

**THE CONSUMER APPROACH TO SUSTAINABILITY IN THE  
AUTOMOTIVE SECTOR/ JORDAN**



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**SEPTEMBER 2022**

**THE CONSUMER APPROACH TO SUSTAINABILITY IN THE  
AUTOMOTIVE SECTOR/ JORDAN**

**A THESIS SUBMITTED TO THE**

**GRADUATE SCHOOL**

**OF**

**BAHÇEŞEHİR UNIVERSITY**

**SAMI AL MASHNI**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS**

**FOR**

**THE DEGREE OF MASTER**

**SEPTEMBER 2022**



T.C.

**BAHCESEHIR UNIVERSITY  
GRADUATE SCHOOL**

**MASTER THESIS APPROVAL FORM**

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<b>Name Of The Thesis:</b>	<b>THE CONSUMER APPROACH TO SUSTAINABILITY IN THE AUTOMOTIVE SECTOR/ JORDAN</b>
<b>Thesis Defense Date:</b>	

This thesis has been approved by the Graduate School which has fulfilled the necessary conditions as Master thesis.

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This thesis was read by us, quality and content as a Master's thesis has been seen and accepted as sufficient.

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## ABSTRACT

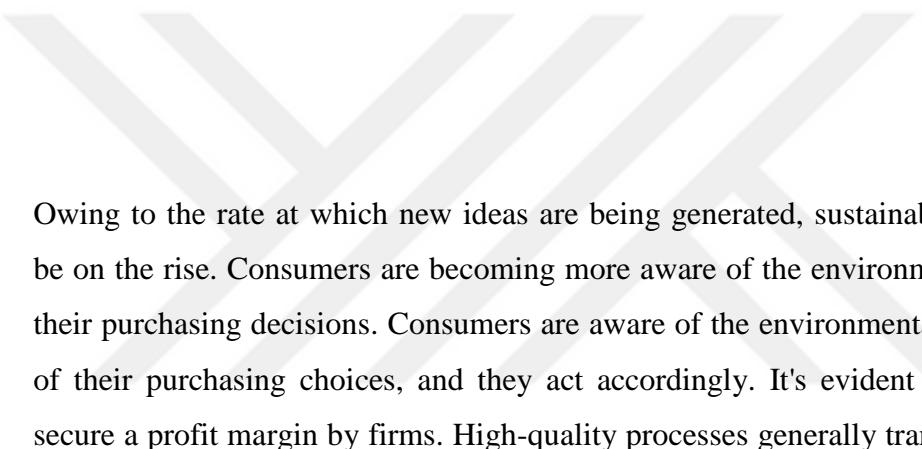
### THE CONSUMER APPROACH TO SUSTAINABILITY IN THE AUTOMOTIVE SECTOR/ JORDAN

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Master's Program in Marketing

Supervisor: Prof. Dr. Adnan Veysel Ertemel

September 2022, 79 pages



Owing to the rate at which new ideas are being generated, sustainability appears to be on the rise. Consumers are becoming more aware of the environmental impact of their purchasing decisions. Consumers are aware of the environmental consequences of their purchasing choices, and they act accordingly. It's evident in the effort to secure a profit margin by firms. High-quality processes generally translate into high-quality products; therefore, customers are willing to pay more for them. Consumers are increasingly eager to purchase electric automobiles since the cost of batteries, which had previously been a deterrent to widespread adoption, had declined. As an alternative to gasoline-powered automobiles, electric vehicles will be the primary emphasis of this article. For the sake of the environment, consumers are willing to pay more for sustainable items. The usage of fuel-efficient vehicles, which damage the environment, is the most glaring example of a shift away from ecologically beneficial items. Customers are drawn to electric cars because they provide a novel and environmentally responsible alternative.

Key Words: Sustainability, Environment, Ecologically, Eco-friendly, Automotive, Fuel-efficient vehicles, Electric vehicles

## ÖZ

### OTOMOTİV SEKTÖRÜNDE SÜRDÜRÜLEBİLİRLİKTE TÜKETİCİ YAKLAŞIMI / ÜRDÜN

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Eylul 2022, 79 sayfa

Yeni fikirlerin üretilme hızı nedeniyle, sürdürülebilirlik artıyor gibi görünüyor. Tüketiciler, satın alma kararlarının çevresel etkilerinin daha fazla farkına varıyorlar. Tüketiciler satın alma tercihlerinin çevresel sonuçlarının farkındadır ve buna göre hareket ederler. Firmaların kar marjı sağlama çabalarında açıkça görülmektedir. Yüksek kaliteli süreçler genellikle yüksek kaliteli ürünlerle dönüşür; bu nedenle, müşteriler onlar için daha fazla ödemeye hazırlıdır. Tüketiciler, daha önce yaygın olarak benimsenmesine engel olan pillerin maliyeti düşüğünden, elektrikli otomobil satın almaya giderek daha istekli hale geldi. Benzinli otomobilere alternatif olarak elektrikli araçlar bu makalenin öncelikli vurgusu olacak. Çevre uğruna, tüketiciler sürdürülebilir ürünler için daha fazla ödeme yapmaya isteklidir. Çevreye zarar veren yakıt tasarruflu araçların kullanımı, ekolojik açıdan faydalı maddelerden uzaklaşmanın en bariz örneğidir. Müşteriler, yeni ve çevreye duyarlı bir alternatif sağladıkları için elektrikli arabalara yöneliyor.

**Anahtar Kelimeler:** Sürdürülebilirlik, Çevre, Ekolojik, Çevre Dostu, Otomotiv, Yakıt tasarruflu araçlar, Elektrikli araçlar.

## **ACKNOWLEDGEMENTS**

I wish to express my deepest gratitude to my supervisor Prof. Dr. Adnan Veysel Ertemel for his guidance, advice, criticism, encouragements and insight throughout the research.

I would also like to thank my parents, Aref Al Mashni and Hadya Al Sharqawi, for their great support throughout her life. Without their understanding, and continuous support, I could have never been able to aspire for this level of education and complete this study. Also, my thanks to family, specially my brother Hadi Al Mashni. Finally, thanks to my sweet brilliant kids Aya and Ahmed Al Mashni.

## **LIST OF ABBREVIATIONS**

EV      Electric Vehicle

E.L.V. End-of-Life Vehicle

H.R. Technology      Human Resources Technology

FCV      Fuel Cell Vehicles

ICE      Internal Combustion Engine

ZEV      Zero Emission Vehicles

BEV      Battery Electric Vehicles

HEV      Hybrid Electric Vehicles

P.S.S.      Product Service Plans

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## **The consumer approach to sustainability in the automotive sector/ Jordan**

### **1.0 Introduction**

Sustainability appears to be growing at the pace at which innovative ideas are birthed. There is evidence that points to the changing behavior of consumers with regard to issues that touch on eco-efficiency approaches (Meijkamp, 1998). Consumers are aware of the impact their choices have on the environment, and they are making conscious decisions on the kind of purchases that they make (Young et al., 2009). This is reflected in how companies are rushing to juggle between profits and going green. Customers are willing to pay for services that relate to their quality, as the higher process often translates to higher quality (Kumar, 2017). Electric vehicles are one of the leading productions that consumers are keen on making purchases as their price is plummeting because of the dropping prices of batteries getting cheaper (Klee, 2021), as it was previously presented as a hindrance in the adoption of electric vehicles. This paper will focus on electric vehicles as one of the alternatives that consumers are currently considering to fuel-powered vehicles.

### **1.1. Thesis statement**

Consumers are willing to pay more for products that are sustainable and prove to be an alternative to products that pose a risk to the environment. While there are many products that are being forfeited in place of eco-friendly products, one that stands out is the use of gasoline-powered vehicles, which pose a risk to the environment. Electric vehicles are a solution that provides an alternative that is innovative and eco-friendly and is drawing consumers towards making a purchase.

### **1.2. Hypothesis**

There are three areas that are responsible for sustainable consumption; the environment, consumer preference and the manufacturing industry, whose interests must align for it to be viable. This dissertation addresses the following questions concerning consumer attitudes towards sustainability in the automotive sector:

1. Are customers willing to pay more for sustainable products, and what criteria must these products meet to warrant a purchase from the customer?
2. Are customers and manufacturing companies concerned about emissions produced during manufacturing or when using the products produced and thus take up eco-friendly practices?
3. What are the roles of customers in edging companies to sustainable product development, such as the manufacture of electric vehicles?
4. Does price have a role to play in the choices that a consumer will make in purchasing a product, and does quality affect the choice of the product?
5. What role does technological advancement and alternative forms of energy play in purchasing sustainable products?
6. Are consumers willing to pay more to conserve the environment through sustainability?

## 2) Literature Research

Consumers have a responsibility in the consequences of the choices that they make, especially owing to the fact that climate change is a pressing concern. There are barriers that pose a challenge to the adoption of sustainable behavior (Trudel, R. 2018). It has been established that consumers are contributors to the ecological and social problems with regard to emission and consumptions of goods and there is need for policy issues on sustainable consumption (Schrader, U., & Thøgersen, J, 2011) that will help consumers overcome barriers to making sustainable decision on their consumption practices. There may be psychological and cognitive barriers to sustainable behaviors that is overcome by customers who have adopted a future focus (Trudel, R. 2018). Part of the future focus is being able to see the potential for electric vehicles being one of the leading productions that consumers are keen on making purchases as its price is plummeting because of the dropping prices of batteries getting cheaper as it has been observed that future focused individuals have a preference for eco-friendly products (Klee, 2021). What comes to mind are arguments of how the future generations will remember them as well as what impact their

actions have on the future. Measuring sustainable consumption behavior demonstrates that there are many variables that come to play in consumer behavior when sustainability is concerned (Geiger et al., 2017). Customers are willing to pay for services that relate to their quality as higher process often translate to higher quality (Kumar, 2017).

The comprehensive information provided in the literature review and the research model provides the Hypothesis for sustainable consumption where three main factors that affect sustainable consumption lie as supported by various literature. While examining the environment, consumer preference, and the manufacturing industry, what is birthed are layers that need to be well synchronized to maintain a balance that will lead to eco-friendly manufacture of products and sustainable consumption (Loureiro, 2012). An overlap between manufacturing and the environment requires technology that will lead to eco-friendly practices. The manufacturing process must provide quality products that will appeal to the customer's preference if the price needs to be high to be sustainable to the environment. Customers are aware of the link between an increase in price for environmentally friendly products and are willing to spend accordingly provided they are sustainable and of quality.

Consumer preference is determined by the effect in which the environment is affected consumer preference is influenced by the environmental impact that is felt by the consumer. In other words, demand is based on a model of how people actually behave. Economic factors do not determine the tastes and values of any given customer. Many elements play a role, including one's own cultural and educational background and one's personal tastes. As a result of this paradigm, the cost of genuine opportunities for the customer who buys and consumes good is reflected in these ratios.

For everything purchased, there is the potential cost of lost property that the purchaser may have purchased instead. We construct a model where we map or find in detail the preferences of consumers. This is measured in terms of the satisfaction a consumer receives from eating a range of combinations or quantities of commodities. The consumer's purpose is to choose the bulk of the things that offer the highest level of enjoyment as the consumer describes. Consumers, on the other hand, are too late in the game. These problems can be explained by the amount of money spent by the buyer and the pricing they pay. We're going

to make the model of consumer choice available to everyone. As we go, we will construct a language to define a model. Model development will be in three phases. Following the official declaration of consumer intentions, we'll map the buyer's preferences. Second, we set a budget limit for the buyer, and then we mix the two to assess their product selection. The benefits of the majority of assets are used to determine consumer choices. These amounts of commodities can be categorized by the user according to the usage standards they supply. As a reminder, preferences are not influenced by money or pricing. If a person has the money to buy something, that doesn't mean they like it or not. Porsches are more expensive than Fords, but one may still afford to drive a Ford (Ceschin, 2010). To map these favorites, simply use the same method for creating them and then mapping them with random curves. In other words, the buyer has a preference for a different set of products than the set of commodities themselves. Our model has to be improved by considering the desires of our customers. There are four main points to consider. To begin with, you need to make a decision. Any two bundles of items in a warehouse should be able to be positioned by the buyer when he or she views them.

### **Consumer Preference with Relation to Technology and Innovation**

Consumer preference is determined by the technology and innovations that are used on the products, with preference to how they will benefit themselves as the users of the technology. It's beginning to take shape as a visual representation of production theory. Goods are lots in a system in which we see them as things. There is a distinct difference in structure between utility employment and producing jobs. The standard function will be used as a single (good) input and a single (combined) output in the standard production process (a number of features). For some features, you'll need to provide a few items or some input. Driving an automobile, for example, requires a huge number of work-related elements to be provided by the buyer in the form of consumer goods, other goods (gas and oil), and labor.

A consumer-related interest in multiple aspects or impacts, such as a drop in a marginal resource, is assumed to have appeared in the form of a preferred vector symbol, rather than the relationship between goods and features (Van der Vooren, 2013). The application

technology is made up of a collection of all potential functions. Technology will get more complex in a well-developed economy with a wide range of goods and services, while it will become simpler in a less-developed economy. While the U.S.S.R. had advanced manufacturing technology, it also had a relatively easy-to-use consumption technology. Assets and features are to be linked through the use of new technologies. A plausible hypothesis would be that goods in complicated application technology, such as that in the U.S., are likely to outweigh their value. In general, there is no need to correlate more brands and more goods (more than goods and features) with production technology. The output and the input of the defined parameters can both be easily measured in the examination of manufacturing technologies. This emphasizes the wand's effects, such as the presence of strange artifacts (Van der Vooren, 2013). On the other hand, it is extremely difficult to collect information regarding the nature of the input details; therefore the effects of input type changes are less emphasized.

Unfortunately, we have less and less information regarding changes in the input components of deployment technology than we did in the past. As a result, the effects of wand magic are not of interest to us, but the other three effects could be. There is room for technological advancement in a special sense to increase efficiency, even if goods or services remain in the same condition, because our consumer behavior model allows for effective selection. Knowledge and management skills are the most common causes of technology misuse in practice as well as in production.

It is possible that the buyer does not know that a particular product has specific features or that certain products can be combined to create a variety of brands. Using advertising, manufacturers and retailers can ensure that no elements of their products are perceived to be of great interest to consumers (Bornschlegl, 2020). Consumers will be made aware of other characteristics of the product as they deal with small discomforts. There is a strong case for making these products more widely known to the public and for adopting regulatory requirements, such as content composition and labeling, that take advantage of the most current technical advances.

## **Consumer Preference and Eco-Friend**

Consumer preference is determined by eco-friendly practices associated with the product, price and the quality of the product. Special attention is placed on price as it determines the plausibility of consumers making the purchase of the product. An alignment of these factors leads to sustainable consumption. It's been shown in previous studies that the costs associated with buying environmentally friendly or Fair-Trade automotive industry and the values they represent are highly variable. and all focused-on consumer perceptions and purchases of 'sustainable use' products, and all found that consumers were more interested in organic products than in animal welfare labels (Kushwaha, 2016). According to a number of writers, labeling methods have a significant impact on consumers' impressions of a product's eco-friendliness currently; there is no definition of wine that is appropriate for the environment. A study by found that Australian wine buyers place a higher value on organic features than on other ecological claims (such as "Carbon Neutral" or "Environmentally Responsive"). The importance and use of each attribute's various levels were assessed through a series of tests. Only a small percentage of Australian wine purchasers (one component) are willing to pay the higher price for ecologically friendly wines, according to the results of the study. The findings of this study, however, do not include information on how wine consumers perceive the various types of wine they consume (eco-friendly).

### **How Consumer preference is affected by variables that include; Age, educational level, Occupation, household size and gender.**

The motivational elements affecting customer purchasing decisions for fresh beef steaks and roasts in three regions of the United States were determined based on surveys that were completed by a total of 1,370 different consumers (Ceschin, 2010). When compared to males, females placed a greater emphasis on the softness, ease of preparation, and nutritional value of steaks and roasts. The tenderness, product consistency, and nutritional value of

steaks were all affected by age, whereas the taste, product consistency, and nutritional value of roasts were all affected by age.

As consumers' levels of education improved, they developed a perception that juiciness, nutritional content, and the use of natural goods were less relevant factors in influencing their purchasing decisions about steaks and roasts. The degree of doneness of steaks that was preferred was a factor in determining the value that was placed on six of the nine different purchase motivators. The purchasing decisions of consumers for fresh beef steaks and roasts were influenced by their tastes and demographics regarding meat. The findings of this research can be utilized to assist in identifying characteristics that have a favorable influence on purchase decisions within certain market segments that have been targeted.

#### **A Balance of price, quality and eco-friendly practice leads to sustainable consumption.**

A variety of demographic parameters, such as age, gender, occupation, income, level of education, and the number of people living in the household, can all have an impact on the preferences and behaviors of consumers of food goods across the board. In addition, as individuals develop new features, their requirements for the variety and quantity of food products will also shift accordingly (Loureiro, 2012). Beef is not exempt, and if the consumer category groups can be identified through more concentrated marketing campaigns, then it is possible that these campaigns will be more successful in comparison to more general marketing tactics. In addition to demographic factors, several changes in consumer vehicles and lifestyles have piqued interest in the Development of new food marketing tactics.

Consumers are driving more hybrid vehicles. According to a number of studies, advertising and marketing of food goods can have an effect on the purchasing decisions of consumers alterations in the relative significance placed on health and nutrition also have an impact on the demand for food. While purchasing food goods, consumers frequently look for distinguishing product attributes in the products they purchase. Brand names, product logos, one-of-a-kind packaging, and retail establishment logos are examples of some of these features. One distinct label incorporates U.S.D.A. grade or test stamps. Consumers can utilize this information to correlate information about beef consumption, economic value,

safety, nutritional content and specific food intake. The research that was conducted by in the countries of France, Germany, Spain, and the United Kingdom involved the use of focus groups and combined analysis to establish the primary reasons for purchasing fresh beef. Taste, softness, depth, dependency, youth, and nutritional value were some of the most crucial aspects of the product's quality.

The most important purchasing motives included culture and stability, flexibility, social life, health, family/children/guests' hospitality, nutrition, cooking ability, and status. Other major purchase motives included flexibility, social life, and health. These reasons for making a purchase were significant because beef is thought to instill a feeling of safety and flexibility in one's day-to-day life, to demonstrate to the organizer and to others how well a person can cook, and to facilitate participation in entertainment activities due to the expected level of satisfaction beef offers. In addition, beef, more than any other type of meat, is better suited for festive occasions and is more entertaining to those around you. On the other hand, a positive image of beef was discovered to be linked to a recollection of the process of preparing or carving beef that was previously experienced, and it was the only one to meet the highest acceptance criteria in comparison to the acceptable taste.

### **3) Methodology**

#### **3.1. Reliability, Validity & Survey Analysis for 380 Respondents**

##### **Reliability**

When it comes to a Jordan's ability to function and its accuracy, reliability is defined. A sustainable function is necessary to enhance the functionality and enhancement of consumer satisfaction by providing sustainable products. This might also include having the requested item in stock, making the delivery on time, and doing it in compliance with the contract. As a result, it raises the typical person's perception of a product's value. It has also been observed that a company's reliability has an impact on customer satisfaction.

##### **3.1.1. Research Model and Hypothesis Development**

Following questions have been addressed in the scope of this dissertation:

1. concerned about emissions produced while utilizing/using the products?
2. What practices do consumers regard as ecofriendly by consumers?
3. Are most consumers concerned about eco-frindly products?
4. What are the emission concern raised by consumers on the product manufacturing process?
5. To save environment via sustainability, is Jordan ready to pay extra for eco-friendly products with the same/or more function & quality as a non-eco-friendly products?
6. Do consumers prefer the use public transportation's (taxi, bus, etc.)?
7. What are some of the important factors when buying an automobile, from Jordan and are they sustainable.

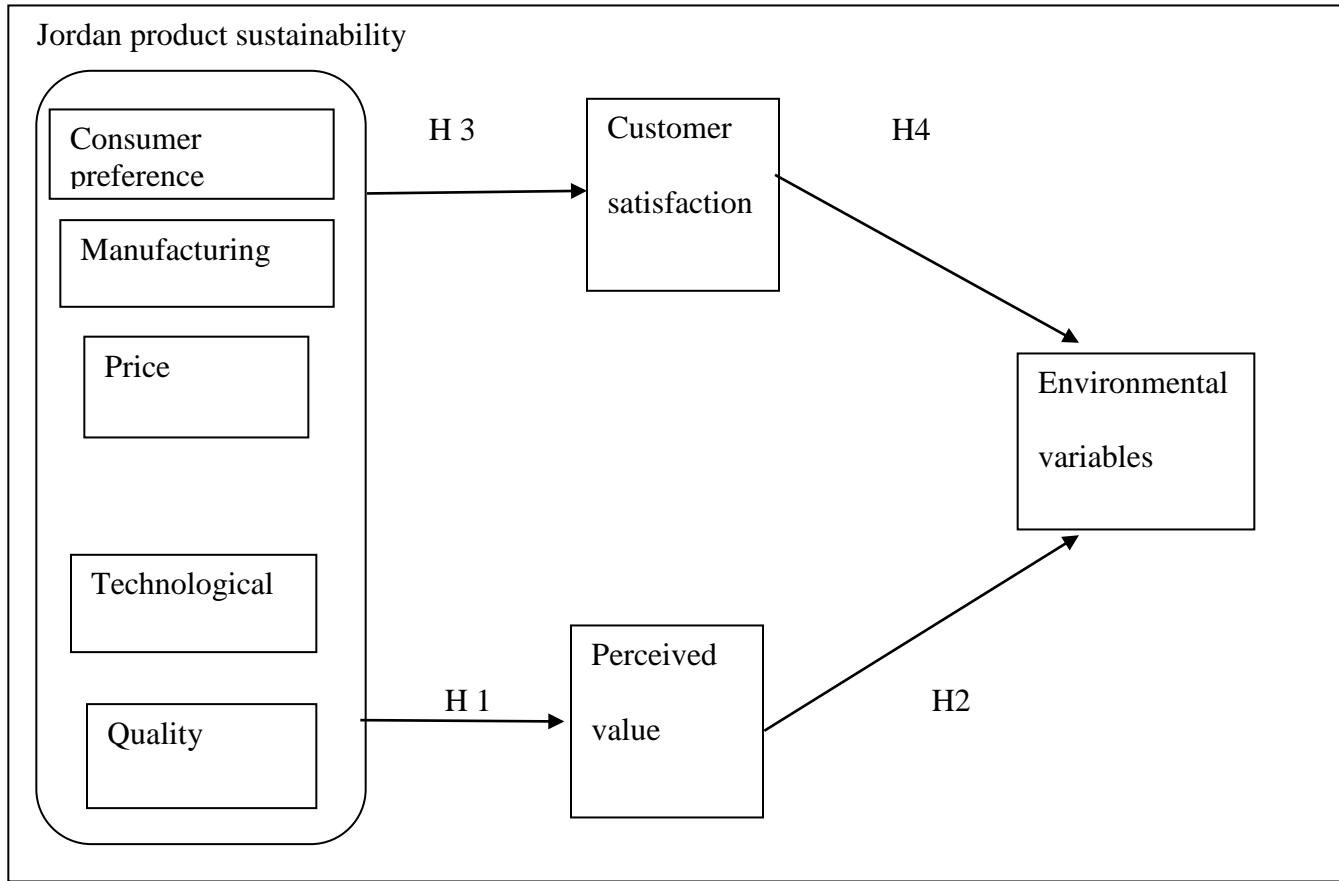
According to these inquiries, a research model with six independent variables, consumer preference, manufacturing, environmental variables, price, quality variable and scientific variables is depicted in the figure below with four dependent variables, age, occupation, educational level, household size and gender.

In light of the comprehensive information given in the literature review and based on the research model, the following hypotheses have been suggested.

### **3.1.2. Research model**

When examining consumer preference, it is important to understand that it is also influenced by other variables such as age, education level, occupation, household size, and gender. Research demonstrates that different age groups hold different environmental attitudes, with findings indicating that older individuals would engage with nature and avoid ecological harm, conserving raw materials and natural resources. Consumers with high objective knowledge often make environmentally friendly choices with a preference for environmentally friendly preference for products with low prices. Consumers make informed choices based on their level of expertise, making education an essential factor in the decisions they make concerning sustainability. Gender is a consistent and significant influence in the use of vehicles and therefore plays an essential role in car ownership, with a majority of females being car owners. Concerning gender, “there is weak but significant negative correlation between gender and interest in E.V.s and the importance they attach to the range that an electric vehicle can drive.”. Car use is also influenced by occupation, with various sectors employing significant uptake in the use of electric vehicles. At the same time, household size impacts the choice of cars that can be utilized.

**Figure 1: Research Model**



In light of the comprehensive information given in the literature review and based on the research model, the following hypotheses have been suggested.

H1: There is a positive impact of Jordan product sustainability on customer's perceived value.

H2: High products perceived value increases product environmental safety.

H3: Jordan product adherence to customer preference has a positive impact on customer satisfaction.

H4: Customer satisfaction has resulted in environmental safety.

### **3.1.3. Sampling**

A simple random selection procedure was employed to reach every Jordan shopper who shops in the automobile sector. In particular, this approach was favored because of its simplicity, cost-effectiveness, and speed. Our research adopted online Google forms, and the findings were then exported to an excel spreadsheet. An ordinal Likert scale was used as part of the quantitative research approach. 380 individuals have completed the survey thus far.

### **3.1.4. Data analysis**

The research adopted was quantitative research, a correlational design to evaluate the consumer approach to sustainability variables and the study's independent variable. Based on past research on customer behavior and practice, the research developed the concept for this new questionnaire. Only a few goods were created from scratch in response to sustainability. This study used descriptive and quantitative methodologies to explain theories relevant to the study's significant concepts. It is possible to use quantitative methods to assess the Validity of data acquired by factor analysis, which helped to identify the most critical elements influencing employee performance. A total 380 participants were involved in the study. In this case, the 380 participants were selected through random selection.

The Delphi technique was used to get a more profound knowledge of advertising performance and customer purchasing behavior by using surveys and questionnaires. To lay the groundwork for the research, part one of the research entailed the Demographic Questions Analysis where's part 2, Environment Questions Analysis for the subsequent quantitative research. During the second phase of the research project, the results were analyzed quantitatively through comparative analysis, making it easier to draw conclusions. According to appropriate statistical methods, the survey was conducted using a pre-designed questionnaire.

The Delphi panel's recommendations for two dimensions of advertising effectiveness, that consumer approach and sustainability, and related questions, were incorporated into the survey. An automobile consumer sample from Jordan was chosen using a stratified simple random sampling method. Sample characteristics within the population can be examined because of the statistical efficiency of the stratified sampling technique's selection of sample members. Major car dealerships in the Jordan region were invited to participate in the survey. Researchers collaborated with customer relationship managers to reach out to current car owners.

The consumers were invited to take questionnaires. All 380 completed questionnaires were used for statistical analysis. A pilot study involving 380 clients was conducted to test the questionnaire research method. The questionnaire was tested for reliability using an internal consistency reliability test, the degree to which people's replies on a multiple-item assessment are consistent over time. There are a lot of correlations between people's scores on such measures because they are supposed to reflect the same fundamental concept. According to the Rosenberg Self-Esteem Scale, those who believe in their worth are likelier to think they possess various positive traits. It would be a fallacy to say that the items all measure the same underlying construct if people's responses to them are not associated. This is true for both self-report and behavioral and physiological assessments. Testing the survey instrument's reliability is critical since it validates that the questionnaire will yield consistent findings across all sampling points. To evaluate whether or not the questionnaire is free of systematic and random errors, the Validity was checked. Analysis of raw data collected via the survey and transformation into helpful information for suggestion design was carried out using software such as Microsoft excel.

#### **4.0. Research Design**

This study's internal consistency dependability was evaluated using a split-half reliability test. The excel solvers were used to do the multiple regression analysis. In the

beginning, the survey instrument's reliability and Validity were checked. This ensures its Validity in the current study. Researchers looked at a questionnaire's predictive Validity (also known as external or criterion-related Validity), which quantifies how closely it correlates with an independent assessment of a related variable. It was determined that the instrument's reliability and Validity could be verified. Using multiple regression analysis, it was determined whether or not there was a connection between the dependent variable, consumer approach, and an independent variable, the dimensions of advertising effectiveness. Customers' purchase decisions in the automotive industry are influenced positively by advertising's efficacy. No statistical significance was found in the results. According to Williams (2014), it is clear that in the study's dependent variable, consumer purchasing behavior, advertising effectiveness was responsible for 66% of sustainability. In addition, according to Nunes (2016), based on the standardized coefficient, an increase in advertising effectiveness of one unit will have a favorable impact on customer purchasing behavior by 72.4%.

#### **4.0.1.Measurement Instruments**

There were 34 questions in all throughout the three sections of the survey. A preliminary inquiry in the first section focused on the participants' views on the research and personal information that could be used to evaluate its findings. The questionnaire was closed if the respondent answered "no" to this question. The second section of the session was devoted to participants' critical responses to the study's primary research question: how do consumers view automobile sustainability?

The second waves of questions include:

Question 1. Of your previous question 25, answer which was the (Third) most important factor to you when buying an automobile?

Mark only one oval.

Environmentally friendly/low CO2 emissions

Electric Vehicle - one that's plugged directly into an electricity supply Design/image of brand/model

In-car technology and innovations, Comfort

Large engine/speed/performance Safety

Interior space/boot size

Costs - purchase/running/small engine/resale value/tax/insurance Quality

Reliability

Dealer reputation Financing options

Friend or family recommendations

Resale value

Question 2. If you are buying an electric vehicle, which cost factors that will be important for you? (please check up to 3 factors)

Tick all that apply.

Purchase costs - including low customs & tax Recharging costs

Maintenance costs Resale value

Not sure

Question 3. Which of these statements best describes you? \*

Mark only one oval.

I already own an electric car

I am thinking about buying an electric car quite soon

I haven't thought before about buying an electric car, but I am thinking now

I have thought about buying an electric car, but have decided not to at this stage I am not thinking about buying an electric car now, maybe later

I will never think about buying an electric car

I have never heard of electric cars

Question 4. From your point of view, what are the barriers for you to buy an electric vehicle? (please check up to 5 barriers) \*

Tick all that apply.

Limited choice (not many vehicles to choose from) Lack of knowledge

The vehicle cost

Battery: distance traveled per charge Recharging time

Infrastructure spread of recharge points Resale value

The vehicle: performance (e.g. speed/handling), size/practicality, looks

Technology: doesn't work/not proven

Not sure

Question 5. Of your previous question 31 answer which was the (First) barrier for you to buy an electric vehicle? \*

Mark only one oval.

Limited choice (not many vehicles to choose from) Lack of knowledge

The vehicle cost

Battery: distance traveled per charge

Recharging time

Infrastructure spread of recharge points

Resale value

The vehicle: performance (e.g. speed/handling), size/practicality, looks

Technology: doesn't work/not proven

Not sure

Question 6. Of your previous question 31 answer which was the ((Second)) barrier for you to buy an electric vehicle?

Mark only one oval.

Limited choice (not many vehicles to choose from)

Lack of knowledge

The vehicle cost

Battery: distance traveled per charge

Recharging time

Infrastructure spread of recharge points

Resale value

The vehicle: performance (e.g. speed/handling), size/practicality, looks

Technology: doesn't work/not proven

Not sure

Question 7. Of your previous question 31 answer which was the (((Third))) barrier for you to buy an electric vehicle? \*

Mark only one oval.

Limited choice (not many vehicles to choose from)

Lack of knowledge

The vehicle cost

Battery: distance traveled per charge

Recharging time

Infrastructure spread of recharge points

Resale value

The vehicle: performance (e.g. speed/handling), size/practicality, looks

Technology: doesn't work/not proven

Not sure

Question 8. Do you have a feeling that electric cars improve the environment? \*

Mark only one oval.

Yes No Little Not sure

Qurestion 9. Are you ready to pay extra for an electric automobile with the same/or more function & quality as a petrol/diesel-powered car? \*

Mark only one oval.

Would not pay a higher worth

Not extra than 5%

Not extra than 15%

Not extra than 25%

#### 4.0.2. Scale Development

In this section, all four scales are used in the thesis: reliability, sustainability, social - economic, environmental, technological, and scientific variables.

#### 4.0.3. Measuring Jordan automobile product Quality Dimensions

The essential Jordan quality factors research has been used to develop the scale items. For starters, they've proven the scales among car buyers shopping online. To begin with, the most crucial Jordanian quality attributes, such as product service quality and long-term viability, were derived rationally.

*Table 1: Item scale for Jordan*

Code	Scale Item
<b>Reliability</b>	
Car 1	The company offers safe services
Car 2	Jordan company complies with my safety needs
Car 3	The company is easy to contact, and its services are easily accessible
Car 4	The company's products offer environment safety
<b>Sustainability</b>	
SUS 1	The automobile offers an eco-friendly use
SUS 2	The products can accommodate human setting
SUS 3	The company's production process does no influence consumers
SUS 4	Services offered are up to standards
<b>Environment</b>	
E.N.V. 1	Less smoke emission to the environment
E.N.V. 2	Less sound prolusion
E.N.V. 3	User health safety
E.N.V. 4	Less risk during use and production
<b>Technology</b>	
TECH 1	Effective, sustainable communication with the company

TECH 2	Use of product use
TECH 3	Less physical effect and contact

Azevedo (2012) developed and validated the perceived value scale in their quality-value-loyalty study for Jordan. The Azevedo (2012) quality-value-loyalty study was the source of the product safety scale, which has been tested and proven accurate. The following two comparisons are mostly assessed using the scale's five items: For what a client paid the firm, and what they received in return. For what another rival could give them in return for their payment. The five-item scale is mainly used to compare the following: i. What a client received from the business in return ii. What a client could receive from another rival in return.

#### 4.0.4. Validity and reliability of the scales

Jiang et al. (2016) used two scales with the same items already utilized in Turkish investigations. These are the five-item perceived value scale and the six-item measure of customer sustainability. As a result, the reliability of these scales has already been established. Factor analysis wasn't essential because of this; hence the rankings didn't need it. For the first time, the item numbers for the service quality (20 items) and customer satisfaction (4 items) scales were the same in Turkish. As a result, the dissertation included two pilot investigations. These scales were subjected to item analysis, reliability analysis (Cronbach's alpha), item-total correlation analysis, and E.F.A.

The scales' dependability was found to be high based on a review of the survey's primary data. (Cronbach's alpha > 0.7) Table 2 provides other information.

*Table 2: Reliability Levels of the Research Scales*

Variable	Cronbach's Alpha	Item number
Service quality	0,882	20
Perceived value	0,802	5
Customer satisfaction	0,831	4
Customer sustainability	0,848	6

## Service Quality Scale Validity And Reliability Analysis Results

Based on the data gathered in a pilot study of the service quality scale, Table 2 shows the item analysis results. It is assumed that each scale item connects with other items of at least 0.30. Because this requirement was met, the decision was made to leave nothing off the scale. Using Cronbach's alpha reliability analysis, the scale's internal consistency level was evaluated and found to be quite high. A value of (0.886) is used. This information is provided in Table 3.

*Table 3: Statistics Concerning Service Quality Scale*

Items	Item Deletion Scale average	Item Deletion Scale variance	Item-Scale Relationship	Item Deletion Reliability Value
Item 1	60,99	104,36	0,65	0,88
Item 2	61,06	107,43	0,52	0,88
Item 3	61,23	105,28	0,56	0,88
Item 4	61,32	105,97	0,57	0,88
Item 5	61,15	104,88	0,62	0,88
Item 6	61,23	105,88	0,59	0,88
Item 7	61,46	105,95	0,61	0,88
Item 8	61,11	107,10	0,43	0,88
Item 9	61,25	108,19	0,52	0,88
Item 10	61,30	106,66	0,59	0,88
Item 11	60,93	110,52	0,36	0,89
Item 12	60,85	109,85	0,47	0,88
Item 13	60,81	110,23	0,43	0,88
Item 14	60,94	110,73	0,44	0,88

Item 15	61,28	109,41	0,36	0,89
Item 16	61,62	107,11	0,41	0,88
Item 17	61,53	107,15	0,46	0,88
Item18	61,94	105,98	0,49	0,88
Item 19	61,69	103,67	0,50	0,88
Item 20	61,69	105,44	0,49	0,88
Cronbach's Alpha = 0,866				

There is a good connection between the overall correlation value of all items above 0,30, which indicates a good measurement performance. These connections were statistically significant (p<0,01) and ranged from 0,430 to 0,702 when comparing scale items to the overall scale score.

As a result of this data, it was concluded that the items did not pose any issues with consistency. Data and correlation values for each item can be found in Table 4.

**Table 4: Service Quality Scale Items And Total Correlation Values**

Item 1	0,702	0,000**
Item 2	0,675	0,000**
Item 3	0,624	0,000**
Item 4	0,627	0,000**
Item 5	0,669	0,000**

Item 6	0,647	0,000**
Item 7	0,664	0,000**
Item 8	0,513	0,000**
Item 9	0,571	0,000**
Item 10	0,636	0,000**
Item 11	0,430	0,000**
Item 12	0,524	0,000**
Item 13	0,488	0,000**
Item 14	0,492	0,000**
Item 15	0,441	0,000**
Item 16	0,492	0,000**
Item 17	0,530	0,000**
Item 18	0,563	0,000**
Item 19	0,580	0,000**
Item 20	0,569	0,000**

As a requirement for factor analysis, K.M.O. and Bartlett-Sphericity tests were used to evaluate the presence of a link between variables and determine the data structure's suitability for factor analysis. We discovered that the Bartlett sphericity test was statistically significant at a 99 percent confidence level when the K.M.O. value was more significant than 0,60 (p 0,01). As can be seen from these results, the acquired sample data are adequate for factor analysis and are distributed normally across all variables. Table 5 provides further information.

**Table 5: K.M.O. And Bartlett Test Results For Service Quality Scale**

<b>K.M.O. Sampling Adequacy</b>	<b>0,803</b>	
<b>Bartlett's Test of Sphericity</b>	Chi-square Value ( $\chi^2$ )	1522,487
	Degree of freedom	190
	Significance value	0,000

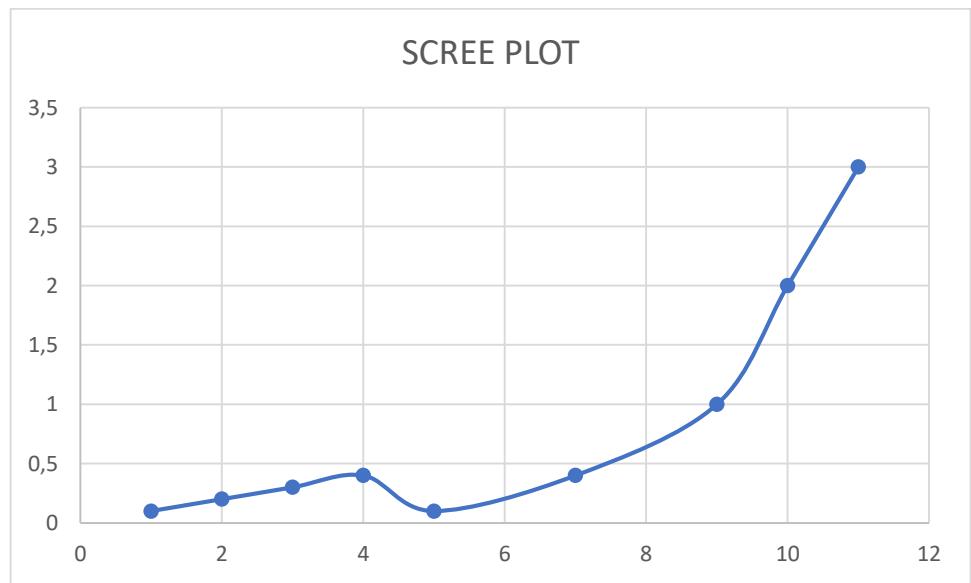
The object can only stay on the scale if the load factor exceeds 0.45. We simultaneously analyzed while examining item overlap and single-factor loading. The twenty-item scale's factor analysis found a five-factor situation that accounted for 83,896 percent of the overall variation. The scale includes five components; hence the vertical varimax rotation approach was chosen. Although a value between 40% and 60% of the variance was deemed sufficient for the scale, this study's weight was also deemed enough. Factor one accounted for 23.540 percent of the scale, followed by factors two, three, four, and five, each accounting for 16.790, 16.15, 13.859, and 13.557 percent of the total. More details are shown in Table 6.

*Table 6: Eigenvalues And Variance Levels Accounted For The Service Quality Scale*

Components	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	6,662	33,209	33,209	4,708	23,540	23,540
2	3,616	18,078	51,286	3,358	16,790	40,330
3	2,610	13,049	64,335	3,230	16,150	56,480
4	2,274	11,370	75,705	2,772	13,859	70,339
5	1,538	8,191	83,896	2,711	13,557	83,896

The scree plot test diagram was investigated to determine the factor structure with better certainty. Refraction was measured after the fifth dimension, as seen in figure 2, but the trend for other components became stationary after that.

**Figure 2: Service Quality Scale Scree Plot Test Diagram**



For the service quality scale, the factor loading values were displayed in Table 4.8. When analyzing the results in the table, it was determined that there was no continuity between the items and that the factor loading value was more than 0.45 (Ceschin, 2010). The importance of the loading factor were discovered to fall between 0.776 and 0.932.

## 4) Findings and Analysis

### 4.1. Findings

The results reveal a variety of factors that must be taken into account. First, despite the factor analysis supporting proposition 1, it was feasible to see that the average evaluation of the four items included in the eco-friendly group was lower than the mean of 4.205 by analyzing the descriptive statistics. Current developments like carbon-neutral manufacturing and zero-emission automobiles show how sustainability is becoming increasingly important in the automotive sector. These developments are fueled not only by the implementation of stricter emissions rules or even quotas but also by a growing public consciousness of environmental and sustainability issues and consumer demand for environmentally friendly automobiles. Consumers were unable to name any green models. Additionally, many no longer view cars as a status symbol. For many customers, sharing is preferable to owning—and not simply for environmental reasons. Our findings imply that consumers are primarily motivated by the allure of personal benefits because they show little interest in the environment and have little general awareness of green marketing and sustainability-focused policies.

Despite the cost savings and environmental benefits of green cars, many respondents appeared unwilling to pay more for alternative fuel vehicles. Additionally, the response "I am inclined to spend up to 20% more for a hybrid or electric car rather than the same with the traditional engine" did poorly. In other words, consumers are aware of the value of eco-friendly features when thinking about purchasing a new automobile, but they do not commit to them. Several external factors could be to blame for this result. First, the device has several technical issues, such as installing an electric car outlet at home, having a limited driving range, and having trouble recharging the batteries when traveling. Additionally, as evidenced by those in the enthusiast cluster, those who love automobiles are often opposed to the use of alternative fuels since, in their perspective, when the sound is not a classic rumble, and the smell is not burned gasoline, automobiles lose their attractiveness.

Cost reductions or efficiency gains have primarily driven the automotive industry's sustainability strategy. On the other hand, automotive executives view it far more generally as being about long-term value and purpose. Our survey's sustainability leaders know how critical it is to live up to these standards. They prioritize sustainability as a vital aspect of their mission: 91% of respondents claim that their "determination to live up to our organization's moral and ethical ideals" motivates their sustainability plan. But for laggards, this figure falls to 57%. Jordan Group's head of sustainability, Ralf Pfitzner, explains why the company views sustainability as essential to its long-term value: "If we go about it the correct way, sustainability is an investment in a viable firm, not a cost component," 36 Sustainability is ingrained in leading firms' cultures, which also encourage employee knowledge and promote sustainability outside. They make it a core component of their company mission or reason for existing. It is essential to lure talent and satisfy the higher expectations of numerous stakeholders, including investors, clients, staff members, and society. For instance, while leaders perceive sustainability as essential to drawing in, keeping, and inspiring talent, laggards see it as only 47% important.

Our study demonstrates that businesses only implement narrowly focused environmental strategies. They hardly ever ensure sustainability from metal mining to material recycling at the "ends" of their value chain. O.E.M.s frequently have little influence on adopting sustainable practices by their tier-two and tier-three suppliers. The director of a major international O.E.M. claims that "a lot of the time, we don't have a choice regarding who our tier-one suppliers choose from." "We can support them, but they are running their operations.

Sometimes we can't drill down because of a connection. The company is working with its suppliers to increase supply chain transparency to address these issues. The business collaborated with two of its suppliers of E.V. batteries to develop a digital ledger that monitors the origin of rare-earth components like cobalt. 41 Leading businesses integrate sustainability into their operations and procedures, including R&D, design, operations, supply chain, sales, I.T., and mobility services. Ninety-three percent of executives include

fair labor policy tenets, including gender equality, human rights, and enhanced working conditions, into their sustainability policies and those of their suppliers. But for laggards, this figure falls to 51%.

Long-standing societal debates have included issues related to climate change and its effects. Legislators have thus significantly increased the burden of carbon emissions rules in recent years. Both the pollutants produced during vehicle production and the emissions produced by the vehicles themselves must be reduced by automakers. Using alternative power trains, such as fuel cells, is crucial in this situation. Sustainability along the value chain is becoming increasingly critical for the automotive industry as natural resources become increasingly limited. They are founded on the idea of resource reuse and recycling. Transparency must be established throughout the supply chain. The value chain can only be sustained in this fashion, and the origin of parts can be tracked. With this in mind, automakers and suppliers are thinking about how to adopt cutting-edge ideas like a circular economy, battery recycling, biodegradable parts, and sustainable manufacturing techniques. Online accountability the emphasis will turn to issues like releasing digital value, data privacy, and data security as self-driving and networked vehicles become more prevalent. On the one hand, automakers and suppliers must define the digital functionalities and technology required to deliver sustainable solutions. Nevertheless, tight guidelines are necessary to guard against data law infractions.

When asked which elements are most important when purchasing an automobile, quality, pricing, performance, and design come first. Only 34% of respondents said that sustainability is significant, the lowest percentage of any criteria. This finding demonstrates that although sustainability is frequently mentioned in the automotive business, it has little effect on consumer choice, particularly in the premium market. The willingness to pay more for environmentally friendly elements in the car is also quite apathetic. 47.5 percent of respondents said they weren't willing to pay more for automotive sustainability features. This is a sizable percentage and illustrates vehicle manufacturers' difficulty in passing on higher prices to consumers.

From the client's perspective, an automobile's power unit (41%) and electronics (38%) acquire the highest relevance for sustainability. Nearly 35% of respondents believe that sustainability is crucial in every aspect of the car, while 30% place particular emphasis on the inside. This finding shows that, despite the customer's focus on the interior's sustainability, the driving system and electronics appear to have a higher sustainability potential from the customer's perspective. Now, the additional inquiries just concern the interior. Electric motors and their related optimization areas, lightweight design, and CO<sub>2</sub> emission reduction are important topics for the car industry. However, one cannot overlook the interior of the vehicle. Since the driver sees the interior of a car the most, it must be functional, aesthetically beautiful, and lightweight simultaneously. Utilizing natural fibers as replacement materials for synthetic ones in the interior has a significant impact and advances sustainability.

The scientific community is also gaining increasing traction on the issue of sustainability in the automotive sector. For instance, Nunes and Bennett compare environmental activities of automakers on a fundamental level and come to the conclusion that these are frequently still highly nebulous and need additional concretization. As a result, the following main research question is raised: What are the difficulties for original equipment manufacturers (O.E.M.s) and suppliers, and how are the three pillars of sustainability (economic, ecological, and social issues) influencing the new interior development by premium brand manufacturers?

Another complaint is that the ecological aspect receives the majority of attention. A theoretical framework is being developed to analyze the impact of green and lean S.C.M. techniques on automakers' long-term sustainability. Performance indicators are things like ecological (like CO<sub>2</sub> emissions), social (like supplier screening), and economic (like operating costs) factors. The research's complement is examining a sustainable business model for the automotive sector that incorporates all three facets of sustainability. This contribution also demonstrates that over the past ten years, the sustainability performance of the automotive supply chain has improved. According to Sinha et al., a comprehensive

process strategy that begins with the product's conception and continues through its series production is the only way to manage sustainability in the automotive sector. Several authors also consider tangible materials regarding their sustainability potential for the automotive sector in addition to these mainly conceptual contributions. For instance, Jordan largely evaluates the suitability of natural fibers, whereas Kumar and Das consider the suitability of bio composites, particularly in dashboards. Jordan considers how drivers feel about using sustainable materials within cars. Here, the emphasis is on consumers' willingness to pay extra for renewable raw materials.

In conclusion, while sustainability in the automotive industry may be gaining popularity and scientific attention, the interior design business, particularly, has received little attention. Several studies address the subject of sustainable interiors; however, they almost all take a strictly technological stance. Others examine the potential of sustainability as a customer requirement but neglect to concentrate on the interior of automobiles. The article makes an effort to fill this gap.

The tropical mallow plant Kenaf fibers are also used to make the door beams visible and the instrument panel cover. Compared to flax and hemp, Kenaf has a higher degree of fineness and purity in its fibers, which is necessary for a high-quality surface. The design philosophy of Jordan I vehicles combines a persistent focus on sustainability, which becomes obvious and tactile in the inside, with simultaneous fulfillment of the O.E.M.'s premium claim, making this a fundamental need. Another illustration is the new BMW 3 Series, which has components made of wood fiber that lessen the strain on the environment and lower weight by 20% compared to previously employed alternatives.

Utilizing natural and renewable raw materials as a sustainable replacement for plastics is directly in line with the younger generation's demands. For instance, Yanfeng Automotive Interiors purposefully gives the door panel's recyclable, aesthetically created natural fiber middle sections a natural appearance. Han Hendriks, Yanfeng's Chief Technology Officer, claims a current trend toward increased individualization and personalization. In addition to being safe and in tune with the times, drivers want to be

sustainable. For O.E.M.s, International Automotive Components (I.A.C.), a supplier, optimizes component designs. The "Fibre Frame" technology is a new item. The traditional material sheet steel is replaced with the natural fiber semi-finished product "EcoMatHot" in the mounting frame of the vehicle roof liner with panoramic or sliding roofs. 70% of the raw components in the material are renewable. It is possible to lose up to 50% of one's body weight.

Although it is accepted in business practice that sustainability is not just a fad but also a long-term indicator, the empirical findings do not fully support this. Only 50% of those surveyed concur with this assertion. About 50% of the customers are hindered by the cost factor, which the O.E.M. claims would need to be compensated. This implies an objective conflict with the O.E.M. for every second respondent. Most participants concur that sustainability should be integrated into the automobile, not just one specific aspect. The category "everywhere" comes in second place in terms of importance, even though most respondents chose the modules' power supply and electronics. As a result, the interior must be integrated into the overall automotive design as a single module.

The customers also emphasize that a sustainable interior must satisfy all traditional automobile requirements, particularly appearance, haptics, comfort, smell, quality, safety, and value. Manufacturers frequently detect a problem at this point. Natural materials fulfill certain properties, but others sometimes do not. Consequently, manufacturers need to look more closely at this issue to satisfy their customers' wishes. The empirical study shows that most participants can imagine a center console made of ligneous wood or a door panel made of natural fibers such as hemp or Kenaf. In addition, the topic of recycling is essential for the customers. Therefore, manufacturers should work on innovative solutions regarding this topic.

Most customers also see an increase in the importance of sustainability for the interior on the horizon. Therefore, manufacturers must be innovative, show initiative, take advantage of emerging market opportunities, and act proactively. The focus should be on achieving first mover advantages, and it is crucial for O.E.M.s to maintain their position as

technology leaders and premium manufacturers in Germany and beyond. Therefore, it is imperative that premium manufacturers concentrate on the existing mega-trend of sustainability and especially take more effort into sustainable automotive interior solutions. However, all against the background that customers accept compromises in comfort, practicality, and price only to a very limited extent. In detail, the paper adds new insights to customer requirements regarding automotive sustainability in the public and sustainable automotive interior research in this area. The paper's main result is to provide further details on the connection between sustainability and customer comfort in the automobile industry and to confront the needs of the customers with the challenges of the companies. This made an important contribution to the sustainability research field in the automotive industry.

Most individuals seem to show uncertainty in terms of caring about global warming. Hence conducting the survey twice for 380 responses would lead to different results, therefore low reliability and Validity. Therefore, individuals who are likely to respond positively towards being concerned about the emissions are 85%. On the other hand, 15% of the individuals are likely to react otherwise.

For a survey done more than three times, 323 individuals responded positively to being concerned about emissions. This is equivalent to 85% of the total number of individuals. Since there are high probabilities that the same responses would be achieved, reliability would be high for a survey done more than three times. High reliability would also lead to a high validity.

Regarding individuals concerned about eco-friendly services, similar numbers of people are likely to respond positively to adopting eco-friendly practices for 380 responses. If the survey were done more than two times, then 323 individuals would show concern for eco-friendly services. This is equivalent to 85% of the total number of respondents. Thus, reliability would be higher for the individuals who would respond positively. High reliability would also lead to a high validity.

For 323 individuals who would respond to adopting eco-friendly practices, a larger percentage would be those using solar energy for heating. This would then be followed by

people who would be using non-plastic products, then those who would be using electric cars for transportation. If the survey was conducted for a second time, there would be similar results, leading to high reliability. Since there would be high reliability, Validity would also be higher.

#### ***4.1.3: Automotive Questions Analysis,***

For the analysis, it is evident that 90% of 380 individuals own or drive a car. This is the equivalent of 342 individuals. If the study were done more than two times, there would be similar responses regarding those who own a car. As a result, there would be high reliability, leading to a high validity.

People must always consider some factors when purchasing a car. However, most individuals have certain apparent factors: Environmental, Electric Vehicle, Comfort, and Large Engine (high performance). If the study were to be done twice or thrice, people would select these top factors. As a result, there would be high reliability and Validity.

The statistical analysis above shows two main important factors for any person who opts to buy an electric car, purchase & recharging costs. Surveying for a second time for 380 respondents would lead to many individuals selecting similar characteristics. As a result, there would be high reliability and Validity.

Although 51% of individuals stated they own an electric car, in general, people get to have a change in their state. Someone may be lacking a car today but opts to purchase one tomorrow. As a result, it would be difficult to predict the form of an individual. When the survey is conducted for 380 respondents, different people would have other statements that best describe them. As a result, there would be low reliability and Validity.

There are often different hindrances that prevent people from buying an electric car. However, the most common barrier is that electric vehicles use batteries; as simple as that, issues like distance per charge and recharging time will be most people's primary concerns. If 380 respondents were to participate in the survey, approximately 228 would choose battery and distance as the hindrance factors to purchasing an electric car. As a result, there would be high reliability and Validity. 80% of the individuals support that electric car improves the environment. This forms a total of 304 of the total 380 individuals. If the

survey were to be done more than two times, the same number of individuals would be in support of that statement. Hence, there would be a high reliability, leading to a high validity. People would be unwilling to pay extra for an electric automobile. If the survey were to be conducted for 380 respondents, there would be different results. Thus, reliability and Validity would be lower than 50%.

**Table 7: Reliability of individual response**

Demographic Questions	Positive Response	Negative Response
Nationality	369	11
Residents in Jordan	342	38
People Concerned about Emissions	323	57
People who encourage eco-friendly products	352	28
People who own or usually drive a car	342	38
People who use public transport	323	57

The data given in the table above support reliability. The table indicates that individuals likely to respond as residents of Jordan include 369 respondents. Non-Jordan residents are only about 38 out of the possible 380 respondents. The table also indicates that individuals concerned about the emissions are about 323 out of 380 respondents. Those who encourage eco-friendly products and have their cars are 342 and 323. Hence, it implies that reliability is likely to be high since most individuals are in a position to respond positively.

Table 8: *Questionnaire overview analysis*

	Positive Response as Majority	Negative Response as Minority
Gender(M/F)	226	154
Age (35-54)	304	76
Marital status (Single/Non single)	247	133
Household size (Less 5 person)	350	30
Education (B.A. and above)	312	68
Field of study (Business/Else)	228	152
Employment status (Employed/Else)	228	152
Occupation (Sales/Else)	190	190
Reasons Behind eco-friendly practices (Both “Saving and Environment”/Else)	219	161
Concern about emissions produced while manufacturing (Yes/No)	323	57
What would you pay for saving the environment via sustainability? (Not higher worth/ 5% extra and above)	152	228
Important factors for buying an automobile (Environmental/Else)	170	210
Important cost factor when buying an electric vehicle (Purchase Costs & Recharging Costs/Else)	150/100	130
Statement description (I already own an electric car/Else)	190	190
Barriers of buying an electric	171	209

vehicle (Battery distance/Else)		
Do you think that electric cars improves environment? (Yes/Else)	304	76
Would you pay extra for an electric automobile with the same/or more function & quality as a petrol/diesel-powered car? (Not extra than 25% and below/ Not higher worth)	76/114/105	85

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Also, here, data implies the suggested Hypothesis since most individuals responded positively (as majority) as a Hypothesis suggestion.

## 4.2. Analysis

Manufacturers have also made great achievements in improving fuel efficiency and safety, as well as reducing emissions, to lessen the environmental load associated with the usage phase, using new and growing materials, as noted by (Resta et al, 2016). Car sharing and new service solutions could reduce vehicle numbers by 40% and driving distances by up to 60% and support End-of-Life vehicles (E.L.V.) Rehabilitation Measures, such as Design for Disassembly and Design for Recycle Processing to facilitate and effectively manage the dispersion.

Even while the automotive industry is frequently linked with innovation, Van Den Hoed shows this is not always the case (Resta et al, 2016). Complex procedures, low genes, and high risks foster innovation. As a result, it's rare for people to adopt new technologies requiring considerable motor abilities and performance changes. However, more onerous environmental regulations may necessitate car industry changes. An intriguing study of radical technological change in established industries can be done with H.R.

technology(human resources technology) as in the case of fuel cell technology (FCV-fuel cell vehicles) that has not yet taken place.

In the automotive industry, radical innovation is referred to as radical technology. Various engineering approaches are used to create materials that hold the developed technologies and go beyond present industrial skills in this technology. As new players enter the market, they bring a fresh perspective and the ability to offer new regulations, thanks to their less stressful hobbies and more efficient operations. Entrepreneurs aren't the only ones interested in dynamic technology; for instance, companies with many financial clouts might consider investing in electric vehicle technology to better use their existing infrastructure. Businesses and others who may be held back by established technologies could benefit from new entries that are more resilient.

A 'temporary event' is an external shock or calamity that disrupts a long period of stability. As a significant factor in the current instability, surprise plays an essential role. Uncertainty breeds novel judgments, and firms and sectors alike feel compelled to come up with better (solid) solutions due to the shock; a third significant difference stems from the performance of new technologies and their learning curves compared to the technology they are replacing. While some revolutionary technology is more expensive and complicated than conventional technology, it may indicate more excellent learning curves that give long-term benefits than standard technology. It is more likely that radical technology will be approved if it offers better characteristics than mainstream technology. We contend that functional aspects play a significant role in the treatment of sound technological progress, even though radical technology in innovation books is often considered a mystery.

As a result of evolving operational requirements or as a result of novel possibilities provided by new (technology-driven) technologies, market conditions can shift. For example, they may be questioned if current methods or technology cannot meet changing market needs. The current downsides, where the desired market changes may lead to the investigation of new, more powerful technologies, which eventually destroy incumbent technology, are highlighted in the prior case.

In the industrial sector, the rivalry between and among members can also play an essential role in a substantial transformation. Early adopters of radical technology can gain a competitive advantage; they may recognize an opportunity to enhance market share. Strong innovations that a company might use to its advantage can be influenced by industry competition and the Development of unique new ideas.

When it comes to local gas emissions (NOx, CO2, and VOC1) and fossil fuel use, the vehicle industry has faced tougher regulations since the late 1960s. Most of the standards established by governments can be satisfied with upgraded versions of I.C.E. (internal combustion engine) or other means such as developing lightweight structures or integrating catalytic technology. A regulation known as the Zero Emission Vehicles (ZEV)Regulation was first established by the California Air Resources Board (CARB) in 1990. BEV (battery electric vehicles) and HEV (hybrid electric vehicles) became more popular in the early 1990s as the automobile industry invested more in these technologies (HEV). It wasn't until the late 1990s that fuel cell automobiles became a reality.

Regarding how new innovations contribute to business sustainability, Williams (2014) explains that various environmental problems are associated with the automotive industry, including those linked to high utilization of automotive resources and waste disposal when vehicles arrive at their useful life. Vehicles comprise the world's largest source of air pollution, accounting for around 30 percent of emissions from industrialized countries and 17 percent of CO2. In the sphere of the environment, it has been stated that, although the efficiency improvements produced as a result of clean technology have lowered gas emissions, they have been resolved by greater use overuse (Williams, 2014). Some have argued that to ensure long-term success for the entire industry, change must occur at system level rather than at the product or group of innovation level, citing the "reversal effect" as evidence.

The concept of product service plans (P.S.S.) presents an attractive potential. However, many programs now or recently adopted by participants within the automotive industry have continued to highlight the role of technology itself, rather than tackling major difficulties of changing behavior or system level. There is a strong case for rethinking the

role of economic activity, which has traditionally focused on manufacturing and marketing, in favor of delivering a specific function. As a result, according to Williams, organizations can take advantage of new and profitable economic prospects while improving their environmental performance. In the production, use, and disposal of automobiles, four main environmental impacts are associated with high resource utilization, (i) sometimes non-renewable; (ii) the use of water and energy in the production and production of electrical products; (iii) other aspects of the integration and production of vehicles, especially during the painting and disposal of methamphetamines; and (iv) other aspects of the integration and production of vehicles.

The industry focuses on the creation of renewable and recyclable materials, as well as the employment of clean technologies and environmental management systems in each production area and across the supply chain. As a result, companies have also made steps to cut inputs, adapt production methods so that they can reuse manufactured products and other, less dangerous chemicals. Some automobile manufacturers have been pushed to look at alternative technology for internal combustion engines (I.C.E.) as a reaction to environmental concerns. Fuel-powered engines and electric automobiles are two examples of current efforts to locate some of the most cutting-edge technology in the power train. In addition, several companies have improved hybrid engine technology to find environmental benefits while still providing I.C. engine protection to consumers. Increasing patterns of general use or overuse have been shown to obstruct improvements in vehicle environmental performance at the level of the impacted environmental sector. Regarding environmental impact, the present economic strategy is directly related to unit sales and consumption. The advantages of environmental efficiency outweigh the drawbacks of many cars' excessive usage of distractions.

### **Automotive industry sustainability**

Innovation, great branding, worldwide efficiency in the value chain, and highly motivated employees are all critical to long-term success in the automobile business. The automobile industry invests more than any other in research & Development, which might be

seen as a key to long-term success. The current turbulence in the automotive sector is unquestionably a stage in the history of the business (Dannenberg, 2017). There has been a great deal of progress in the areas of pollution reduction, lightweight construction, automated driving, coordination, and mobility services. Adaptability and major changes in the supplier industry are likewise in line with these trends (Nooren, 2014).

The scientific community is becoming more aware of the importance of sustainability in the automotive industry. Comparisons of car manufacturers' systems by Nunes and Bennett, for example, revealed how ambiguous many of those systems are and the need for additional clarification. There is also a complaint that the focus is on the environmental side (Nunes, 2016). An analysis of the influence of green supply chain management(G.S.C.M.) processes and the sustainable Development of automobile manufacturers has been developed by Azevedo et al. Performance indicators include environmental (such as CO2 emissions), social (such as provider testing), and economic (such as running costs) (Azevedo, 2012).

### **Reliability of automobiles**

The inside of a car can be completely redesigned thanks to recent developments in the automotive and automotive driving fields. A beautiful living place should be created within the vehicle. This can be accomplished, for example, by the use of visually appealing settings created from environmentally friendly materials. The interior plays a significant influence in deciding whether or not to buy a product. As a combination, it arouses feelings, ensures comfort, safety, and efficiency, and sheds light on the product's unique identity (Wellbrock, 2020).The cockpit; seats, door and side trim, headliner, luggage compartment, and floor trim are all components of the car's interior (Feldman, 2018). It's making progress.

The ability to create cash to pay for production features, to replace worn-out assets, and to invest in order to remain competitive is commonly referred to as business sustainability. As a result, rebranding into a product and service product and the process of becoming a management and business model is nothing new. Since its public contracts require it to maintain a long-term continuity, this is a long-term coincidence that derives from this belief. Nevertheless, if business sustainability is seen as a valuable contribution to

sustainable Development, then new strategies bring an alternative evaluation approach in addition to the standard one. To put it another way, there's no other rationale for include this as a cornerstone of the sustainable development paradigm. D.D.T. (dichloro-diphenyl-trichloro-ethane) was highly condemned by Rachel Carson in relation to its roots as a sustainable development organization.

Sustainable innovation is a requirement for an organization, and it may be easily done because of the uncertainty that innovation brings, especially when the number of young people in a given country is high or high in terms of its national context art. Economic outcomes can be predicted with ease, thanks to the abundance of technologies and clever businesses that can put them to use. These repercussions are particularly difficult to predict in advance because they entail additional unpredictability, uncertainty and interplay. When it comes to a framework for sustainable Development, it's easy to overlook the continuation of common sense accompanied by the discourse that incorporates good intentions, if not an expression of rising views on population and ideological leaders. Because of their interdependence, technological and social advancements are necessary for long-term sustainability.

The use of a new or highly developed product, good or service, or process, or new invention, as defined by the Oslo Manual (Oslo Manual — Guidelines Proposal for Data Collection and Interpretation on Technological Innovation, published in 1990 by the Organization for Cooperation and Economic Development (O.E.C.D.)), according to the Oslo Manual As far as I'm concerned, [18] is the (page 55). An "eco-innovation" is a product, process, service, or new business that reduces environmental hazards and pollution and other adverse effects of resource utilization—including energy—throughout their life cycle, rather than other appropriate alternatives. As far as I can tell, [19] (page 7).

Note that “eco-innovation” denotes “eco-efficiency”, processes that arise from the integration of two elements of sustainability, namely economic and social. Eco efficiency is a practice that depends on the economic and environmental pillars. In addition, this includes the Development of goods and services that are cost-effective and may gradually reduce environmental damages to the level supported by Earth [20]. (page 82). Toxic compounds

can be eliminated, the quantity of material and energy used per unit produced can be reduced, and the product's life cycle can be increased by using new procedures. However, they can lead to unemployment, a lack of firefighting skills, damage to neighborhoods, and other social issues. The social component must therefore be taken into account while developing an environmentally friendly technology in order for it to be a long-term innovation.

While "eco-innovation" has been utilized extensively in business and government environmental management programs, its functional importance has been reduced due to varying contexts and meanings. When it comes to eco-innovation, the most important question is how it's categorized so that we can better grasp its qualities and turn the most effective components of a sustainable industry.

When it comes to showing how eco-innovation can be demonstrated as a new form of innovation, Christensen (2015) emphasizes the differences between major and emergent changes (Christensen, 2015). He says that emerging changes focus on building new networks to add value to an existing system, whereas major changes aim to replace existing components and systems and/or create new networks from scratch.

That the distinction between dynamic and rising renaming is related to environmental functions may be one explanation. To achieve environmental sustainability, it is becoming increasingly clear that merely improving existing facilities on established roadways is not enough. A remedy has been identified in the form of considerable technology change or even new innovation at the system level. As a result, systemic adjustments are more likely to have a greater impact than major modifications. As a result of long-term integrated manufacturing efforts, such as closed supply chains, more environmentally friendly products and processes can be developed. Eco-innovation, according to Pujari (2020), can be an excellent tool for the success of a creative system. Helps keep the system up to date (Bhbosale, 2020).

## **5) Research limitation**

The objectives of the research on which the proposed study is designed and the most thorough aims. You can identify methods in which the Development of research objectives and objectives can be minimized in order for the level of research emphasis to increase. Due to the absence of knowledge on the basic data collecting, there is a good likelihood that the type of data collection method is faulty. Sample size depends on the nature of the research problem. As if the sample size is too small, statistical analysis will not be able to detect the meaningful association between the data set. Of course a high sample size can yield very reliable results, if possible. The significance of sample size is greater in quantitative research compared to quality studies. Document review is a crucial aspect of any research, as it helps to determine the breadth of the work that has been done.

## **6) Conclusion**

In conclusion, the environment is gradually getting damaged due to climate change. As a result, residents of Jordan are being encouraged to embrace green technology to conserve the environment. They can do this by embracing vehicles that do not emit greenhouse gases like electric vehicles. From the survey questions presented above, very few individuals in Jordan use public transport. It, therefore, implies that a lot of the people in Jordan own cars. As a result, if the survey is conducted to determine individuals' views on electric cars, reliability would be high since most individuals would be willing to embrace electric cars. As a result, Validity would also be increased.

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