risk and their impact on innovation resistance are

discussed. Therefore, the following paragraphs will attempt to define the dimensions of perceived risks, formulate the hypotheses of this study based on the perceived risk theory and link them, customers' attitudes towards the adoption of EVs in Jordan.

6.2.1 Physical Risk

Physical risk refers to the possibility that the product may cause physical or health harm or that the product harms an individual, members of his/her family or others using this product.

Mitchell (1992, p.27) defined perceived physical risk as:
"The risk that the performance of the service will result in a health hazard to the consumer".

In the field of this study, physical risk may mean that customers anticipate any physical or health risk that may be caused by the use of a new innovation (Klerck and Sweeney, 2007). Here, we talk about the consumers' expectations when they use EVs and the damage resulting from using or purchasing such cars. For example, a person might expect a car such as an EV to be unsafe on the road without a motor, which is a key part of the car (Zhang, 2014). The customer may think in a different way that the lack of a motor in the EV may hide the engine's sound. On the street, this may cause an accident that results in harm to people, especially those who are blind or with disabilities (Thomas, 2009). Therefore, the present study postulates the following negative hypothesis:

H1: Physical risk has a negative and significant effect on consumers' attitude toward EVs in Jordan.

6.2.2 Financial Risk

Financial risk can be expressed in the fear of customers that they may pay more than the value of the purchased product or that they have to pay taxes to buy this product now or in the future. The effect of financial risk is particularly high on individuals with limited income compared with those with large purchasing power. For the two parties, they do not usually want to pay unnecessary expenses for making certain purchasing decisions. Financial risk was defined by Mitchell (1992, p. 27) as:

"the product being not worth the price paid".

Financial risk is related to uncertainties about the cost value of the product, the innovation or the state of investment in the purchase of new products and associated operating expenses, such as the purchase of EVs (Wiedemann et al., 2013). Financial risk is related to the degree of customers' acceptance of such technological innovations. They usually require long periods of time to be satisfied and ready to buy such innovations. EVs are innovations that have entered the market with a very high technology, which increases the fear of customers to pay large sums of money for innovations unknown to them (Armand et al., 2008).

Moreover, people's awareness of financial risk is related to paying money for buying EVs at a certain time followed by being subject to a significant drop in prices as happens with all other technological products. The prices begin high and after that they decline. As a result, consumers usually postpone their purchasing decisions waiting for some markets or government new instructions that encourage them to buy more (Anderson & Anderson, 2010). Consumers also expect that EV operational costs are raising. For example, customers are aware of that gasoline costs are relatively higher than electricity costs, but in light of accelerating economic changes, governments may raise electricity prices, which will increase the

operating costs of the electric vehicle in the coming years. Therefore, the present study postulates the following negative hypothesis:

H2: Financial risk has a negative and significant effect on consumers' attitude toward EVs in Jordan.

6.2.3 Functional Risk

The concept of functional risk refers to the belief of individuals that the product they are buying does not perform the main function required, where they fear the failure of this product and suffer from feelings of remorse and dissatisfaction later on. Therefore, consumers hesitate to buy these products for fear of poor performance. However, functional risk was defined by Mitchell, (1992, p. 27) as:

"the product does not perform up to expectations".

Functional risk is an indicator of uncertainty of the performance of EVs. Customers are concerned that EVs as a new innovation working efficiently, which won't obtain the consumers' confidence (Wiedemann et al., 2013). Functional risk of EVs is that consumers are not sure that an electric battery can work for a long time. It needs to be charged constantly. Electric batteries are generally less efficient and less powerful; therefore, they require replacement and purchase of a new battery (Turrentine & Kurani, 2007).

Functional risk is also related to charging points of EVs. They Charging points are not available in many public areas and are located only in well-known places or consumers can use points of the fixed home charging systems. EVs need specific places, where these are closely related to the risk of expanding the structure of the necessary charging infrastructure. Here, we can say that without charging stations, many consumers do not want to buy EVs (Wiedemann et al., 2013). Therefore, the present study postulates the following negative hypothesis.

H3: Functional risk has a negative and significant effect on consumers' attitude toward EVs in Jordan.

6.2.4 Social Risk

Social risk suggests that the purchase or use of a product may reduce the buyer's relationship with his/her family, friends, colleagues or co-workers. This adoption negatively affects the buyer's social relations, especially when this buyer is from a certain social class. Under social risk, the individual's behavior is challenged and criticized. The members of the society consider this somewhat strange. Sometimes, they demand that the decision must be changed. Social risk was defined by Mitchell (1992, p. 27).

"the product results in embarrassment from others".

Other types of social risk are those that indicate the opinion of the community of the purchasing decision taken by the buyer of the EV. In some cases, the society tries to change this decision by offering advice to the client or trying to prevent it. The community looks at the decision from its point of view and doesn't usually try to understand the client's opinion. Also, the society tries to negatively influence the customer's decision to buy such an innovation. So, many customers may hesitate to buy EVs fearing of the community they live in. Because individuals are part of the society, they obey the decisions of the society, because they don't like to feel strange (Exsen et al., 2010). Therefore, the present study postulates the following negative hypothesis:

H4: Social risk has a negative and significant effect on consumers' attitude toward EVs in Jordan.

6.2.5 Time Risk

Integrating our life with the elements of technology has contributed to the acceleration of events in our lives. This increases the anxiety and fear from losing time. So, people do not want to waste their time. They are always looking for products that are compatible with their lifestyle. For example, they are shifting from buying home-made food to fast-food and moving from traditional buying behaviors to online purchasing and other purchasing patterns, in order to avoid time risk. Therefore, time risk was defined as:

"the risk that the consumer will waste time, lose convenience or waste effort in getting a service redone" Mitchell (1992, p. 27).

Time risk is related to wasting time. Consumers need much more time to deal with the new innovation than the time required to deal with fuel cars. When talking about EVs, consumers are afraid of the need for a lot of time to deal with and recognize this type of cars, as well as to be aware of different specifications. Some previous studies showed that EVs have a unique characteristic that depends entirely on technology, and this made the process of understanding the nature of these cars need more time (Axsen et al., 2010). EVs depend mainly on electric batteries, where the charging process needs a lot of time. They need eight to nine hours charging time per day, whereas traditional cars need a few minutes to refuel. Therefore, the time risk factor may create customer dissatisfaction with EVs. Therefore, the present study postulates the following negative hypothesis:

H5: Time risk has a negative and significant effect on consumers' attitude toward EVs in Jordan.

7. Study Model

Based on the discussions above, the model of this study was developed as shown in Figure 1. It includes six variables: consumers' attitude toward EVs as a dependent variable and physical risk, financial risk, functional risk, social risk and time risk as dependent variables.

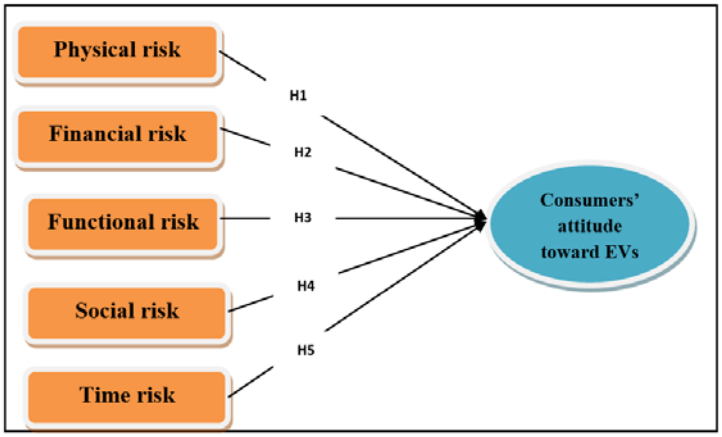

Figure 1: Study Model

8. Methodology

This field study consists mainly of a quantitative approach design for collecting primary data, examining the research hypotheses and achieving the study objectives. The methodology of this study will explain the research population, the sample unit, the

study questionnaire and its items and the analysis used to conduct some tests.

8.1 Population and Sample

The population of the study consists of Jordanian consumers who are interested in buying EVs. To reach this population easily, the researcher targeted customers in the car market "Alharaj" in Amman. The researcher selected 200 buyers randomly to fill the questionnaire as respondents for the study. The survey was conducted from the 13th of August to the 1st of October 2017.

8.2 Questionnaire Design

In order to collect the primary data from the respondents of this study, the researcher designed a questionnaire consisting of three sections. Section one includes a covering letter to explain the title of the study, the purpose of the questionnaire and a statement thanking the respondents. Section two includes seven questions about the respondents' profile age and income, as well as five questions adapted from a questionnaire from the United Kingdom in 2016 to describe the respondents' attitude toward buying a car in general and an EV in particular. The questions are:

1. Which of these things are, or would be, important to you when buying a car?
2. What is the most important thing of cost issues, when choosing or buying a car?
3. Which of these statements best describes your current attitude towards buying an EV?
4. If you were to buy a car or van in the next 12 months, what, if anything, would put you off buying an EV?
5. Thinking about the next time you buy a new car, whether brand new or second-hand, what, if anything, would encourage you to buy an EV?

Section three includes nineteen statements adapted from previous studies and modified to suit the aims of this study. These items and the source of each of them are shown in Table 1. Furthermore, to test the items' content validity, the questionnaire of the study was adapted from previous studies related to EVs (Bessenbach & Wallrap, 2013). Also, questionnaire was translated *via* a process named double-back translation. Firstly, the English questionnaire was translated into Arabic by academics. After that, the Arabic version was translated into English by a different academic staff. Moreover, the last version was in Arabic language to make it easy for the respondents. To measure items of variables, the questionnaire of this study used a five-point Likert scale from 1-5: (1) Strongly disagree, (2) Disagree, (3) Undecided, (4), Agree and (5) Strongly Agree.

Table 1. Variables and Their Items

The variables	The items	The source
Attitude	1- Buying an EV is a pleasant idea. 2- Buying an EV is a wise idea. 3- Buying an EV is an exciting idea. 4- I like the idea of buying an EV.	Fishben and Ajzen (1975)
Physical risk	1- The absence of the engine sound of EVs might result in a higher accident risk. 2- I might have problems finding a nearby charging station when travelling with an EV, which needs a lot of effort to find it. 3- Small size of EVs could be somehow dangerous for me on highway roads.	Bessenbach and Wallrapp (2013)

Functional risk	1- The driving range (battery capacity) of an EV might decrease over time. 2- I have difficulties to maintain an EV. 3- I (might) have problems to drive an EV.	Bessenbach and Wallrapp (2013)
Financial risk	1- I do not consider buying an EV now, because purchase prices may drop in the next years. 2- I hesitate to buy an EV, because the operating cost (e.g. electricity) might increase in the next years. 3- EV technology might hardly gain full acceptance on the market.	Bessenbach and Wallrapp (2013)
Social risk	1- If I own an EV, people might consider me as too progressive or showy. 2- My family doesn't want me to buy an EV. 3- People dislike EVs; I believe that their opinion is right.	Bessenbach and Wallrapp (2013)
Time risk	1- An EV's charging time might limit me more than expected in my daily routines. 2- The process of buying an EV might take more time than expected. 3- The learning process to use an EV might take more time than expected.	Bessenbach and Wallrapp (2013)

8.3 Data Analysis Procedure

To conduct the required tests, SPSS software, version 18 was used to identify data entry errors, data screening and frequencies, including (missing data, outliers, normality, linearity, homoscedasticity, multi-collinearity, reliability, validity, descriptive data analysis and test of response bias). Moreover, Structural Equation Modeling (SEM) AMOS software, v.12 was used to test the study hypotheses.

9.Results of the Study

9.1 Response Rate

As mentioned earlier, the researcher distributed two hundred (200) questionnaire forms to respondents who were buyers of cars or those interested in buying cars at "ALHARAJ" in Amman. The questionnaire forms were distributed personally. Therefore, the researcher got back all the questionnaire forms. Then, the researcher tested the returned questionnaires manually and found that six (6) questionnaire forms were incomplete. These questionnaire forms were deleted from the final analysis. Thus, one hundred and ninety-four (194) questionnaire forms were valid for the next steps of analysis. However, the overall response rate was 97% (194/200) which is a good response rate. One hundred ninety-four questionnaire forms were going into SPSS 18 and then carefully tested.

9.2 Demographic Profile

The respondents' age in this study was divided into five main categories: less than 25 years, 26-35, 36-45, 46-55 and 56 years and more. The analysis results showed that most of the respondents' ages were between 36-45 years with (53%). The analysis results showed that the most respondents' incomes per month were between JD 501-1000, which represents the typical monthly income of Jordanian people. Moreover, five questions were adapted from an electric vehicles' questionnaire from the United Kingdom in 2016. These questions were modified to be used in Jordan context to describe some factors related to adopting EVs in Jordan. These questions are the following; **which of these things are, or would be, important to you when buying a car?** Costs of purchase/running value, tax/insurance, comfort, environment friendliness, style/ design/

image, Reliability, Safety or Large engine. The majority (with 88%) selected the first choice related to costs purchase/running value/tax/insurance. This result indicates that the Jordanian people are interested in buying cars with suitable price. Also, the results showed that most of the respondents (85%) selected maintenance costs from four choices: car purchase costs, fuel/recharging costs including fuel tax, maintenance costs and insurance costs. When asking them:" **what is the most important thing of cost issues, when choosing or buying a car?"**, their answer could reflect that buyers don't like buying cars that need a lot of maintenance, because this costs money and wastes effort and time in maintenance workshops. Moreover, when asking the respondents: "**which of these statements best describes your current attitude towards buying an** EV?", the answers were: I am thinking about buying an EV quite soon; I am thinking about buying an EV, but I haven't thought about when I will buy it; I have thought about buying an EV, but I haven't decided to buy it at this stage; I haven't really thought about buying an EV, I have never heard of EVs. The results showed that (86%) out of the respondents' answers were: I haven't really thought about buying an EV. The nest answer was: I have thought about buying an EV, but I have decided not to buy it at this stage (5%). This answer reflects that consumers in Jordan are still in an early stage to buy EVs and haven't got positive attitudes toward buying such cars. In addition, when asking the respondent: "**if you have to buy a car or a van in the next 12 months, what, if anything, will put you off buying an EV?,** the results showed that most of them selected battery recharging, distance travelled with one charge with (55%), followed by the vehicle performance (17%), limited choice (9%), lack of knowledge (9%), cost (8%), safety features/record and technology (2%). Finally, most respondents indicated that technology was the most important factor that encourages them to buy EVs with (82%), when they were asked: "**thinking about the next time you buy a new car or van, whether brand new or second-hand, what, if anything, will encourage you to buy an EV?** This result may reflect that they can use this car because it is of high technology or they are willing to buy this kind of innovation.

Table 2. Demographic Factors and Response Rates

Demographic factor					
Age	Less than 25 (7%)	26-35 (9%)	36-45 (53%)	46-55 (26%)	More than 56 (5%)
Income per month	Less than 500 (3%)	501-1000 (48%)	1001-1500 (36%)	More than 1500 (13%)	----------

Table 3. Response Rates Related to the Five Questions

Q1: **Which of these things are, or would be, important to you when buying a car?**						
Costs of purchase, running value, tax, insurance (88%)	Comfort (62%)	Environment friendliness (69%)	Style Design Image (28%)	Reliability (12%)	Safety (30%)	Large engine (9%)
Q2: **What is the most important thing of cost issues, when choosing a car or a van to buy?**						
Car purchase costs (72%)	Fuel/recharging costs, including fuel tax (83%)	Maintenance costs (85%)	Insurance (72%)			
Q3: **Which of these statements best describes your current attitude towards buying an EV?**						
I am thinking about buying an EV quite soon (3%)						
I am thinking about buying an EV, but I haven't thought about when I will buy it (7%)						
I have thought about buying an EV, but I haven't decided to buy it at this stage (5%)						
I haven't really thought about buying an EV (85%)						
I have never heard of EVs (0%)						
Q4: **If you have to buy a car or a van in the next 12 months, what, if anything, will put you off buying an EV?**						
Battery recharging, distance travelled with one charge (55%)	Vehicle performance (17%)	Limited choice (9%)	Lack of knowledge (9%)	Cost (8%)	Safety features/record and technology (2%)	
Q5: **Thinking about the next time you buy a new car or van, whether brand new or second-hand, what, if anything, will encourage you to buy an EV?**						
Technology (85%)	Cost (50%)	Convenience of recharging (16%)	Environmental friendliness (36%)	Vehicle size (36%)		

9.3 Missing Data

To discover the missing data, descriptive data test results showed that three (3) questionnaire forms (1%) had missing responses. In this case, the replacement method was used, because missing data values were found to be missing in a totally random manner (Hair et al., 2010).

9.4 Outliers, Normality and Multi-collinearity

To test the questionnaire of this study to be out of outlier cases, this study followed Hair et al. (2010), who indicated that any value more than (X2) value will be deleted. Results of the item values showed that the chi-square (X2) value with 19 items is 109.51 compared to the Mahalanobis distance value (D2) which is 113.72. This result indicates outlier cases to be (2). Therefore, these cases had been removed from the total, so that (192) responses were valid for final analysis. By using AMOS software, v.12, normality

test for all items showed CR-skewness and CR-kurtosis values indicating that normality values for variables of this study are acceptable. In addition, the correlation results from the correlation matrix obtained from AMOS software, v.12 showed that (r) values for the relationship between the independent variables are less than 0.8, which means that there is no multi-collinearity (Sekaran, 2003).

9.5 Reliability and Composite Reliability

To calculate composite reliability, this study followed (Fornell & Larcker, 1981) equation as shown below:

$$\text{Composite Reliability} = \frac{(\Sigma Li)^2}{(\Sigma Li)^2 + \sum \varepsilon j} \quad (1)$$

"where (**Li**) is the standardized factor loading for each indicator and **(εj)** is the error associated with the individual indicator variables".

However, the results in Table 4 show that Cronbach's alpha values for all the variables were between 0.79 and 0.88, whereas composite reliability values for all the variables were between 0.87 and 0.95. Therefore, both values for all variables in this study were more than the recommended value which is 0.60 (Bagozzi & Yi, 1989).

Table 4. Cronbach's Alpha and Composite Reliability for the Variables

Variable	Reliability (CA)	Composite Reliability (CR)
Attitude	0.79	0.84
Physical risk	0.79	0.90
Functional risk	0.81	0.91
Financial risk	0.86	0.95
Social risk	0.72	0.81
Time risk	0.81	0.88

9.6 Validity of the Constructs

Two types of validity tests were applied in this study. Type one is convergent validity test which is conducted by using Amos software, v.12 to examine whether the indicators in a scale load together on a single construct. Type two is discriminate validity test to confirm that the items developed to measure different constructs are absolutely estimating different constructs. Results of this study revealed that the Confirmatory Factor Analysis (CFA) values for all the study variables are found to be between 0.76 and 0.88, as shown in Table 5 which are higher than the recommended value of factor loadings which should be more than 0.50 (Hair, 2010, p. 128).

9.6.1 Discriminate Validity

To calculate the Variance Extracted (VE), this study used the (Kearns & Lederer, 2003) formula to verify which construct is truly distinct from another.

$$\text{Variance Extracted} = \frac{\Sigma(\text{standarized SMC})^2}{\Sigma(\text{standardized SMC})^2 + \Sigma\varepsilon j} \quad (2)$$

"where (**standardized SMS**) is the standardized SMC for each indicator and **(εj)** is the error associated with the individual indicator variables".

The results of Variance Extracted (VE) showed that all the variables had values more than the recommended value of 0.50 (Fornell & Larcker, 1981). In addition, all of the study variables had a correlation value less than the recommended cut-off value which is 0.80 (Sekaran, 2003).

Table 5. Variance Extracted Results

Constructs	Variance Extracted
Attitude	0.84
Physical risk	0.77
Functional risk	0.82
Financial risk	0.79
Social risk	0.88
Time risk	0.85

Furthermore, the results of this test point out that all variables of this study support discriminate validity, since the AVE values were greater than the squared correlations for each set of variables (AVE > correlation square) (Fornell & Larcker, 1981).

9.7 Model of Fit Index

One of the benefits of using Structural Equations Model (SEM) is to examine whether the model of the present study could be generalized or not. In this study, AMOS software, v.12 was applied for running the structural model and examining the hypothesized relationship between exogenous and endogenous latent variables. Maximum Likelihood (ML) estimation was used to evaluate structure coefficients between variables. Results of Goodness-of-Fit Model Index as shown in Table 6 indicated that all the revised values were acceptable according to recommended values (Hair et al., 2010).

Table 6. Goodness-of-Fit Model Index Results

Measures	Fit indexes	Recommended Values
Absolute Fit Level		
RMSEA	0.019	Less than 0.08
GFI	0.944	0.90 and above
Incremental Fit Level		
AGFI	0.906	0.90 and above
CFI	0.998	0.90 and above
TLI	0.996	0.90 and above
NFI	0.972	0.90 and above
Parsimonious Fit Level		
CMIN/DF	1.371	Less than 2.0
SMC (R^2) Attitude	0.449	The bigger the better

9.8 Hypothesis Testing

This study aims at examining the direct effect of perceived risk dimensions as exogenous latent variables on consumers' attitude toward EVs in Jordan as an endogens latent variable. However, this test examines the effect of Physical Risk (FR1), Functional Risk (FR2), Financial Risk (FR3), Social Risk (SR) and Time Risk (TR) on consumers' attitude (CATT), in

determining the significance of each path coefficient (P), estimate of regression weight, and critical ratio for regression weight (CR).

Table 7. Direct Hypothesis Testing Results of the Revised Model

H.	IV	DV	Estimate	C.R.	*P*	Hypothesis Result
H1	FR1	CATT	-0.172	-1.761	0.071	*No*
H2	FR2	CATT	-0.473	-5.241	***	*Yes*
H3	FR3	CATT	-0.517	-6.436	***	*Yes*
H4	SR	CATT	-0.388	-3.581	0.021	*Yes*
H5	TR	CATT	-0.485	-4.993	***	*Yes*

According to Hair et al. (2010), the hypotheses are supported or accepted, when the critical ratio (CR) value is greater than (-/+1.96) (C.R. more than -/+ 1.96). In this study, the first hypothesis related to Physical Risk (FR1) has a negative and significant effect on consumers' attitude (CATT) toward EVs in Jordan. Findings of this hypothesis, as shown in the previous Table 7, indicate that Physical Risk (FR1) has a negative and insignificant effect on consumers' attitude (CATT) toward EVs in Jordan (β = -0.172, C.R. = -1.761; *P* = 0.071), meaning that the first hypothesis not accepted and not supported. The second hypothesis related to Financial Risk (FR2) has a negative and significant effect on consumers' attitude (CATT) toward EVs in Jordan. Findings of this hypothesis, as shown in the previous Table 7, indicate that Financial Risk (FR2) has a negative and significant effect on consumers' attitudes (CATT) toward EVs in Jordan (β =-0.473, C.R = -5.241; *P*.***), which is accepted and supported. The third hypothesis related to Functional Risk (FR3) has a negative and significant effect on consumers' attitudes (CATT) toward EVs in Jordan. Findings of this hypothesis, as shown in the previous Table 7, indicate that Financial Risk (FR3) has a negative and significant effect on consumers' attitudes (CATT) toward EVs in Jordan (β = -0.517, C.R.= -6.436; *P* ***), so that it is accepted and supported. The fourth hypothesis related to Social Risk (SR) has a negative and significant effect on consumers' attitudes (CATT) toward EVs in Jordan. Findings of this hypothesis, as shown in the previous Table 7, indicate that Financial Risk (SR) has a negative and significant effect on consumers' attitudes (CATT) toward EVs in Jordan (β = -0.388, C.R. = -3.581; *P* = 0.021), meaning that it is accepted and supported. The fifth hypothesis related to Tim Risk (TR) has a negative and significant effect on consumers' attitudes (CATT) toward EVs in Jordan. Findings of this hypothesis, as shown in the previous Table 7, indicate that Financial Risk (TR) has a negative and significant effect on consumers' attitudes (CATT) toward EVs in Jordan (β = -0.485, C.R. = -4.993; *P* ***), so that accepted and supported.

10. Discussion of Results

The main objective of the current study is to investigate the effect of perceived risk dimensions on consumers' attitudes toward EVs in Jordan; those consumers who are interested in buying cars in Jordan. Through testing the hypotheses of this study, the findings show the effect of each perceived risk dimension on consumer's attitude. This results will be

discussed based on the objectives of this study. Firstly, to investigate the effect of physical risk on consumers' attitude to buy EVs in Jordan. The results of hypothesis testing show that this hypothesis is unaccepted and unsupported. Perceived physical risk has a negative but insignificant effect on consumers' attitudes toward EVs in Jordan. This is because Jordanian consumers don't care about the shape or appearance of the EVs, whether it is small or big or contains a fuel motor or not, because they consider EVs as one of many other types of cars which have the same small size and they have also driven this size on different kinds of crowded and uncrowded streets. In addition, consumers in Jordan related to the findings of this study don't pay high attention to the fact that EVs don't include a fuel motor, which makes this car free of sounds. This car may be difficult to be seen on the street, especially for blind people. Because they have to deal with hybrid cars before in the Jordanian market and it's almost like EVs. Moreover, they are dealing with streets with infrastructure designed for crossing the streets in crowded areas of Jordan. Therefore, customers in Jordan don't give great importance to the subject of the physical risk of EVs in Jordan.

The second objective is investigating the effect of financial risk on consumers' attitude to buy EVs in Jordan. The results of hypothesis testing show that this hypothesis is accepted and supported, because consumers in Jordan realize that EVs are a technological innovation, which changes rapidly according to changing in consumers' desires and needs. This could happen when other EVs with the latest technological specifications are introduced in the market, which will change the price of EVs. In addition, they are afraid of paying large sums of money to buy EVs and after a short period being affected by rapid price change and losing a lot of money. The results indicate that consumers fear buying EVs because of their high operating costs with high electricity prices. However, electricity in Jordan has changing prices over. Consumers think that they fear that the government will in future impose taxes on the prices of electric batteries, which are the main source of running EVs. Jordanian consumers are aware of that they purchase EVs early at the Jordanian market, which is still in an early stage of EVs adoption. This car does not find great acceptance by consumers, which will be reflected negatively on the financial cost that they pay for it.

The third objective is investigating the effect of functional risk on consumers' attitude to buy EVs in Jordan. The results of hypothesis testing show that this hypothesis is accepted and supported. Consumers in Jordan realize that EVs will be less efficient after a period of time. They require regular maintenance and need specialists to carry out this maintenance who are not always available in many areas. Consumers also expressed their inability to deal with this car technically if anything is needed in a place far away from specialists. They need to know the parts of electric vehicles more than knowing how to drive them. In addition, consumers are worried about the electric battery issue and the cost of charging. With time, the battery will be less efficient and of lower capacity. It requires replacement, with a new battery, because the electric car does not work without it. It is the only source to provide power for EVs.

The fourth objective is investigating the effect of social risk on consumers' attitude to buy EVs in Jordan. The results of hypothesis testing show that this hypothesis is accepted and supported. Consumers in Jordan depend heavily on the community opinion where they live toward the decisions of purchasing and are keen to listening to their advices, especially those who have information about the nature of the purchase decision. The results indicate that people in Jordan are still hesitant to buy EVs and are afraid of adopting this new innovation as

indicated by the statistics in modest numbers, which reflect a small percentage of EV users, despite that the government facilitates providing EVs. But, the society so far is not very convinced in purchasing electric cars and is trying to influence members regarding the emotional rush to decisions that they will regret in the future.

The fifth objective is investigating the effect of social risk on consumers' attitude to buy EVs in Jordan. The results of hypothesis testing show that this hypothesis is accepted and supported. This hypothesis is supported, because consumers in Jordan realize that the process of searching for the specifications, types and characteristics of an electric vehicle needs much more time than the time spent when they buy regular cars. The issue of dealing with this type of vehicle requires consumers to think at length about the mechanism of using EVs and, on the other hand, consumers are concerned about the need for a lot of time for charging the electric battery, which needs eight to nine hours for completed charging, compared with less than a minute to fill the fuel tank in regular cars. The problem of time has emerged as an obstacle to the adoption of electric cars in Jordan and this is something that organizations should consider and try to address in the future.

11. Recommendations

The current study discusses one of the new topics in the Jordanian scope. This is considered as a hot topic in Jordan's car market. This topic needs a lot of investigation, especially under the current economical conditions. Therefore, this study will suggest several recommendations for practitioners and academics. Firstly, for practitioners (government, organizations, importers and traders), they must understand that the Jordanian market is against adopting EVs. It still suffers from many obstacles to buying this car. It is therefore necessary to look for new marketing strategies that adopt policies encouraging consumers to purchase EVs and try to eliminate the risks perceived by consumers such as financial risk, functional risk, social risk, among other risks. Moreover, the government must realize that Jordanian consumers are seeking those products that are not subject to rapid change in prices and provide the necessary infrastructure, so that consumers can deal with this innovation more widely and not limited to certain environments. In addition, researchers should examine the factors that influence Jordanian consumers to adopt and use EVs in a coordinated manner and expand research bases to include more targeted communities and make effective recommendations to decision-makers regarding the purchase of EVs in Jordan.

12. Conclusion

This study examined the effect of perceived risk dimensions on consumers' attitude toward EVs in Jordan. Two hundred buyers (200) were targeted the car market in Jordan called "ALHARAJ". After returning the responses, one hundred and ninety-four (1994) datasets were analyzed. SPSS, v. 18 program was applied to conduct some tests, such as outliers, normality, reliability, validity and multi-coleaniarity. AMOS software, v.12 was applied to test hypotheses. Findings of this study indicated that one hypothesis related to physical risk is unsupported, having a negative and insignificant impact on consumers' attitude toward EVs in Jordan. This study indicated that four hypotheses related to financial risk, functional risk, social risk and time risk were supported and accepted to have a negative and significant effect on consumers' attitude toward EVs in Jordan. Finally, some recommendations for practitioners and academics were presented to enrich the area with some empirical future studies.

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