T.C.

İSTANBUL KÜLTÜR UNIVERSITY

INSTITUTE OF GRADUATE STUDIES

ELECTRIC VEHICLES MARKET SHARE ANALYSIS USING MULTI-CRITERIA DECISION-MAKING TECHNIQUES

Master of Science Thesis

Moath ARAFEH

Department: Industrial Engineering

Program: Engineering Management

Supervisor: Prof.Dr. Murat ERMİŞ

SEPTEMBER 2025

T.C.
İSTANBUL KÜLTÜR UNIVERSITY
INSTITUTE OF GRADUATE STUDIES

ELECTRIC VEHICLES MARKET SHARE ANALYSIS USING MULTI CRITERIA DECISION MAKING TECHNIQUES

Master of Science Thesis

Moath ARAFEH
2000001229

Department: Industrial Engineering

Program: Engineering Management

Supervisor: **Prof. Dr. Murat ERMİŞ**

Members of Examining Committee: **Prof. Dr. Özgür K. ŞAHİNGÖZ**
Assist. Prof. Dr. İ.Ethem TARHAN

SEPTEMBER 2025

PREAMBLE

To my beloved parents, whose love, prayers, and sacrifices have been the foundation of my journey.
To my family, for their constant support and encouragement.
To my friends, who stood by me with kindness and motivation.
And to my professor, whose guidance and mentorship were invaluable throughout this work.
I dedicate this thesis with deep gratitude and respect

September 2025 Moath ARAFEH

TABLE OF CONTENTS

ABBREVIATIONS

ICE : Internal Combustion Engine
EV : Electric Vehicle
HEV : Hybrid Electric Vehicle
FCV : Fuel Cell Vehicle
MCDM : Multi-Criteria Decision Making
BEV : Battery Electric Vehicle
PHEV : Plug-in Hybrid Electric Vehicle
FCHEV : Fuel Cell Hybrid Electric Vehicle
EV-Turkey : Electrical Vehicles in Turkiye
HEV-Turkey : Hybrid Electrical Vehicles in Turkiye
FF-Turkey : Fossil Fuel Vehicles in Turkiye
EV-Jordan : Electrical Vehicles in Jordan
HEV-Jordan : Hybrid Electrical Vehicles in Jordan
FF-Turkey : Fossil Fuel Vehicles in Jordan
ANP : Analytic Network Process
AHP : Analytical Hierarchy Process

LIST OF TABLES

LIST OF FIGURES

Üniversite : **İstanbul Kültür University**

Enstitü : **Lisansüstü Eğitim Enstitüsü**

Bölüm : **Endüstri Mühendisliği**

Programı : **Mühendislik Yönetimi**

Tez Danışmanı : **Prof. Dr. Murat ERMİŞ**

Tez Türü ve Tarihi : **Yüksek Lisans – Eylül 2025**

ÖZET

ÇOK KRİTERLİ KARAR VERME TEKNİKLERİ KULLANILARAK ELEKTRİKLİ ARAÇLAR PAZAR PAYI ANALİZİ

Moath Arafeh

Sürdürülebilir ulaşım sistemlerine doğru hızlanan küresel değişim ışığında, gelişmekte olan pazarlarda çeşitli araç türlerinin kapsamlı bir karşılaştırmalı çalışmasına acil ihtiyaç vardır. Bu çalışma, AHP ve ANP çok kriterli karar analizi metodolojilerini kullanarak Ürdün ve Türkiye'deki elektrikli araçlar (EV), hibrit araçlar (HEV) ve geleneksel araçların (FF) performansının kapsamlı bir analizini sunmaktadır. Çalışma, tüketici tercihlerini değerlendirmeyi, iki ülkedeki pazar performansını karşılaştırmayı, iki analitik yöntemin uygulanmasından elde edilen sonuçlar arasındaki farkları analiz etmeyi ve seçim sürecini etkileyen kritik faktörleri belirlemeyi amaçlamaktadır.

Çalışma, her iki ülkedeki otomotiv sektörü uzmanlarından toplanan verilerle AHP ve ANP metodolojilerine göre özel anketler tasarlamaya dayanmaktadır. SuperDecision yazılımı, verileri analiz etmek ve mevcut pazar büyüklüğü ve payı, maliyet, pazarlama, özellikler ve diğer kriterler dahil olmak üzere beş ana kriteri, her biriyle ilişkili alt kriterleri dikkate alarak değerlendirmek için kullanılmıştır. Analiz, Ürdün ve Türkiye bağlamında üç ana alternatifin (EV, HEV, FF) karşılaştırılmasını içermiştir.

Bu çalışma, önem kriterlerini belirlerken her bir pazarın yerel özelliklerini dikkate alarak diğer pazarlara da uygulanabilecek metodolojik bir çerçeve sunmaktadır. Ayrıca karar analizi alanındaki araştırmacılar, pazarlama stratejileri geliştiren üreticiler ve sürdürülebilir ulaşıma geçişi destekleyecek teşvikler tasarlayan politika yapıcılar için de değerli bilgiler sunmaktadır.

Anahtar Kelimeler: Çok Kriterli Karar Verme, AHP, ANP, Elektrikli Araç, Hibrit Araç

University	**: İstanbul Kültür University**
Institute	**: Institute of Graduate Studies**
Department	**: Industrial Engineering**
Program	**: Engineering Management**
Supervisor	**: Prof. Dr. Murat ERMİŞ**
Degree Awarded and Date	**: Master of Science – September 2025**

ABSTRACT

ELECTRIC VEHICLES MARKET SHARE ANALYSIS USING MULTI CRITERIA DECISION-MAKING TECHNIQUES

Moath Arafeh

In light of the accelerating global shift towards sustainable transportation systems, there is an urgent need for a comprehensive comparative study of various vehicle types in emerging markets. This study provides a thorough analysis of the performance of electric vehicles (EV), hybrid vehicles (HEV), and conventional vehicles (FF) in Jordan and Turkiye, using the AHP and ANP multi-criteria decision analysis methodologies. The study aims to assess consumer preferences, compare market performance in the two countries, analyze the differences between the results of applying the two analytical methods, and identify the critical factors influencing the choice process.

The study relied on designing specialized questionnaires according to the AHP and ANP methodologies, with data collected from automotive sector experts in both countries. SuperDecision software was used to analyze the data and evaluate five main criteria, including current market size and share, cost, marketing, features, and other criteria, taking into account the sub-criteria associated with each. The analysis included a comparison of three main alternatives (EV, HEV, FF) in the Jordanian and Turkish contexts.

This study provides a methodological framework that can be applied to other markets, while taking into account the local characteristics of each market when determining the criteria of importance. It also provides valuable insights for researchers in the field of decision analysis, manufacturers in developing marketing strategies, and policymakers in designing incentives to support the transition to sustainable transportation.

Keywords: Multi-Criteria Decision Making, AHP, ANP, EV, HEV

1 INTRODUCTION

Switching to electric mobility brings both environmental and economic benefits compared to traditional transportation methods (Faria et al., 2012). Studies show that making urban transit more sustainable involves carefully considering various factors when choosing between different bus technologies (Feyzioglu et al., 2008). Moving to electric vehicles (EVs) is a key step toward greener transportation, and research in India suggests that policies should be adjusted to support this transition (Srikanth, 2018). Since transportation contributes about 14% of global greenhouse gases, combining electric mobility with renewable energy sources is essential for truly sustainable travel (Longo et al., 2018). Pushing forward the switch to electric vehicles can be faster if governments support the change and new EVs are developed to beat traditional gas-powered cars (Orecchini et al., 2011).

In Italy, studies emphasize that big investments in infrastructure and the economy are needed to make sustainable mobility a reality (Asdrubali et al., 2018). Replacing internal combustion engine (ICE) vehicles with electric options greatly benefits the environment and energy efficiency (Wee et al., 2012). To get the best results in energy use and eco-friendliness, China is blending electric and hybrid vehicles across different transport modes—like cars, buses, and trucks (YunHe & Chen, 2013). Research in the U.S. shows that plug-in hybrids tend to cost less over their lifetime and pay back their initial investment faster, which makes them more appealing to drivers (Al-Alawi & Bradley, 2013).

In China, strong support programs for manufacturers and buyers have helped boost local EV production, outpacing growth in the U.S. (Ou et al., 2019). Researchers are also using advanced decision-making methods, such as AHP and ANP methods, to evaluate the best commercial EV options available in the American market (Biswas & Das, 2019). Similar techniques have been used to assess electric scooters in India (Biswas & Saha, 2019) and to pick the most suitable hybrid vehicles from what's out there (Biswas & Das, 2018).

Accordingly, this study focused on a comparative analysis of automobile markets in two different countries, namely Turkiye and Jordan. For this purpose, Multi-Criteria Decision Making (MCDM) techniques are used to analyze electric vehicles (EV), fossil fuel vehicles (FF), and hybrid vehicles (HEV) for both countries, using the ANP method, which is considered according to many criteria.

1.1 Scope of the Thesis

Due to global warming and increased environmental awareness, there is a shift in the automotive sector from traditional vehicles to electric and hybrid ones. This trend has accelerated globally in recent years thanks to advances in battery technologies and investments in infrastructure. However, countries face numerous challenges in adopting these technologies. For example, Jordan and Turkiye's differing economic, social, and environmental conditions have been considered, which may lead to differences in user adoption of electric and hybrid vehicles. The infrastructure and regulations regarding the automotive sector in these two countries are summarized in general as follows:

In Jordan,

- The country relies heavily on oil imports, making cost one of the main barriers to the transition to electric and hybrid vehicles.
- The weak infrastructure for electric vehicle charging networks limits their spread.
- A need for incentive government policies to encourage consumers to use these cars.

In Turkiye,

- Turkiye has an emerging automotive industry and is focused on developing local production of electric cars, but it faces challenges in local and international marketing.
- Environmental policies may be more advanced, but their implementation depends on government support and market acceptance.

This study aims to comparatively analyze the automotive markets in Jordan and Turkiye and assess the differences between consumer preferences for electric and hybrid cars using MCDM techniques. To this end, alternatives will be compared and

ranked based on various criteria, including cost, energy efficiency, sustainability, and carbon emissions. The aim is to conduct an objective comparison using an analytical methodology that will contribute to providing recommendations that will support decision-makers in both countries.

1.2 Objectives of Thesis

1. Evaluate consumer preferences among different vehicle types (electric, hybrid, conventional) in the Jordanian and Turkish markets based on the identified primary and secondary criteria.
2. Analyze the criteria affecting vehicle type selection decisions using AHP and ANP methodologies, and identify significant differences between the results of the two methods and the impact of interdependencies between the criteria.
3. Analyze the differences between the Jordanian and Turkish markets in the adoption of different vehicle types, identifying the factors influencing these differences (such as infrastructure, government policies, and consumer preferences).
4. Identify the critical criteria influencing the automobile purchase decision-making process, analyzing the relative importance of each primary and secondary criterion in both countries.
5. Provide practical recommendations to policymakers, manufacturers, and consumers based on the analytical findings, to promote the transition towards sustainable transportation systems.
6. Enrich the academic literature in the field of MCDM analysis and its applications in the automotive sector, particularly in emerging markets.

1.3 Research Questions

The Main Question of the study is:

"What are the factors and their weights on purchasing trends in the automobile market in Jordan and Türkiye, and what is the order of preference for FF, EV, and HEV vehicles in both markets?"

Based on the main question, this study answers the following subquestions:

- How do the results of evaluating car types differ when applying the AHP method compared to the ANP method?
- How do the interdependencies between selection criteria (such as the relationship between marketing and market size) affect the final results in both methodologies?
- Which sub-criteria are most influential in determining the preference for each car type in both markets?
- How do consumer priorities differ between Jordan and Turkiye regarding the following criteria: cost, features, marketing, and market size?
- What are the main factors that explain the disparity in electric car adoption between the Jordanian and Turkish markets?
- How can the superiority of certain car types in specific criteria (such as safety or operating cost) be explained in the analysis results?

1.4 Significance of the Study

1.4.1 Theoretical and Academic Significance

- It provides a contribution to the field of MCDM research through the comparative application of the AHP and ANP methodologies in the context of sustainable transportation.
- It fills a research gap in the study of emerging automotive markets, particularly in the Middle East (Jordan) and Turkiye, where comprehensive studies in this field are scarce.
- It enriches the academic literature with an integrated methodological framework that can be applied in similar studies in other markets.

1.4.2 Practical Significance for Manufacturers and Automotive Companies

- It provides strategic insights that help manufacturers understand consumer preferences and adapt their products to the characteristics of each market.
- It provides accurate data on the critical factors in purchasing decisions (such as cost, safety, and infrastructure), which helps in developing effective marketing plans.
- It highlights opportunities for product improvement and service development (such as after-sales services) to enhance competitiveness.

Significance for Policy and Government Decision Makers are:

- It provides a scientific basis for developing policies that support the transition to sustainable transportation.
- Identifies key obstacles (such as lack of infrastructure) that require government intervention in emerging markets.
- Provides indicators to measure the effectiveness of current and proposed government incentives to promote the adoption of eco-friendly vehicles.

1.4.3 Importance to Consumers

- Provides a scientific framework to help consumers make more informed purchasing decisions based on a systematic analysis of various criteria.
- Illustrates the trade-off between initial cost and long-term operating costs of different vehicle types.
- Increases awareness of the advantages and disadvantages of each vehicle type in the local context of each country.

1.4.4 Economic Importance

- Analyzes the factors affecting the economic feasibility of investing in different vehicle types.
- Provides insights into the economic impacts of the shift toward electric vehicles on related sectors (such as energy, maintenance, and infrastructure).
- Contributes to forecasting future market trends in the region.

1.5 Summary

This chapter provides an overview of the thesis study and the importance of choosing electric and hybrid cars according to multiple criteria, in addition to the objective of the topic. This chapter also identified the study questions that will be answered later.

2 LITERATURE REVIEW

In this chapter, a brief review of the literature on EVs and Multi-Criteria Decision Making (MCDM) is given.

2.1 Electric Vehicles

Hybrid electric vehicles will be the most favourable vehicles in the next decades (Waseem et al., 2023) and have the benefits of high energy depletion and waste reduction rate (Bai & Liu, 2021; Husseinet al., 2024) since the fuel is immediately transferred into electrical power (Obileke et al., 2021). In HEVs, the major goal to minimize the cost is to enhance the energy usage and enhance the kinematic performance of the vehicle (Thompson et al., 2018).

The utilization of EVs has been extremely appealing all over the world (Nykvist & Nilsson, 2015). There are basically three types of EVs: the first is the HEV, which relies on both a motor and a battery; the second type is the plug-in HEV, where the battery can be charged either from the motor itself or from an external source; and the third type is the EV, which relies entirely on the battery and can be charged from an external source.

In terms of mechanical connections and energy regime, HEVs can be divided into three categories: series, parallel, and power split. All these types are depicted in Figure 2.1, Figure 2.2, and Figure 2.3 (Qin et al., 2020).

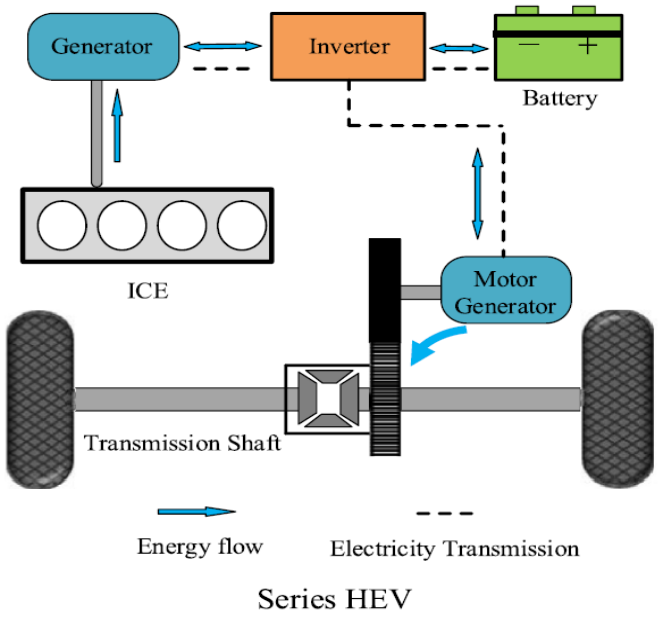

Figure 2.1: Series HEVs set up (Qin et al., 2020).

Figure 2.1 illustrates that series HEVs utilize an electric engine as the initial energy source (Qin et al., 2020). The ICE is not immediately connected to the output column in this design. The battery is charged using ICE and runs the electric engine through a generator. This setup is utilised in almost all EVs with extended range.

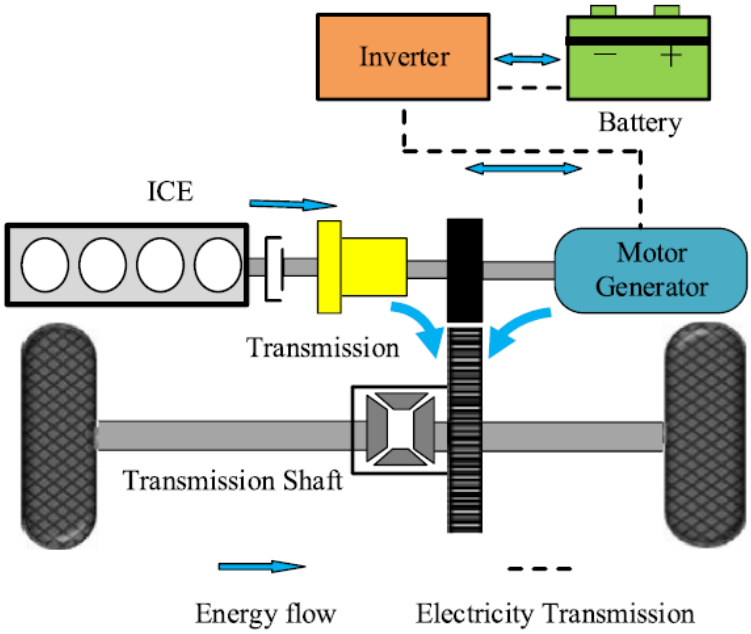

Figure 2.2: Parallel HEVs set up (Qin et al., 2020).

Parallel HEVs characterize a design where the ICE operates along with the electric engine (see Figure 2.2). Both ICE and engine (if adequate energy is obtainable) can drive the automobile either separately or in integration of both. This parallel HEV structure is widely used because the energy regime configuration is similar to that of a conventional automobile, and the budget is lower than that of other regimes (Qin et al., 2020).

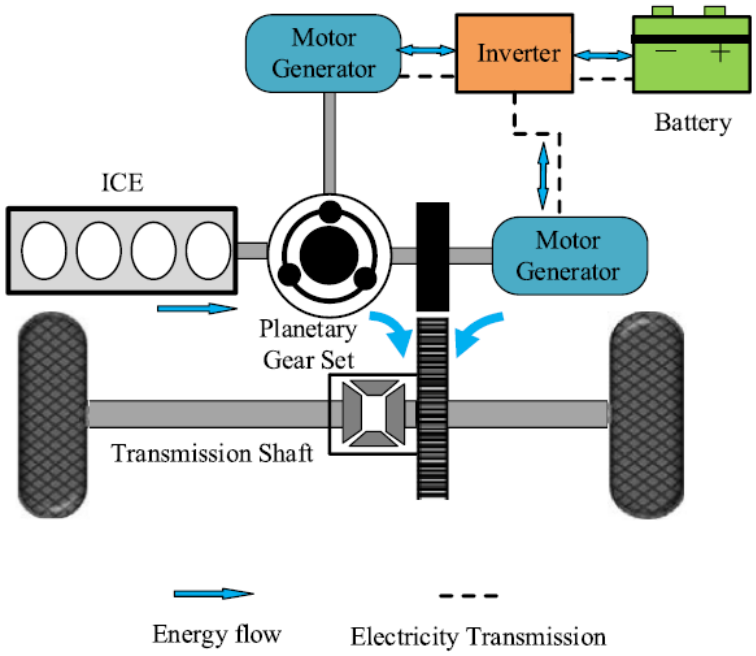

Figure 2.3: Power-split HEVs set up (Qin et al., 2020).

The final type, which is named "power-split HEVs", is illustrated in Figure 2.3. The disconnection of electrical and mechanical power, and the separation between the ICE and the automobile powertrain, is the most prominent feature of this system that allows the ICE to operate more efficiently (Qin et al., 2020).

In terms of sustainability and minimizing energy depletion and reducing CO_2 emissions, over the last decade, countries around the world have developed EVs based on various renewable and innovative energy sources. For instance, hydrogen, natural gas, biogas, biofuels based on biogas and ethanol, biodiesel, and methanol. Based on these energy sources, EVs can be categorized as: (1) Battery Electric Vehicle (BEV), (2) Hybrid Electric Vehicle (HEV), (3) Plug-in Hybrid Electric Vehicle (PHEV), and (4) Fuel Cell Hybrid Electric Vehicle (FCHEV).

1. BEV is an automobile operated by a battery with no ICE, and the majority are immediately driven by an engine. The storage capacity of BEVs' battery is, in general, higher than 100kWh, and it requires an external energy source for the charge process (Cuma et al., 2015). The BEV costs more and has fewer safety issues due to its higher battery storage capacity.
2. HEV refers to cars based on oil and electricity, utilizing a conventional ICE and electric motor as the power sources. Some engines have been modified to use substitute fuels, such as ethanol. The battery's capacity is extremely small and is only used for starting, stopping, accelerating, and decelerating. It cannot be charged from an external source and is mainly powered by ICE (Mahmud et al.,2019).
3. PHEV is considered the integration of a conventional ICE vehicle and a BEV. Compared with the typical HEV, the PHEV has a larger energy storage capacity. This can be operated with stored energy charged from the grid. Compared to the conventional ICE car and BEV, the ICE and its battery are smaller (Lü et al., 2020). In PHEV, two kinds of power and motors are available: the engine and the battery pack. It is important to distribute the power between the two types of energy to increase fuel economy and ensure longer battery life. PHEV charging is grid-based, so they can be in all-electric mode (Barmaki et al., 2016)
4. The fuel cell-EV type is basically similar to the popular EV in the energy conversion and control regime; the main difference is the working concept of the power cell (Lu et al., 2018), and powered by PEMFC. The reaction mechanism of PEMFC is that chemical energy in petroleum is immediately transformed into electric power with no burning, but by chemical reaction (Devi et al., 2018; Molavian et al., 2018). In fact, it is the reverse of the process of water electrolysis, which produces water and releases electricity through the electrochemical reaction of hydrogen (H_2) and oxygen (O_2). In this operation, only water and heat are discharged (Wang et al., 2018; Chen et al., 2019). Therefore, PEMFC technology is one of the most promising clean energy technologies in recent years. It is ideal for electric vehicles (Alves et al., 2016).

The classification, benefits, drawbacks, and typical utilizations of EVs are shown in Table 2.1. Innovative HEVs based on PEMFC seem to be the most favourable EVs in the future (Ramadhani et al., 2019; Çabukoglu et al., 2019; Chen et al., 2019). PEMFC

has advantages such as clean and environmental protection, fast start-up, and short refuelling time (Kolli et al., 2019). On the other hand, the output qualities of PEMFC are approximately soft, and its dynamic response capacity is weak; therefore, it has no ability to recover the electrical power of engine braking feedback (Lipman et al.,2018).

Table 2.1: Properties of different types of vehicles (Lü et al., 2020)

Types	Main power system	Advantages	Disadvantages	Typical applications
BEV	Battery	Relatively mature technology; Easy charging; Pollution-free	Long charging time; Short battery life; High cost and low economic benefit; Short service time	Tesla Model-S; BMW i3; Benz EQC
HEV	Gasoline + battery	Long endurance; Convenient energy supply; Long battery life; Recoverable energy	A small amount of pollution; Long-distance driving does not save fuel	LEXUS NX; Toyota Prius
PHEV	Gasoline + battery	Easy charging; Little pollution; Good driving experience	Complex structure and configuration; Higher cost than BEV	Audi A3 E-Tron; BWM 530Le
FCHEV	FC + SC/battery	Pollution-free; Higher energy efficiency; Run smoothly and no noise.	Immature technology; High cost and low security	Benz F-Cell; Toyota FCHV

2.2 Worldwide EV Development

In recent years, significant progress has been made in all-electric vehicle technology (Chen & Song, 2019). Global sales of electric vehicles from the China Industrial Economy Information Network for the years 2009-2018 are shown in Figure 2.3. It can be said that the global sales of electric vehicles have shown an almost exponential development. Especially in recent years, sales in China have exceeded fifty percent of the total. The increasing sales of electric vehicles have also led many researchers to prioritize research in this area (Li et al., 2019; Machura and Li, 2019; Limmer, 2019).

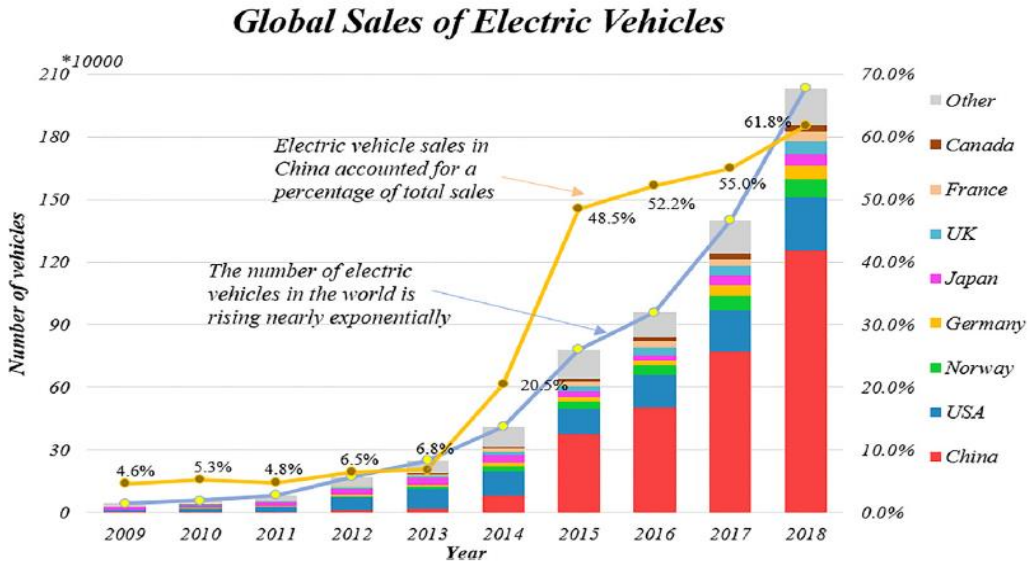

Figure 2.4: Sales growth of EVs in the recent decade (Lü et al., 2020)

Figure 2.5 shows the growth of ICE and EV sales over the past decade, with the latter growing much faster than the former, and the government motivating companies and users to turn their attention to EV production and purchase. Especially in 2014 and 2015, the Chinese government introduced economic and policy subsidies for new EVs, which led to the rapid growth and popularization of new EV brands in China. Based on the current development directions, it is almost certain that EVs will follow a similar development pattern globally in the coming decades (Lü et al., 2020)

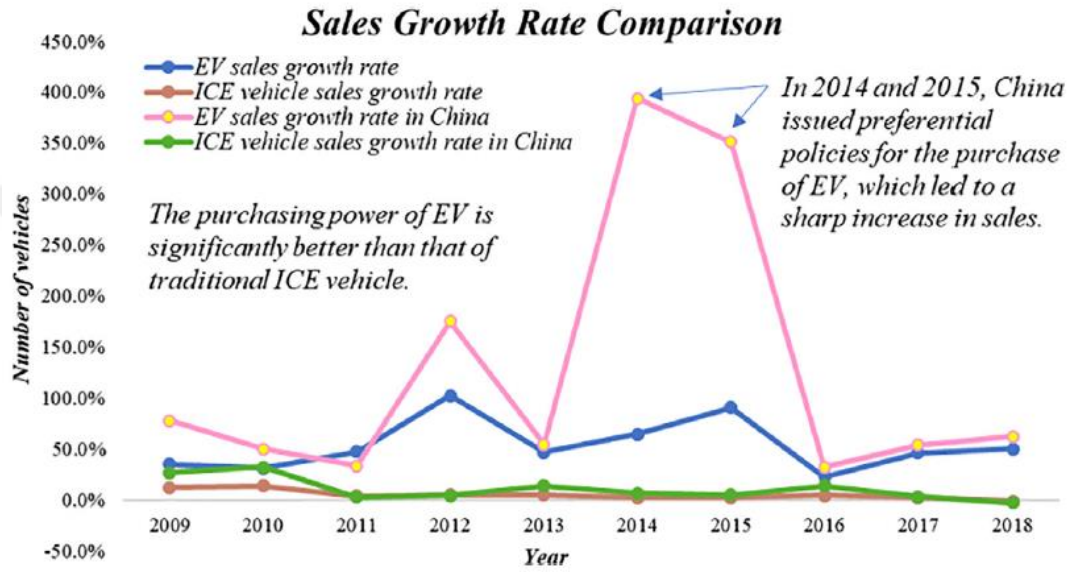

Figure 2.5: The growth of Chinese sales rate and the worldwide (Lü et al.,2020)

2.3 A Brief History of EV and HEV Development

The EV was first invented in 1834 (Gopal et al., 2018), and several companies tried to develop EVs with highly developed techniques, especially in America, Great Britain, and France. However, the technical limitations of batteries and the rapid improvement of the ICE automobile led to the disappearance of EVs by the 1930s. Since the beginning of the 21st century, due to carbon emissions and the growing phenomenon of global warming, electric cars have regained popularity and demand. The main reason for this is the fact that they are considered to be environmentally friendly and carbon free cars. Since then, many models of electric vehicles have been produced.

As for the HEV, Germany produced the first HEV in 1898, called the Lohner Electric Lounge Chair. Porsche used an ICE to power the dynamo that generated energy for

the HEV. This HEV could travel nearly 40 miles on battery power alone. In 1903, Krieger built an HEV that used a gasoline engine to charge a battery. Based on the Pieper patents, commercial automobiles were produced by a Belgian company between 1906 and 1912 (Chan et al., 2007). In 1904, Ford addressed the problems associated with the ICE, such as noise, vibration, and bad odor, and produced a cheap, lightweight HEV.

Flute filed a patent for an oil EV in 1905. Flute's idea was to use an EM as an auxiliary to the ICE, which could reach speeds of 25 miles per hour. Other attempts to produce HEVs were made in the 1970s.In 1997, Toyota innovated the first HEV called Prius. This achievement charmed novel interest in this innovation. Honda Insight was the second HEV offered in America. Since then, approximately every other vehicle manufacturer has offered an HEV in their product line (Ehsani et al., 2021)

2.4 Multi-Criteria Decision Making (MCDM)

MCDM techniques are approaches used to find compromise solutions to conflicting criteria. This approach is suitable for evaluating the performance of different types of electric vehicles. Choosing an electric vehicle is a difficult and complex process for buyers, as each model differs in terms of factors such as driving range, battery capacity, and charging time (Ecer, 2021).

In many domains, decision makers (DMs) must solve problems in a systematic, precise, and reliable way according to their personal preferences. MCDM addresses complex challenges, depending on the solution techniques chosen by DMs. Because of these advantages, MCDM is widely used in fields such as management, economics, medicine, the environment, and energy (Mardani et al., 2015). MCDM is primarily used to enhance the quality, efficiency, rationality, and clarity of decisions. Because each problem requires a specific solution, MCDM is particularly useful in this area.

One of the main areas in which MCDM has been applied is renewable energy sources (RES). In a study conducted by Lee and Chang (2018), many MCDM methods were used to prioritize and recommend a suitable RES to be implemented in Taiwan. Additionally, integrating MCDM can increase opportunities for DMs to achieve robust results. The advancement of MCDM in renewable energy sources (RES) is mainly due

to increased investments in RES as a solution to the depletion of the global fossil fuel supply.

MCDM can also be used in the selection of suppliers in the production, manufacturing, and other related areas. Industrial practitioners consider this methodology an important procedure to produce high-quality products and promote sustainable development. In addition, Kamari et al. (2020) affirmed MCDM as a reliable and effective tool to support policy decisions to reach the most proper solution. For instance, in a study, the proposed model combines a large number of MCDM methodologies to support the selection of green suppliers (Zhang et al., 2017). It was confirmed that the proposed model offers valuable support in solving complex problems.

In the field of transportation, MCDM is proposed as an effective measure of passenger loyalty in public transportation of Tehran (Nassereddine and Eskandari, 2017). In this study, the authors proposed an innovative transportation policy to reduce the private vehicles crossing the streets during rush hour, thus avoiding traffic congestion and motivating people to use public transportation. In another study, Kiani et al. (2018) used the MCDM method to evaluate the performance of bus rapid transit systems to improve customer satisfaction with the transportation mode.

MCDM methods can be broken down into two classes (Singh, et al., 2014; Penades et al., 2016), namely Multi-Attribute Decision Making (MADM) and Multi-Objective Decision Making (MODM). In MADM, DMs select, categorize, or prioritize a limited number of alternatives and then obtain the best solution. MADM has three key methods called pairwise comparison, outranking, and distance-based approaches. Pairwise comparison basically involves evaluating and comparing the significance of numerous criteria depending on a basic scale. Pairwise comparisons are often used Analytical Hierarchy Process (AHP) and Analytical Network Process (ANP). Meanwhile, the outranking method provides numerous alternatives and examines whether one alternative characterizes a level of control over another (Penades et al., 2016). These methods are particularly suitable in situations of uncertainty and insufficient information (Kangas et al., 2001). As shown in Figure 2.6, some superiority methods, such as ELECTRE and PROMETHEE are widely used in different areas (Brans, 2005). Each technique has unique properties and can be applied to a wide range of areas of interest.

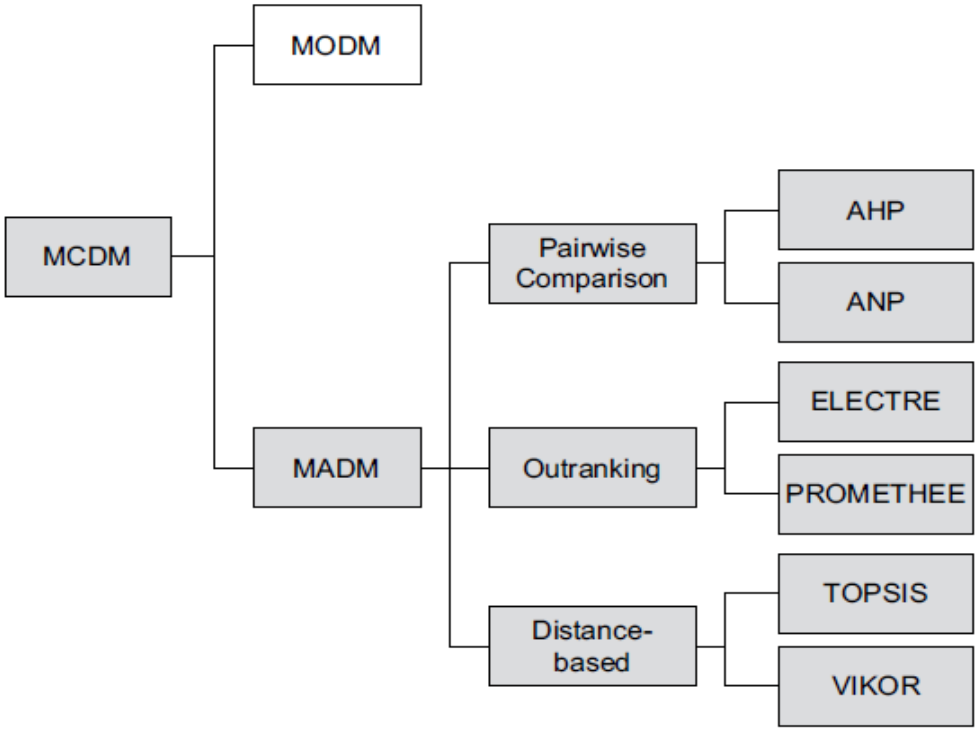

Figure 2.6: MCDM techniques (Azhar et al., 2021)

2.4.1 Analytical Hierarchy Process (AHP)

DMs usually encounter challenges when selecting the best solution to achieve their aims. To address this issue, Saaty (1987) suggested AHP, whose wide guidelines include the problem of decision-making, the components or criteria related to his/her aims, and the alternative resolutions.

The major benefits of AHP are represented by its ease of usage and scalability, since the weights can be computed via utilizing Internet software, comprising MakeItRational, Transparent Choice, SpiceLogic, Decerns MCDA, MATLAB, R, and Super Decisions, or by utilizing an Excel template. (Goepel, 2013). The entire hierarchy composition demonstrates the significance of each component (criteria and alternatives). Since it is appropriate for simple problems, AHP is a suitable and straightforward method. Nevertheless, AHP (Mu & Pereyra-Rojas, 2014) selects between (5- 9) components (criteria) depending on Saaty's scale of significance.

Despite the limitation of the number of hierarchy levels in AHP, the same capacity limit should be followed to avoid establishing a huge hierarchy composition (Mu & Pereyra-Rojas, 2014). The authors in another study (Asadabadi et al., 2019) stated that

the majority of firms think AHP isn't preferable due to its disability to offer good rankings with a few number of selections.

2.4.2 Analytical Network Process (ANP)

To address these challenges and difficulties, researchers have proposed using ANP as an extension of AHP (Saaty, 1999). The network structure of ANP allows decision-makers (DMs) to make decisions in complicated situations (Penadés et al., 2016). Unlike AHP, the components (decision criteria and alternatives) in ANP are independent of one another. However, for some real-life problems, interactions and dependencies between upper- and lower-level components are essential. In these cases, ANP is more effective than AHP because it establishes a relational dependency between the components.

Nevertheless, ANP demands long brainstorming sessions and requires significant experience among the people who will execute the technique. Another obstacle is the complex structure of ANP that demands the utilization of more software, as Super Decisions, Expert Choice, and Decision Lens.

2.5 Previous Studies in the Field of EV Purchase Intentions

Performance assessment of EVs has been very common in recent years with the development electric car market. The literature review introduced in this study showed a very small number of studies relevant to the transportation literature related to the performance assessment of EV models.

Gökgöz and Yalçın (2022) conducted a study aimed at illustrating the EVs sold to European clients. The popularity of EVs adoption as a green alternative is increasing in the European region. With the rise in various models, there have been several EV alternatives for clients, which meet several criteria when choosing one. An EV selection depends on several technical factors, including cost, range, and capacity of battery. MCDM methods can solve several competing criteria. To achieve this, the entropy-integrated TODIM technique has been used to assess the top 10 EVs performance. According to the findings of the TODIM technique, the Tesla Model 3 is shown to have the best performance among EVs, while small-sized hatchbacks showed approximately the worst performance compared to other EVs. In addition,

electric range is revealed to be the highest impact criterion to select an EV. Furthermore, increasing the electric range can lead to a significant increase in sales.

Ecer (2021) evaluated the EVs' performance by utilizing several MCDM methods. Ecer (2021) used acceleration, cost, battery, and range as technical criteria to assess EVs. Cost, payload, and energy depletion are revealed to be the three most significant criteria to select an EV. Tesla Model 3 showed that it is the most preferable alternative among the assessed EVs (Ecer, 2021).

Sonar and Kulkarni (2021) assessed the EVs sold in India through a mixed method. They choose driving range, battery capacity, cost, torque, seating capacity, and charging period to assess the performance. They utilize the AHP-integrated MABAC technique to assess EV models. They first found the criteria weights using the AHP method. They executed the EV performance assessment by the MABAC method, which is one of the innovative MCDM methods. They inferred that the Hyundai Kona showed the best performance among EVs in India.

Ziemba (2021) evaluated the EV market in Poland using numerous MCDM methods. They identified several technical criteria as acceleration, capacity of battery, charging period, energy depletion, cost, torque, maximum velocity, and cargo volume. Ziemba (2021) showed that all verified MCDM techniques referred to Volkswagen Id 3 and Nissan Leaf. These are revealed to be the best-performing EVs in Poland. Ziemba (2021) also inferred that the findings of MCDM techniques exhibited significant harmony.

Biswas and Das (2019) assessed the EVs performance via the MABAC technique. They utilize energy depletion, cost, maximum velocity, acceleration, and range as technical criteria. They used mixed MCDM method to assess EVs. At first, they identified criteria weights via the fuzzy AHP techniques. Then, they utilize the MABAC method to assess several EVs. It has been revealed that the Hyundai Ioniq showed higher performance than others.

Prakash and Mohanty (2017) evaluated the performance of 50 green vehicles via the Data Envelopment Analysis (DEA) using the following inputs: GHG emit, braking, driving quality, acceleration, turning circle, and seating capacity. Outputs are torque

and miles/gallon. They select the output-oriented BCC model to identify the green vehicles' efficiency level.

Więckowski et al. (2024) offered a novel method by combining Ranking Comparison and predicted solution point Stable Preference Ordering Towards Optimal Solution techniques. This mixed method integrates personalization into multi-criteria assessment, serving the individual's favourite. By presenting client preferences via two distinct scales, the suggested method ensures personalized advice complies with decision-makers' requirements. The mixed model efficiency is verified by applying it to the electric vehicle selection problem. The validation operation shed light on possible variations in comparison to other multi-criteria methods. Developing a client preference-based method for more precise and personalized selection advice.

Gomes et al. (2023) introduced a mixed MCDA method, integrating two robust approaches, namely AHP and PROMETHEE, into a guideline to help any person who desires to select EV via a multicriteria framework. A survey was conducted to identify the criteria that are relevant to a private individual when selecting an electric vehicle. The method is validated against the available alternatives for the EV selection problem. The authors presented a case study in which the suggested method—utilizing both quantitative and qualitative criteria—helps decision-makers select an EV from a group of alternatives they have investigated, affirming the significance and relevance of supporting the decision-making process.

3 MCDM APPROACH FOR EV MARKET SHARE ANALYSIS

This study is based on the MCDM methodology, applying both AHP and ANP to compare the performance of electric, hybrid, and conventional automobiles in the Jordanian and Turkish markets. Primary data was collected through surveys specifically designed for each method, including a sample of experts and specialists in the automotive sector in both countries. The theoretical framework for the research involves sequential methodological steps, beginning with defining the main and sub-criteria such as market size, cost, marketing, features, and other criteria, followed by establishing the hierarchical and network structure of the decision, and culminating in data entry and analysis using SuperDecision software. The analysis included pairwise comparisons between criteria and alternatives, verifying the consistency of the results by calculating the Consistency Ratio (CR) in the AHP method and by ensuring the convergence of the matrices in the ANP method.

Our approach takes into account the differences between the Jordanian and Turkish automotive markets in terms of infrastructure, supporting policies, and consumer habits, revealing the unique structure of each market. Comparing the results of the two methods (AHP and ANP) provides insights into the impact of interdependencies between criteria on final results, adding analytical depth to the study.

3.1 MCDM Methodology for Automobile Market Share Analysis

The main flowchart of the approach used in this study is shown in Figure 3.1. It is based on quantitative assessments obtained through surveys consisting of users, suppliers, technical personnel, and vendors as data sources, as well as expert opinions. After selecting the objective, experts were asked questions based on a five-point Likert scale to determine effective criteria and sub-criteria for selecting hybrid and electric vehicles. The reliability of the survey was investigated using Cronbach's alpha. Paired comparisons are used to determine the relative importance of each criterion and sub-criterion, and multiple surveys were prepared. Due to the large number of questions, only five experts from each factory answered the Saaty scale-based

surveys. The proportion of incompatible surveys and their relative weights are measured using the Super Decisions program. The inconsistency of each pairwise comparison and its relative weights are calculated using the Expert Choice program for AHP techniques and the Super Decisions program for ANP techniques. All collected data are obtained through expert consensus.

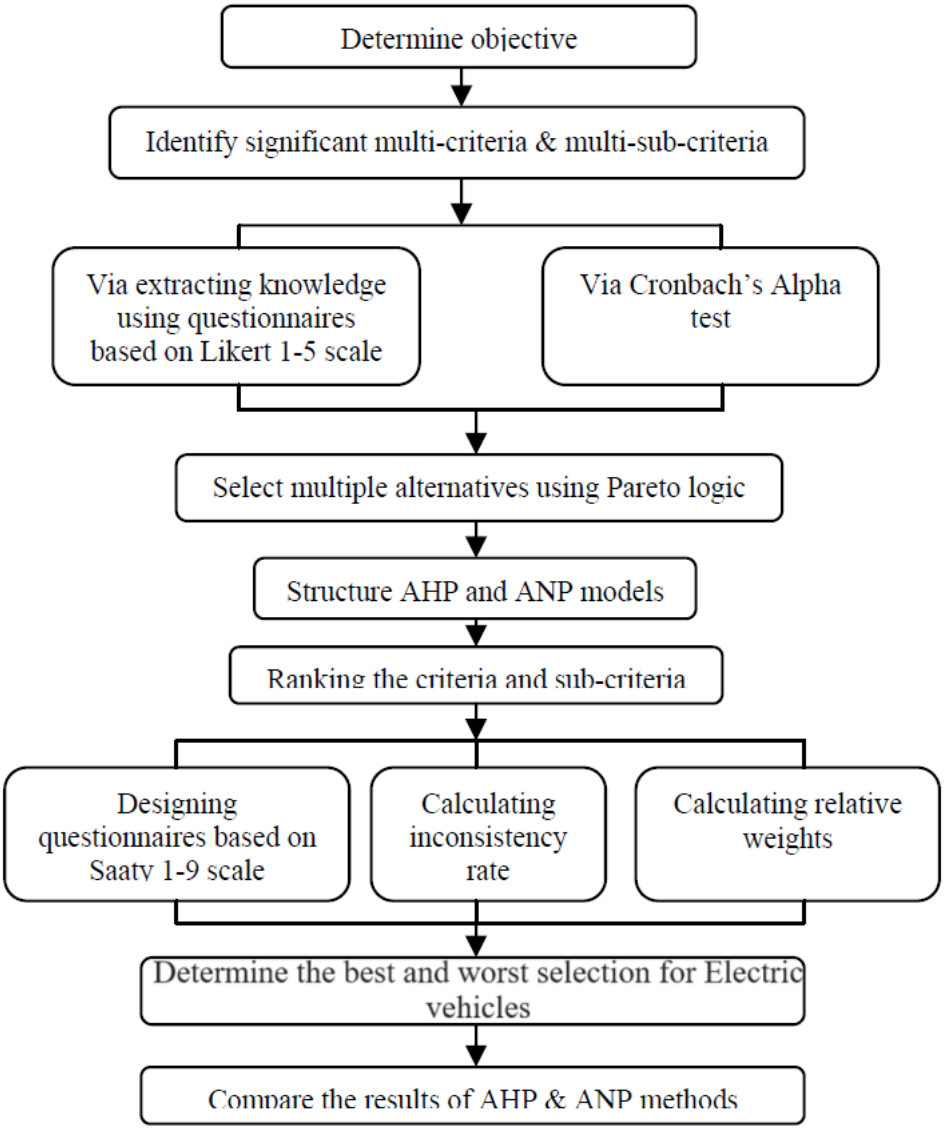

Figure 3.1: Steps of proposed method

3.1.1 Analytic Hierarchy Process Method

AHP first breaks down difficult and complex problems into simpler ones and then solves them, placing criteria at the first level and sub-criteria at subsequent levels. According to Saaty (2008), to set priorities in a structured manner, decisions should be made as follows:

1. The problem and goal should be identified appropriately.
2. Numerous criteria and alternatives must come from a certain issue.
3. The issue must be organized hierarchically as illustrated in Figure 3.2, where the purpose of the decisions is located at the top, followed by the criteria at the mid-level and the hierarchy structure, often including a group of alternatives at the lowest level. A pairwise comparison matrix can be constituted by comparing the levels from top to bottom. The basic scale of significance is used to determine the criteria weights in the pairwise comparison.

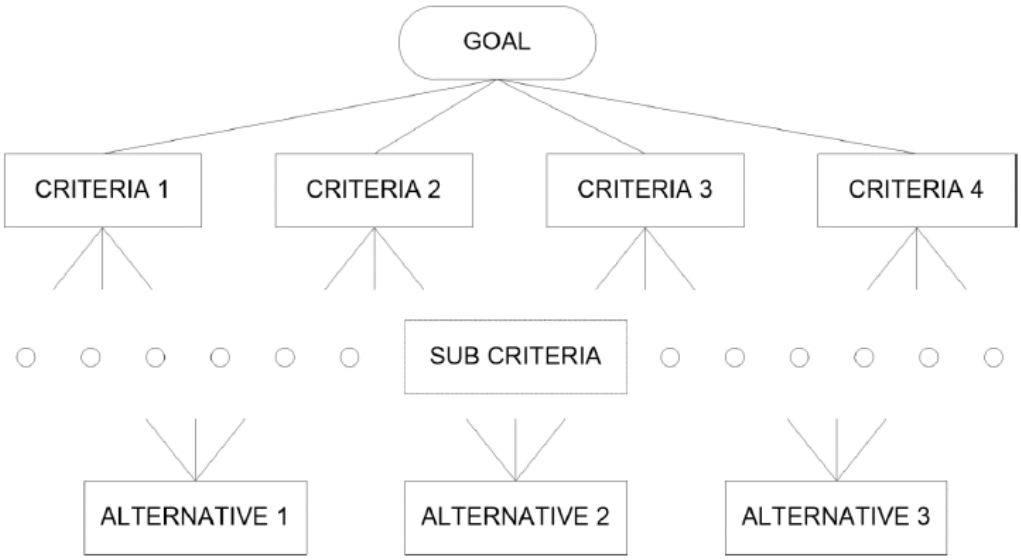

Figure 3.2: Hierarchy structure (Azhar et al., 2021)

The significance scale is illustrated in Table 3.1.

Table 3.1: Significance scale (Azhar et al., 2021)

Scale of Importance	Definitions	Explanations
1	Equally Significant	Equality of two values
3	Slightly Significant	The value is slightly important than the other
5	More Significant	The value is preferable than the other
7	High Significant	The value is strongly preferable than the other
9	Very High Significant	The value is preferable than the other
2,4,6,8	Values between 1,3,5,7,9	According to explanations in 1,3,5,7 and 9

To assess the consistency of the assessment, the ratio of consistency (CR) is computed by dividing the consistency index (CI) by the random index (RI). The CR value calculated must be lower than ten percent. If this ratio is overrun, then the step should be repeated to enhance consistency.

3.1.2 Analytic Network Process Method

ANP is an MCDM approach proposed by Saaty (2004) for MCDM issues. This method correlates the various levels of decision-making: decision criteria and sub-criteria, and alternatives (Gencer et al., 2007), with no goal node. It is actually a generalization of AHP. The major hypothesis in AHP is that the relationship among the decision levels is unidirectional and hierarchical. But numerous decision issues cannot be constituted as AHP, since there are internal and external relationships and inter-relationships between components in the decision levels. In ANP, the relative importance weights are measured through paired comparisons and scale 1 to 9 (Asan et al., 2009).

The structural differences in ANP and AHP are clearly visible in Figure 3.2, with clusters representing decision levels and solid links representing interactions between these levels. The orientaion of brackets illustrates the dependencies and loops illustrate the interdependency of component in each cluster.

Figure 3.3: (a) Hierarchical, (b) network structure

The basic components of the ANP model, cluster structure, inner and outer dependencies, are shown in Figure 3.4. In ANP, the main components, i.e., criteria, sub-criteria, and alternatives, are represented by nodes that can be compared to determine their correlation. Unlike AHP, the alternatives in ANP are independent of the criteria weights. ANP also offers features that allow the alternatives to influence the order of the criteria.

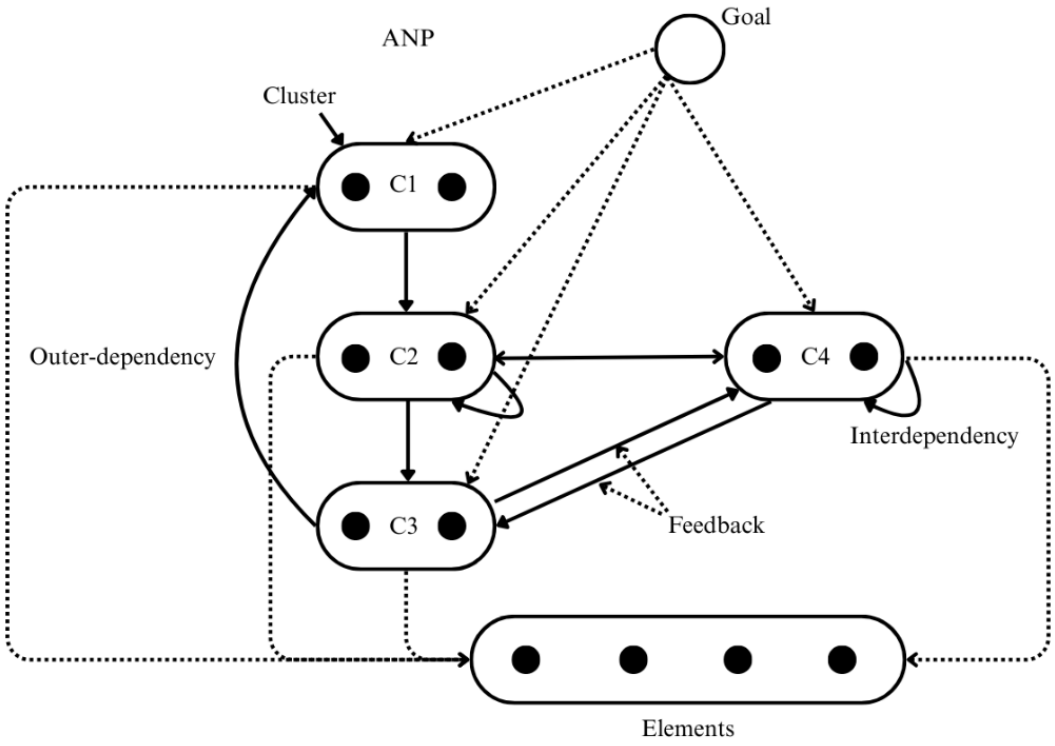

Figure 3.4: Structure of the Analytic Network Process

An ANP model is established in four steps as follows (Gorener et al., 2021):

1. The problem must first be configured as a network.
2. Pairwise comparisons are made.
3. A super matrix is structured (very similar to a long-term Markov Chain transition matrix).
4. Criteria are combined with the alternative priorities, and the most suitable alternatives are selected. One advantage of ANP over AHP is that it does not require independence among components due to its network structure.

ANP can improve the precision and efficiency of predictions by improving priorities through feedback. However, ANP may not support uncertain data. Due to its complexity, ANP also requires additional software, which can increase the time required to solve problems. Some programs available for ANP include ANP Solver, Super Decision, and other math programs such as Excel, Maple, and Mathematica.

To represent correlations and interactions between decision levels in the ANP method, a superscript matrix is used to determine the relative importance of criteria and prioritize alternatives. A supermatrix is a matrix partitioned into smaller matrices, with each entry representing the relationship between two decision levels (two sets) within the overall decision problem.

However, a supermatrix is the collective impact of the components of one cluster on the components of another cluster via a priority vector, which is an eigenvector of a paired comparison matrix (Gencer et al., 2007). In a supermatrix, when paired comparisons among elements of the decision levels are entered and the sum of a column exceeds one, an unweighted supermatrix is formed. To compute the limit matrix in the next procedure, the sum must be changed to 1.

The next procedure is to multiply the weight of each cluster by the weight of the components of that cluster. This gives the priority of one component among the whole clusters. Finally, to determine the final prioritization of the alternatives and identify the relative importance of the decision criteria and problem solving, the weighted matrix can be obtained as long as the limited matrix is obtained (Asan et al., 2009).

3.2 Identifying Criteria and Sub-criteria

The evaluation of alternatives is structured according to the type of fuel they use, classified into criteria and sub-criteria determined to reflect the common operational realities of Jordan and Turkiye. These criteria provide a systematic framework for evaluating each alternative, enabling a balanced analysis of potential advantages, limitations, and long-term effects. A network-based structure has been adopted to ensure that each criterion contributes independently to the overall decision framework. The criteria and sub-criteria used in the ANP method are presented in Table **3.2**.

Table 3.2: The criteria and sub-criteria determined in this study

Criteria	Sub-criteria	Description
1 Alternatives	EV	Electrical vehicles
	HEV	Hybrid electrical vehicles
	FF	Fossil fuel vehicles
2 Marketing	Discounts	
	Frequency	
	Social media	
	Reviews	
	Customer service	The level of satisfaction of consumers has had from previous experiences with electric or hybrid vehicles.
	Brand Recognition	
3 Characteristics	Safety	
	Appearance	
4 Current market size and share	Number of dealerships	Distribution and locations of car dealers in a specific area
	Annual growth	Annual growth rate of electric and hybrid cars
	Current prevalence rate	Percentage of electric and hybrid cars in the current market
5 Cost	Fuel cost	Expresses the amount of energy (electricity or fuel) that a vehicle consumes to travel a distance per km
	Maintenance	Expenses required to operate and maintain the vehicle
	Vehicle price	Cost of buying an electric or hybrid car

3.3 Steps of the Analytic Hierarchy Process

AHP, developed by Saaty in 1977, is a handy way to break down complex decisions into more manageable parts. It organizes the problem into a clear hierarchy, starting with the main goal, then the criteria that influence the decision, and finally the different options or alternatives. There's a straightforward flow from the overall goal down to the specifics. To figure out which criteria and options matter most, you compare each pair at every level using a scale from 1 to 9. Here, 9 shows one option is extremely more important than the other, while 1 means they are equally important. When you've done these pairwise comparisons, the results are put into a matrix. This matrix helps analysts calculate relative weights for each criterion. But the success of AHP relies heavily on making consistent judgments. To check if your ratings are reliable, a Consistency Ratio (CR) is calculated. A CR below 0.1 is generally considered acceptable. If it's higher, it might mean your comparisons are inconsistent, maybe because of subjective biases or guesses. In such cases, it's a good idea to go back and review the comparisons to make sure everything lines up. There are many detailed studies and resources available on how weights are calculated and how CR is determined like Albayrak and Erensal (2004), Borajee and Yakchali (2011), Görener (2012), Rao (2013), and the original works by Saaty from 1977 and 1987, among others.

Steps for implementing the AHP method using SuperDecisions are explained below.

Step 1: Setting up the Hierarchy Structure

1. Select "*Hierarchy Model*" to use the AHP method.
2. Enter the basic elements:
    - *Goal*: Add the goal (e.g., "*Choose the best car brand in Jordan*").
    - *Criteria*: Add the criteria from the table (i.e., current market size, cost, marketing, characteristics, and others).
    - *Subcriteria*: Add them under each primary criterion (e.g., under "*Cost*" add "*Car Price"* and "*Fuel Cost per 100 km*").
    - *Alternatives*: Add the options (i.e., EV-Jordan, HEV-Jordan, FF-Jordan).

Stage 2: Performing Pairwise Comparisons

1. Comparing the primary criteria:

   Select *"Pairwise Comparisons"* and then compare the primary criteria against the goal using a 1-9 scale. For example, *"Is the current market size more important than cost?"*. If the importance is medium, choose a value of 3.

2. Comparison of sub-criteria:

   Repeat the comparisons for the sub-criteria under each main criterion (e.g., compare "*car price*" and "*fuel cost*" under the "*cost*" criterion).

3. Comparison of alternatives:

   Compare the alternatives (EV, HEV, FF) for each sub-criterion (e.g., which car is better in terms of "*car price*"?).

Stage 3: Consistency Check - Calculate the Consistency Ratio

- After each comparison, the program will calculate the CR.
- Ensure that the CR is ≤ 0.1 to accept the results. If it is higher, adjust the comparisons.

Stage 4: Calculate Weights and Priorities

1. Generate weights:

   Click "*Compute*" to automatically calculate the relative weights for the criteria and alternatives.

2. View results:

   Go to "*Results*" to view the final alternatives' priorities.
   Example: The results might show that "*EV-Jordan*" is the best based on the combined weights.

Step 5: Sensitivity Analysis

1. Test the impact of changes:

   Use "*Sensitivity Analysis*" to examine how the results would change if the criteria weights were different.

Figure 3.5 shows the criteria, subcriterial and alternatives defined in Superdecision software for comparison process between FF, HEV and EV in Jordan

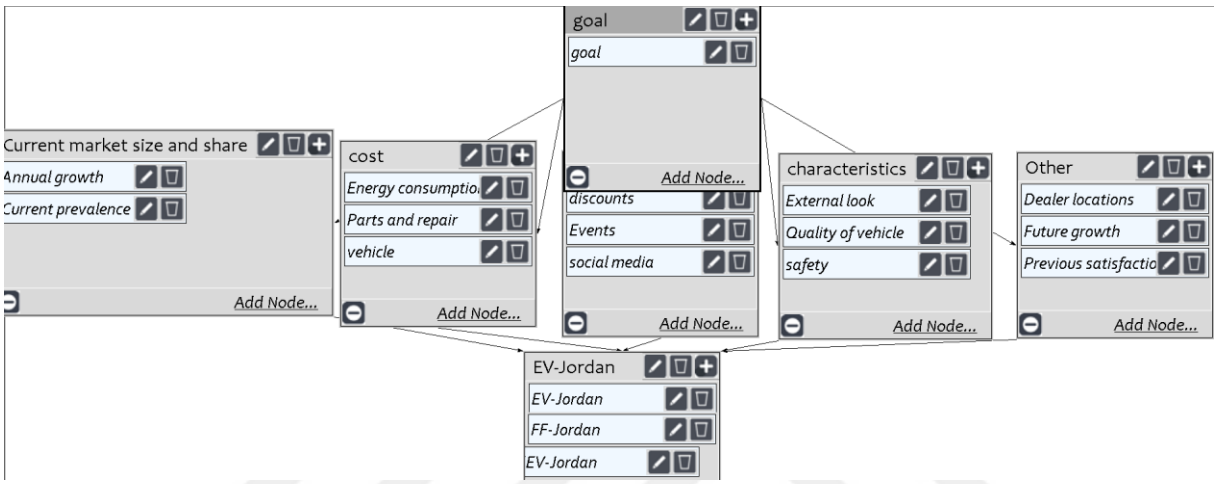

Figure 3.5: AHP model for vehicle selection in Jordan and Turkiye

3.4 Steps of the Analytic Network Process

The Analytic Network Process (ANP), which was introduced by Saaty in 1996, is a bit different from the more well-known Analytic Hierarchy Process (AHP). While AHP relies on the idea that criteria are independent of each other, ANP takes into account how criteria can influence one another, which makes it better suited for complicated, real-life problems. Instead of organizing everything into a strict hierarchy, ANP views the problem as a network of interconnected criteria and options, which are called elements, and groups of elements are called clusters. The process involves figuring out how elements influence each other, both within the same cluster and between different clusters. To do this, decision-makers compare pairs of elements using Saaty's familiar 1-9 scale. These comparisons help determine the priority of different options and are used to create an unweighted super-matrix. This matrix shows how much each element influences the others, with rows representing the influencing

element and columns the influenced one, all relative to a specific control criterion. Next, the unweighted super-matrix is adjusted by multiplying it with the weights assigned to each criterion, resulting in a weighted super-matrix. If no cluster comparisons are made, then all criteria are given equal importance. The weighted super-matrix is then repeatedly multiplied by itself until the values settle—this is called reaching convergence. Once stable, the final priorities are read from the normalized columns of the limit matrix. For more details on the theory and math behind ANP, see studies by Afzali et al. (2014), Huang and Yoon (2011), Saaty (1996, 2008), Saaty and Ozdemir (2005), Yang et al. (2008), and Yüksel and Dagdeviren (2007).

Steps for applying the ANP method using SuperDecisions software are:

Stage 1: Model Structure

1. Select "*Network Model*" to use the ANP method.
2. Enter the basic elements:
    - *Clusters:* Distinct groups of similar criteria
    - *Main criteria:* current market size, cost, marketing, characteristics, and other
    - *Alternatives:* EV-Jordan, HEV-Jordan, and FF-Jordan
    - *Elements:* Sub-criteria under each main group (e.g., under "*Cost*" add "*Car Price*, "Fuel Cost per 100 km")

Stage 2: Determine Relationships and Dependencies

Draw a network that shows the relationships between the criteria, sub-criteria, and alternatives as illustrated in Figure 3.5 and Figure 3.6.

1. Link Overlapping Elements:

   Link criteria that affect each other (e.g., "*Cost*" may affect "*Reviews*" under the "*Other*" group) and ensure that the alternatives (EV, HEV, FF) are linked to all sub-criteria.

2. Assign internal dependencies:

   Identify relationships between sub-criteria within the same group (e.g., "*Discounts*" might influence "*Social Media*" within the "*Marketing*" group).

Stage 3: Pairwise Comparisons

1. Perform comparisons using a 1-9 scale
    - For each sub-criteria, compare its impact on the other elements (e.g., compare "*Car Price*" and "*Fuel Cost*" in terms of their impact on the choice of alternatives).
    - Enter values according to relative importance (e.g., if price is more important than fuel, use a value of 3).
2. Evaluating alternatives:

    Compare the alternatives (EV, HEV, FF) for each sub-criteria (e.g., which car is safer?).

Stage 4: Creating Matrices and Calculations (SuperMatrix)

1. Create an "*Unweighted SuperMatrix*":

    The program will generate an unweighted matrix reflecting the results of the pairwise comparisons.
2. Convert it to a "*Weighted SuperMatrix*":

    Multiply the unweighted matrix by the weights of the criteria (if no weights are specified, the program assumes they are equal).
3. Calculate the "*Limit Matrix*":

    Raise the weighted matrix to a high power until the values converge (use "*Compute*" → "*Limit Matrix*").

Step 5: Extracting Results (Priorities)

1. Determine final priorities:
    - After convergence, the final columns will show the priorities of the alternatives for each criterion.
    - Use "*Results*" → "*Show Priorities*" to see the final ranking (e.g., which alternative—EV, HEV, FF—is the best according to the criteria).

2. Perform sensitivity analysis:

   - Use "*Sensitivity Analysis*" to examine the impact of changing the weights on the results.

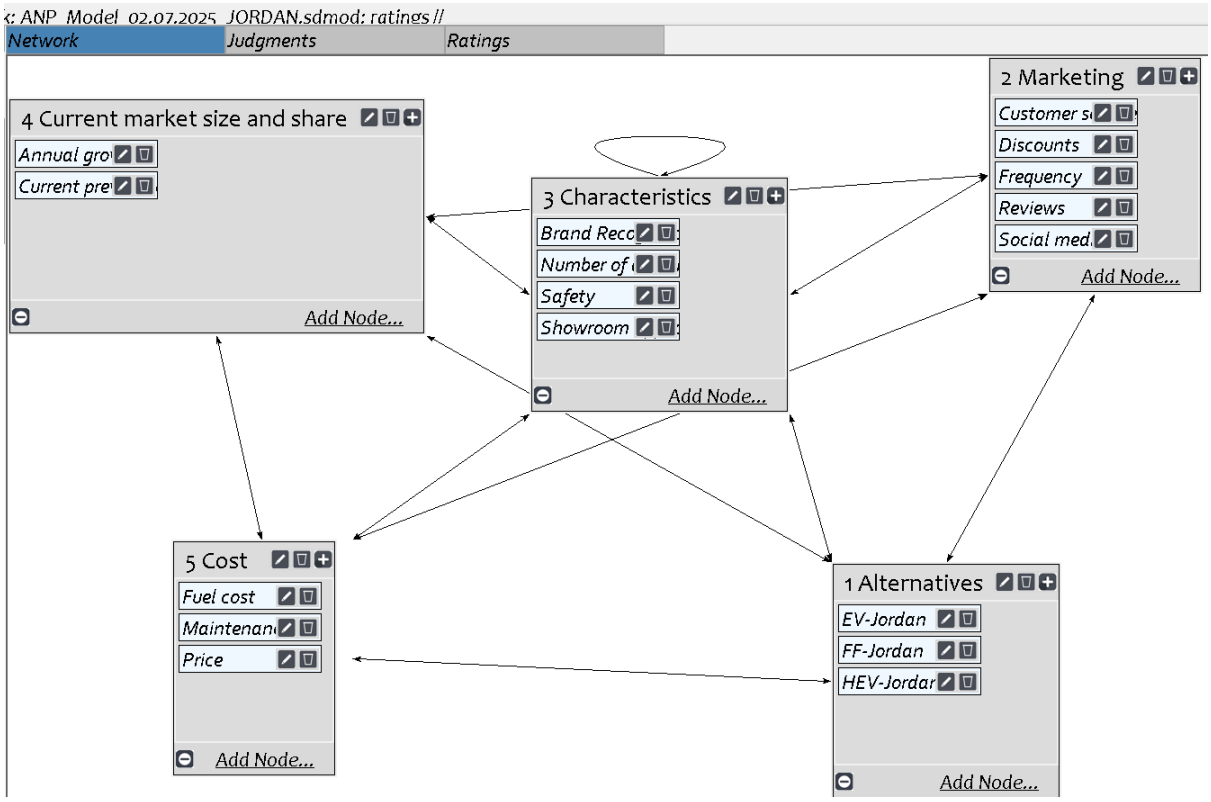

Figure 3.6: ANP model for vehicle selection

4 RESULTS AND DISCUSSION

This chapter presents the construction of the ANP model using Super Decision software, as well as the analysis of results obtained from expert surveys to determine the selection criteria priorities for HEV, FF, and EE in Turkiye and Jordan. It aims to determine the best ranking of alternatives according to the identified criteria and to conduct a comparative study of vehicle selection in Jordan and Turkiye. To accomplish this, the relative importance of the evaluation criteria was determined, as well as the prioritization of the alternatives.

4.1 Analysis of Jordan Survey Data

The relative weights are obtained through a questionnaire to a group of 10 experts in the field of automobile marketing in Jordan. Pairwise comparisons are made between the proposed evaluation criteria, relative weights are calculated, and priorities are set. Then the consistency ratio matrix is obtained. After obtaining the relative weights for each criterion, the relative weights of the criteria are synthesized to obtain the best alternative for cars in Jordan.

4.1.1 Priority of Alternatives in terms of Marketing Criteria

This section deals with the study of determining the priority of alternatives according to the main criterion “marketing”, which includes sub-criteria, namely customer service, reviews, social media, frequency, and discounts.

From Figure 4.1, it can be seen that the inconsistency ratio is 0.05, which is lower than 0.1. Also, the best alternative according to the customer service criterion is HEV-Jordan alternative by percentage 68.17%, followed by EV-Jordan alternative by 23.63%, followed by FF-Jordan alternative by 8.19%.

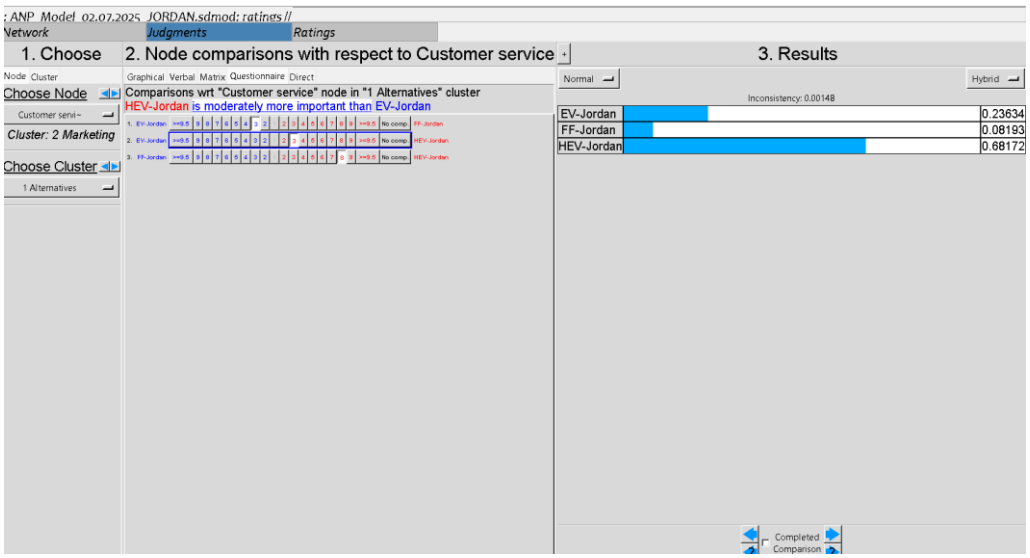

Figure 4.1: Priority of alternatives in terms of customer service criteria

Figure 4.2 shows that the inconsistency ratio is 0.05, which is lower than 0.1. Also, best alternative according to the discounts criterion is EV-Jordan alternative by percentage 59.36%, followed by FF-Jordan alternative by 24.93 %, followed by HEV-Jordan alternative by15.7% .

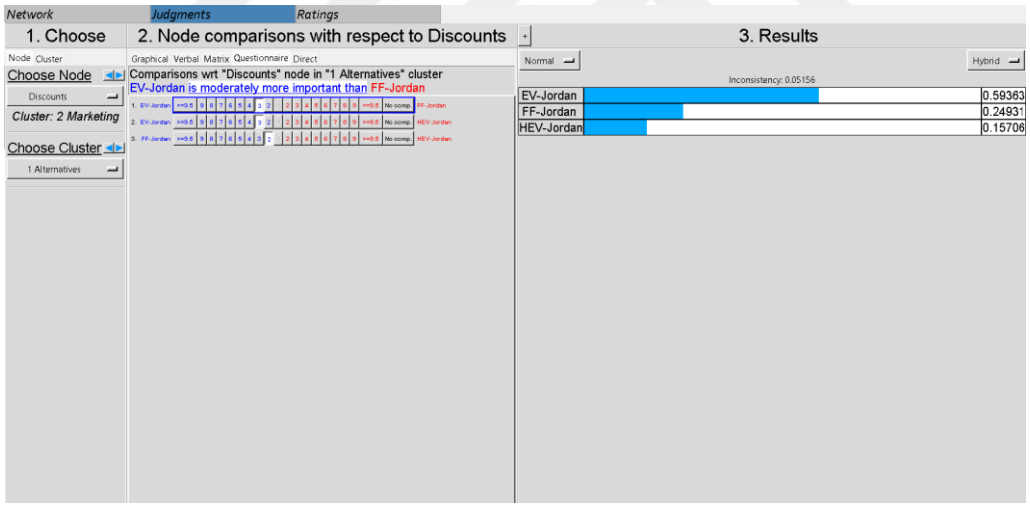

Figure 4.2: Priority of alternatives in terms of discount criteria

Figure 4.3 depicts that the inconsistency ratio is 0.05, which is lower than 0.1. Also, the best alternative according to the frequency criterion is EV-Jordan alternative by percentage 49.33%, followed by HEV-Jordan alternative by 31.08 %, followed by FF-Jordan alternative by19.58%.

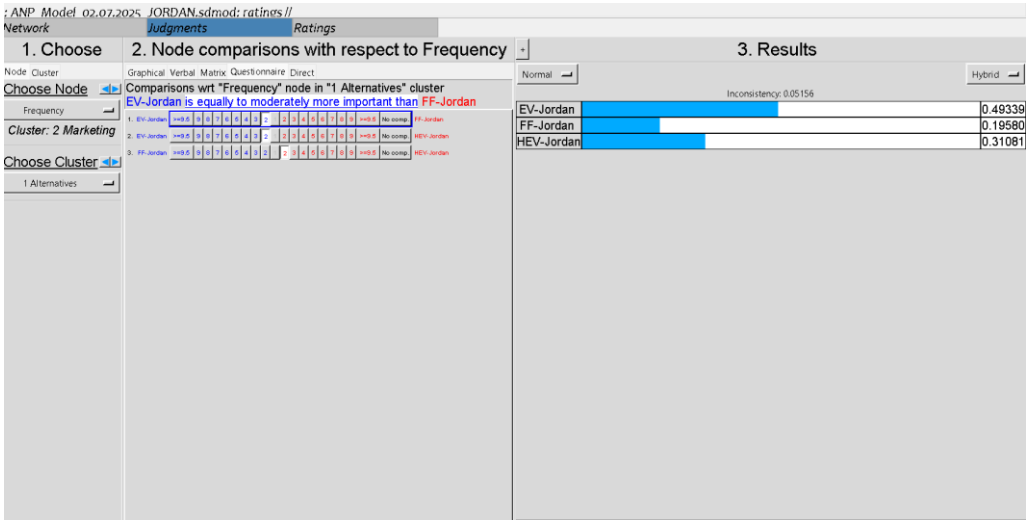

Figure 4.3: Priority of alternatives in terms of frequency criteria

Figure 4.4 depicts that the inconsistency ratio is 0.07, which is lower than 0.1. Also, the best alternative according to the reviews criterion is EV-Jordan alternative by percentage 61.44%, followed by HEV-Jordan alternative by 26.83 %, followed by FF-Jordan alternative by11.72 %.

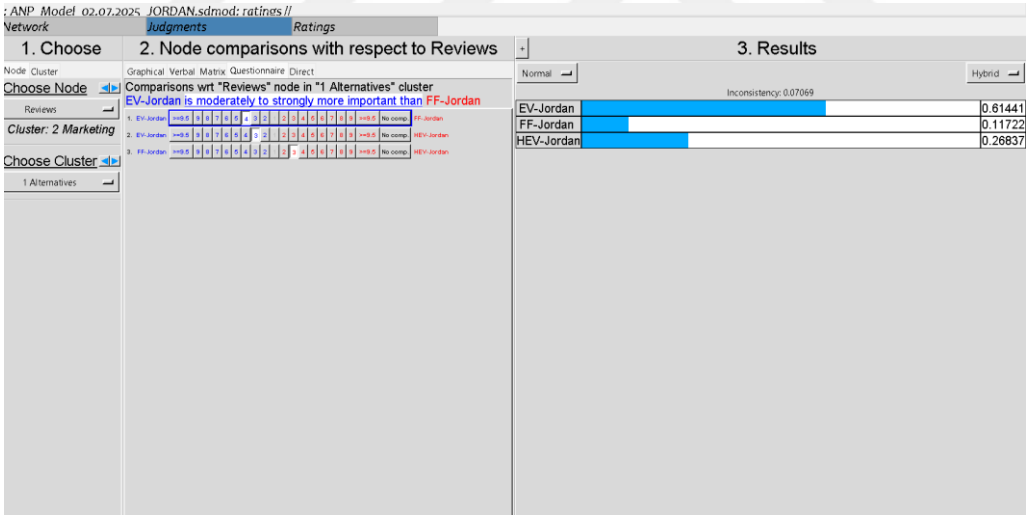

Figure 4.4: Priority of alternatives in terms of review criteria

Figure 4.5 shows that inconsistency ratio is 0.02 which is lower than 0.1 .Also, best alternative according to the social media criterion is EV-Jordan alternative by percentage 9.73%, followed by HEV-Jordan alternative by 33.3 %, followed by FF-Jordan alternative by11.72 %.

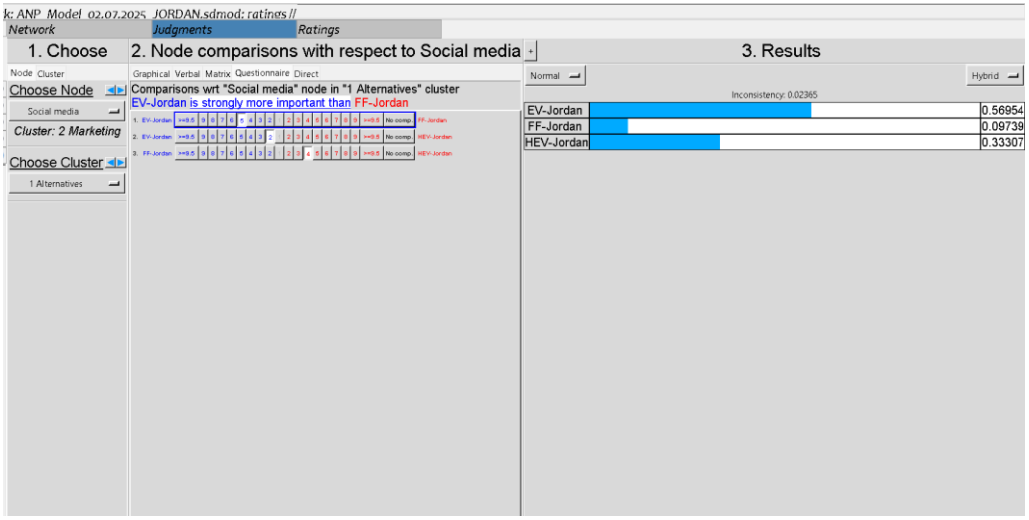

Figure 4.5: Priority of alternatives in terms of social media criteria

4.1.2 Priority of Alternatives in terms of Characteristics Criteria

This section addresses determining the priority of alternatives according to the main criterion "characteristics", which includes sub-criteria, namely: Brand recognition, safety ,showroom appearance, Numbers of dealer ships.

Figure 4.6 shows that inconsistency ratio is 0.008 which is lower than 0.1 .Also, best alternative according to the Brand Recognition criterion is HEV-Jordan alternative by percentage 53.96%, followed by EV-Jordan alternative by 29.7 %, followed by FF-Jordan alternative by16.34%.

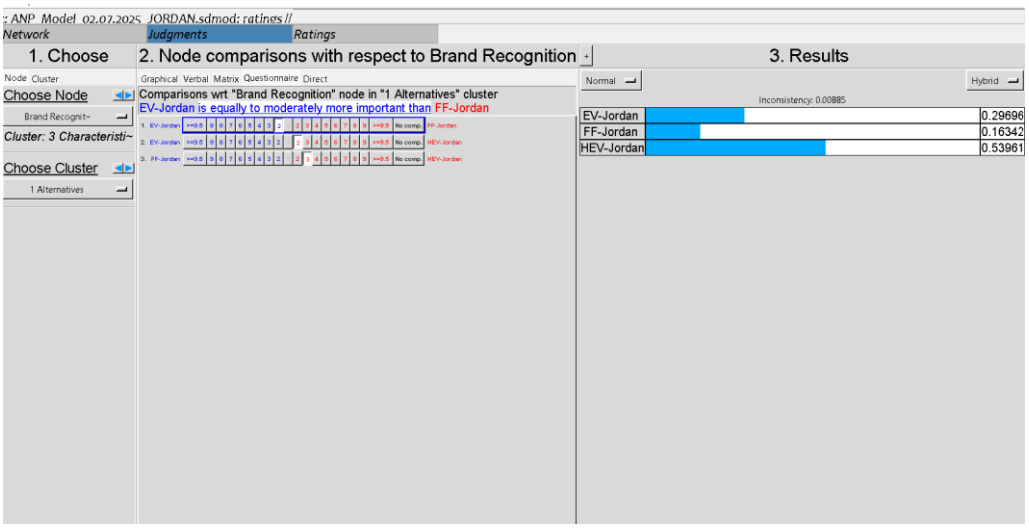

Figure 4.6: Priority of alternatives in terms of brand recognition criteria

Figure 4.7 shows that inconsistency ratio is 0.05 which is lower than 0.1 .Also, best alternative according to the Number of Dealerships criterion is EV-Jordan alternative by percentage 49.33%, followed by HEV-Jordan alternative by 31.1 %, followed by FF-Jordan alternative by19.58 %.

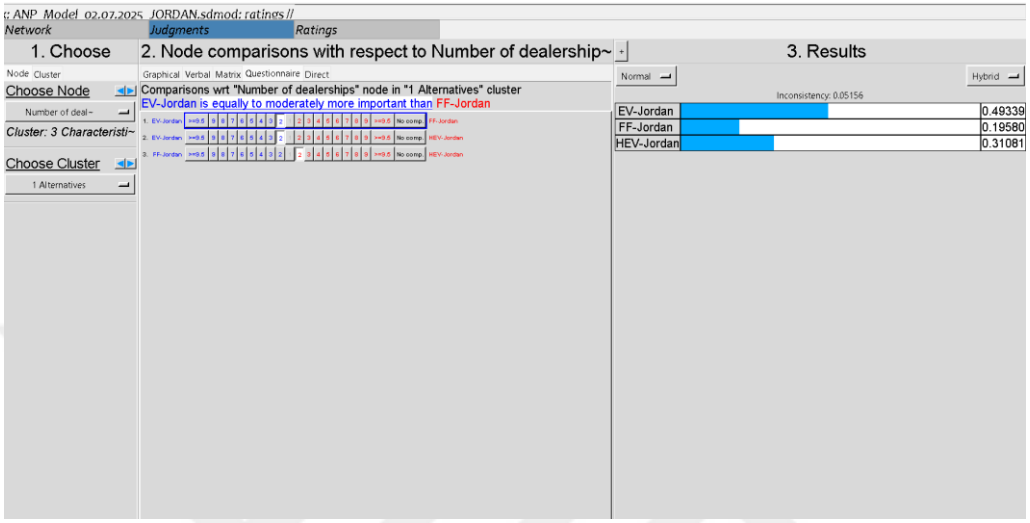

Figure 4.7: Priority of alternatives in terms of number of dealerships criteria

Figure 4.8 shows that inconsistency ratio is 0.01which is lower than 0.1 .Also, best alternative according to the Safety criterion is EV-Jordan alternative by percentage 55.84%, followed by FF-Jordan alternative by 31.96 %, followed by HEV-Jordan alternative by12.19 %.

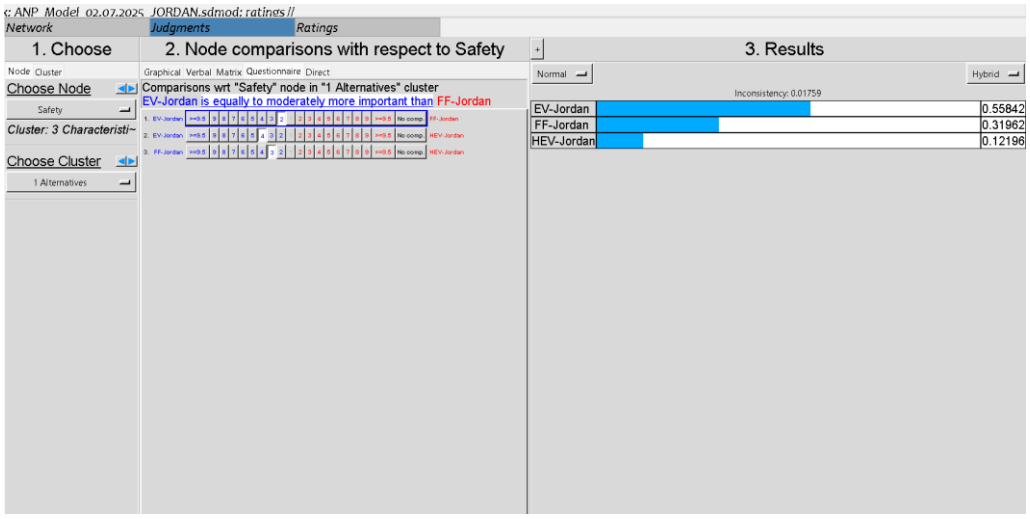

Figure 4.8: Priority of alternatives in terms of safety criteria

Figure 4.9 shows that inconsistency ratio is 0.08 which is lower than 0.1 .Also, best alternative according to Showroom Appearance criterion is EV-Jordan alternative by percentage 62.67%, followed by HEV-Jordan alternative by 27.7 %, followed by FF-Jordan alternative by9.6%.

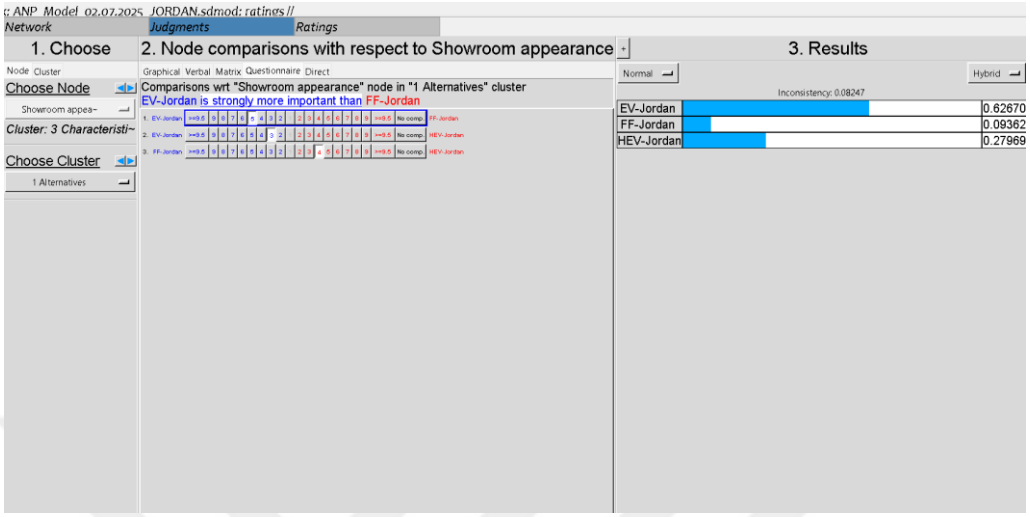

Figure 4.9: Priority of alternatives in terms of number of showroom appearance criteria

4.1.3 Priority of Alternatives in terms of Current Market Size and Share Criteria

This section addresses determining the priority of alternatives according to the main criterion "current market size and share", which includes sub-criteria, namely: Annual growth and current prevalence rate.

Figure 4.10 shows that inconsistency ratio is 0.01 which is lower than 0.1 .Also, best alternative according to the annual growth criterion is HEV-Jordan alternative by percentage 65.48%, followed by H EV-Jordan alternative by 24.98 %, followed by FF-Jordan alternative by 9.5 %.

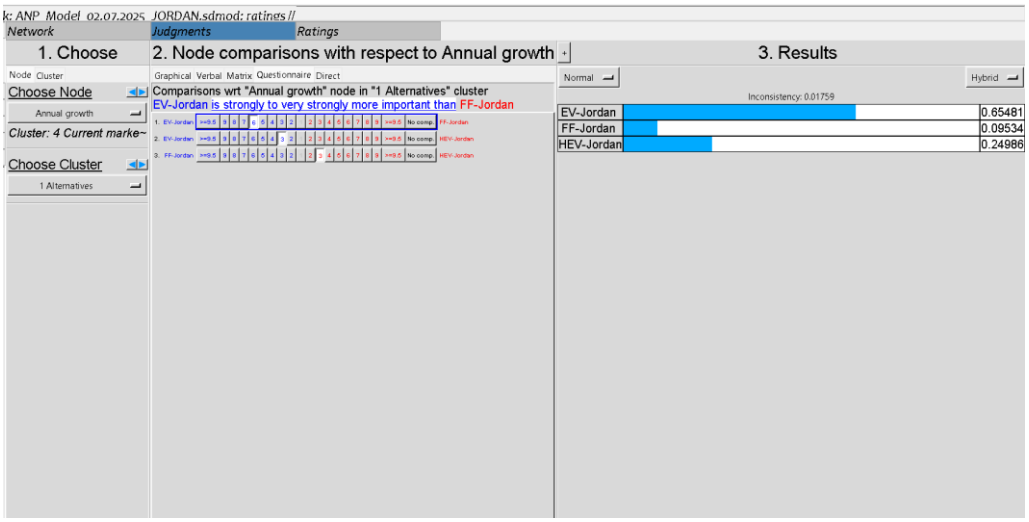

Figure 4.10: Priority of alternatives in terms of annual growth criteria

Figure 4.11 shows that inconsistency ratio is 0.01 which is lower than 0.1 .Also, best alternative according to the current prevalence rate criterion is EV-Jordan alternative by percentage 58.41%, followed by FF-Jordan alternative by 23.18 %, followed by HEV-Jordan alternative by 18.4%.

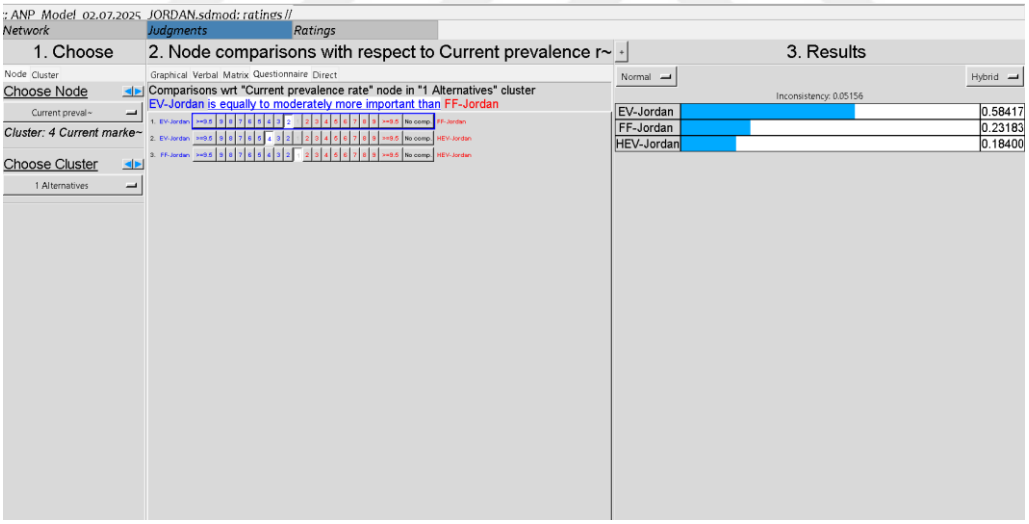

Figure 4.11: Priority of alternatives in terms of current prevalence rate criteria

4.1.4 Priority of Alternatives in terms of Cost Criteria

This section addresses determining the priority of alternatives according to the main criterion "cost", which includes sub-criteria, namely: Fuel cost, maintenance and price.

Figure 4.12 shows that inconsistency ratio is 0.05 which is lower than 0.1 .Also, best alternative according to the Fuel cost criterion is HEV-Jordan alternative by percentage 54.69%, followed by EV-Jordan alternative by 34.4 %, followed by FF-Jordan alternative by 10.85%.

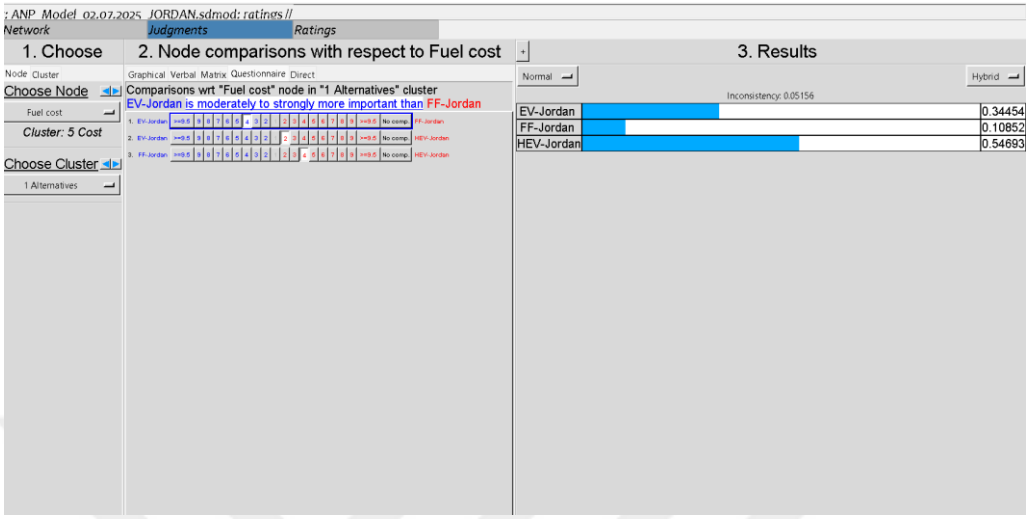

Figure 4.12: Priority of alternatives in terms of fuel cost criteria

Figure 4.12 shows that inconsistency ratio is 0.07 which is lower than 0.1 .Also, best alternative according to the maintenance criterion is EV-Jordan alternative by percentage 61.44%, followed by HEV-Jordan alternative by 26.8 %, followed by FF-Jordan alternative by 11.72%.

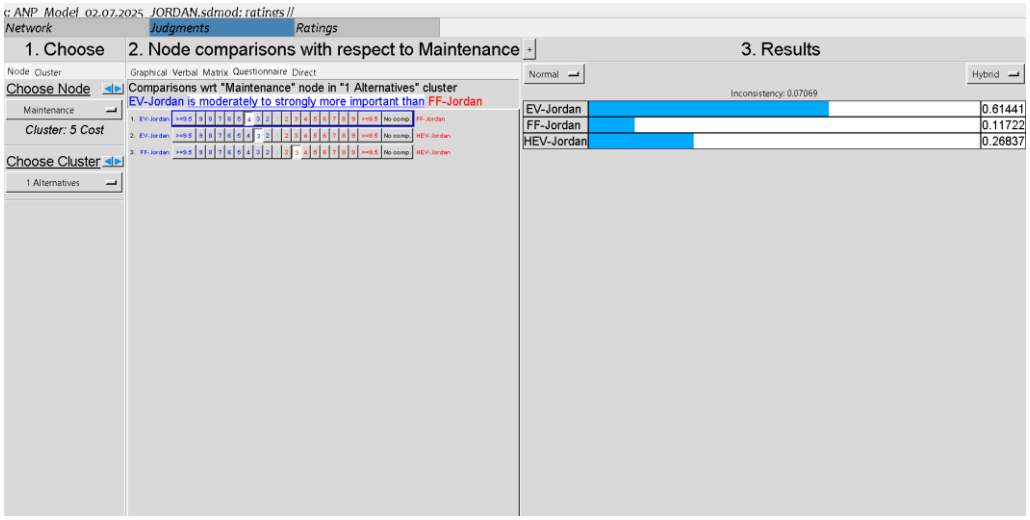

Figure 4.13: Priority of alternatives in terms of maintenance criteria

Figure 4.14 shows that inconsistency ratio is 0.07 which is lower than 0.1 .Also, best alternative according to the price criterion is EV-Jordan alternative by percentage 55.84%, followed by FF-Jordan alternative by 31.96 %, followed by HEV-Jordan alternative by 12.2%.

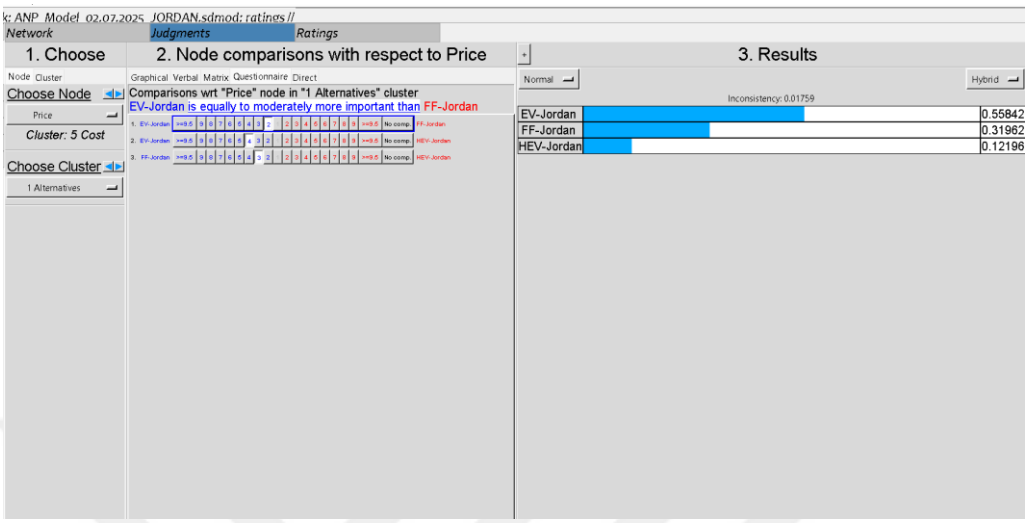

Figure 4.14: Priority of alternatives in terms of price criteria

4.1.5 Degree of Importance of Sub-factors in Alternative Selection

4.1.5.1 Degree of Importance of Sub-factors in FF-Jordan Selection

This section is concerned with identifying the most important criteria by arranging them in terms of their importance according to relative weight in FF-vehicle selection.

It is clear from the figure 4.15 that inconsistency ratio is 0.09 which is lower than 0.1. Also, the first factor, which is customer service, obtained the highest importance among the other main selection criteria, as it obtained a percentage 44.84%. Also, the criteria discounts ranked as second among other criteria by 24% and frequency criteria ranked as third by 13.11% while the criteria reviews and social media were ranked as fourth(6.9%) and fifth(8.4%) among other criteria, respectively.

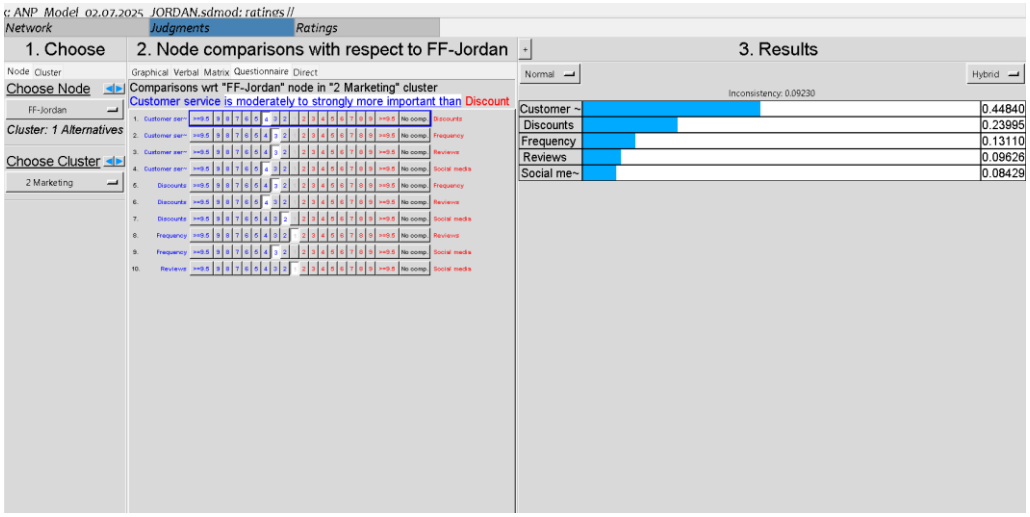

Figure 4.15: Importance of sub-criteria related to marketing for FF-jordan selection

It is clear from the figure 4.16 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 41%. Also, the criteria showroom appearance ranked as second among other criteria by 26.9% and safety criteria ranked as third by 21.19% while the criteria number of dealerships was ranked as fourth (10.9%) among other criteria, respectively.

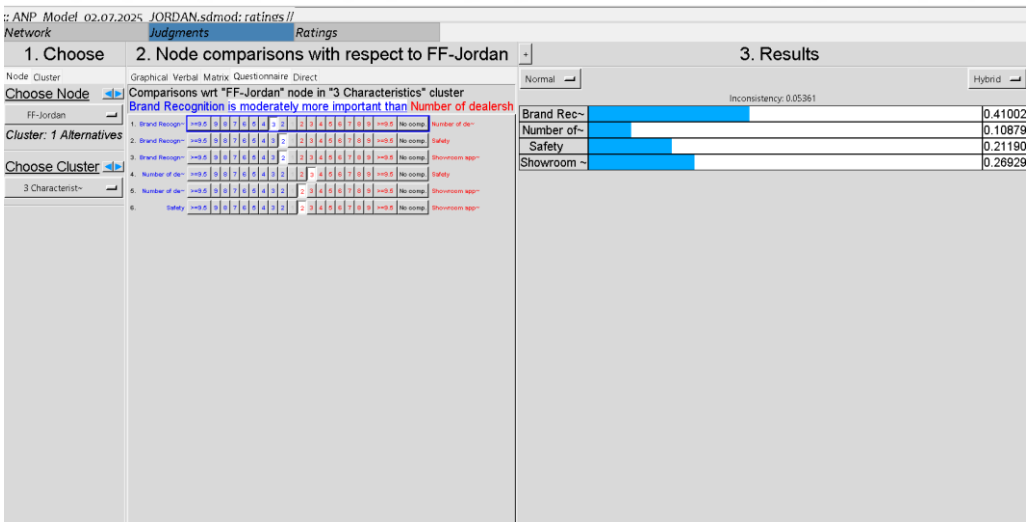

Figure 4.16: Importance of sub-criteria related to characteristics for FF-Jordan selection

It is clear from the figure 4.17 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is current prevalence rate , obtained the highest importance among the other

main selection criteria, as it obtained a percentage 75%. Also, the criteria annual growth ranked as second among other criteria by 25% .

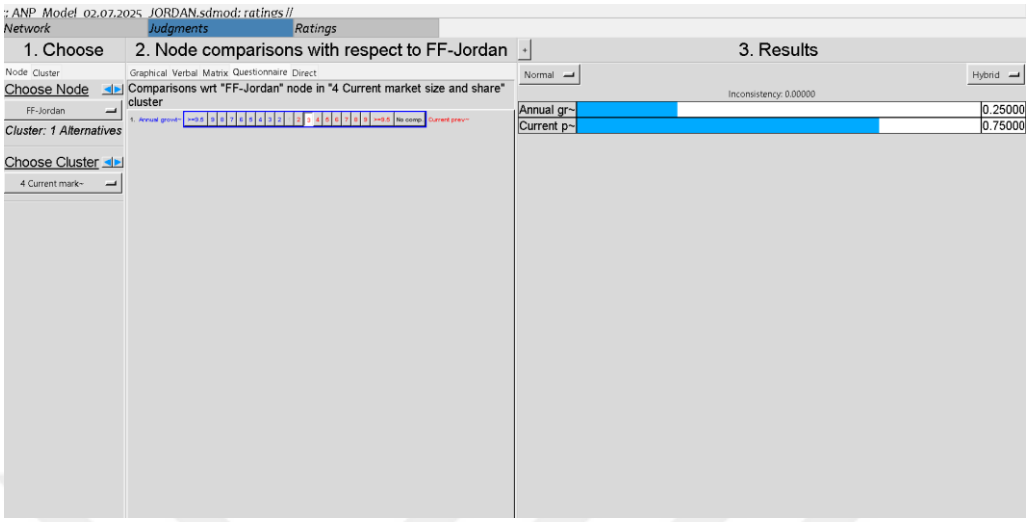

Figure 4.17: Importance of sub-criteria related to current market size and share for FF-Jordan selection

It is clear from the figure 4.18 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.96%. Also, the criteria price ranked as second among other criteria by 53.96% and fuel cost criteria ranked as third by 16.34%.

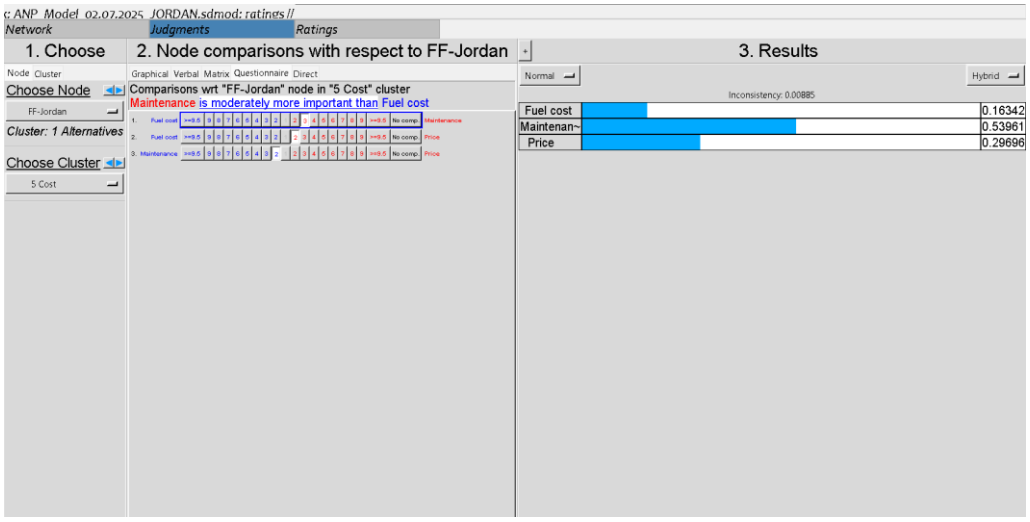

Figure 4.18: Importance of sub-criteria related to cost for FF-Jordan selection

4.1.5.2 Degree of Importance of Sub-factors in EV-Jordan Selection

This section is concerned with identifying the most important criteria by arranging them in terms of their importance according to relative weight in EV-vehicle selection.

It is clear from the figure 4.19 that inconsistency ratio is 0.08 which is lower than 0.1. Also, the first factor, which is customer service, obtained the highest importance among the other main selection criteria, as it obtained a percentage 40%. Also, the criteria discounts ranked as second among other criteria by 23.68% and frequency criteria ranked as third by 19.19% while the criteria social media and reviews were ranked as fourth(9.7%) and fifth(7.4%) among other criteria, respectively.

Figure 4.19: Importance of sub-criteria related to marketing for EV-Jordan selection

It is clear from the figure 4.20 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is safety, obtained the highest importance among the other main selection criteria, as it obtained a percentage 38.4%. Also, the criteria brand recognition ranked as second among other criteria by 34.95% and showroom appearance criteria ranked as third by 13.66 % while the criteria number of dealerships was ranked as fourth (12.97%) among other criteria, respectively.

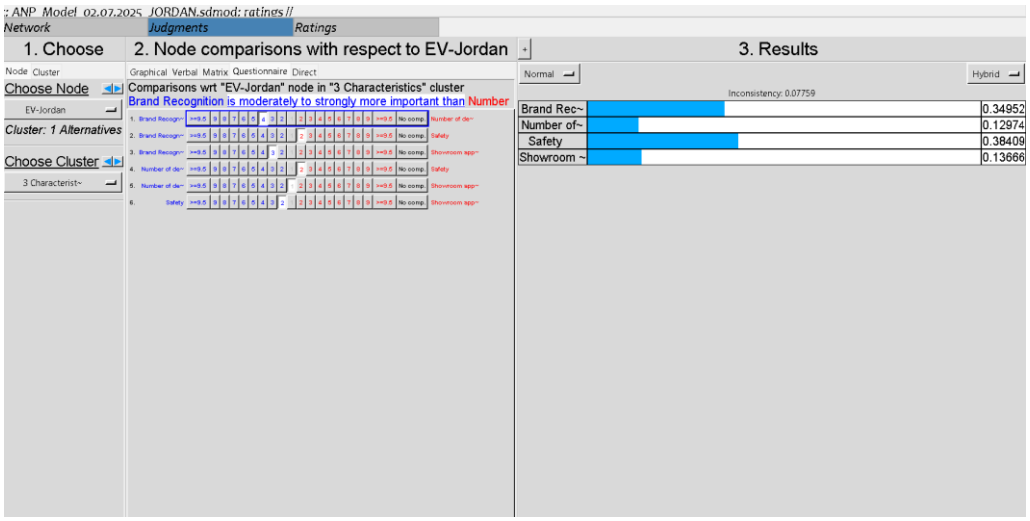

Figure 4.20: Importance of sub-criteria related to characteristics for EV-Jordan selection

It is clear from the figure 4.21 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is current prevalence rate , obtained the highest importance among the other main selection criteria, as it obtained a percentage 66.67%. Also, the criteria annual growth ranked as second among other criteria by 33.33% .

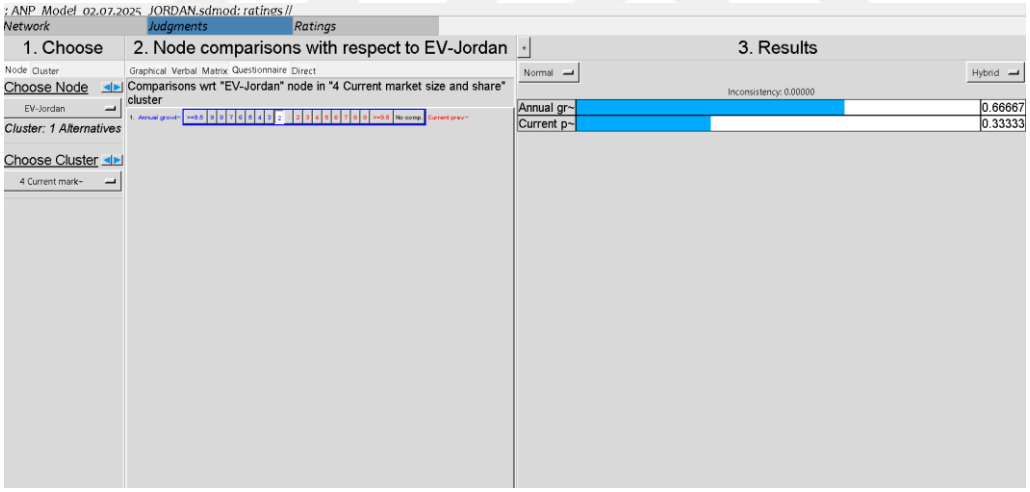

Figure 4.21: Importance of sub-criteria related to the current market size and share for EV-Jordan selection

It is clear from the figure 4.22 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 52.7%. Also, the criteria price ranked as second among other criteria by 33.25% and fuel cost criteria ranked as third by 13.96%.

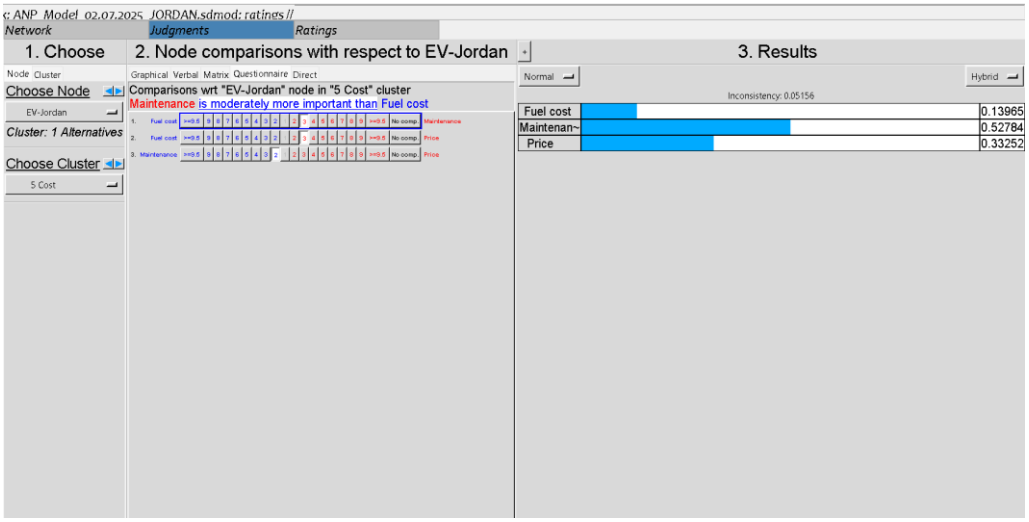

Figure 4.22: Importance of sub-criteria related to the cost for EV-Jordan selection

4.1.5.3 Degree of Importance of Sub-factors in HEV-Jordan Selection

It is clear from the figure 4.23 that inconsistency ratio is 0.09 which is lower than 0.1. Also, the first factor, which is reviews, obtained the highest importance among the other main selection criteria, as it obtained a percentage 27.74%. Also, the criteria customer service ranked as second among other criteria by 22.76% and discounts criteria ranked as third by 21.5% while the criteria social media and frequency were ranked as fourth(16.15%) and fifth(11.9%) among other criteria, respectively.

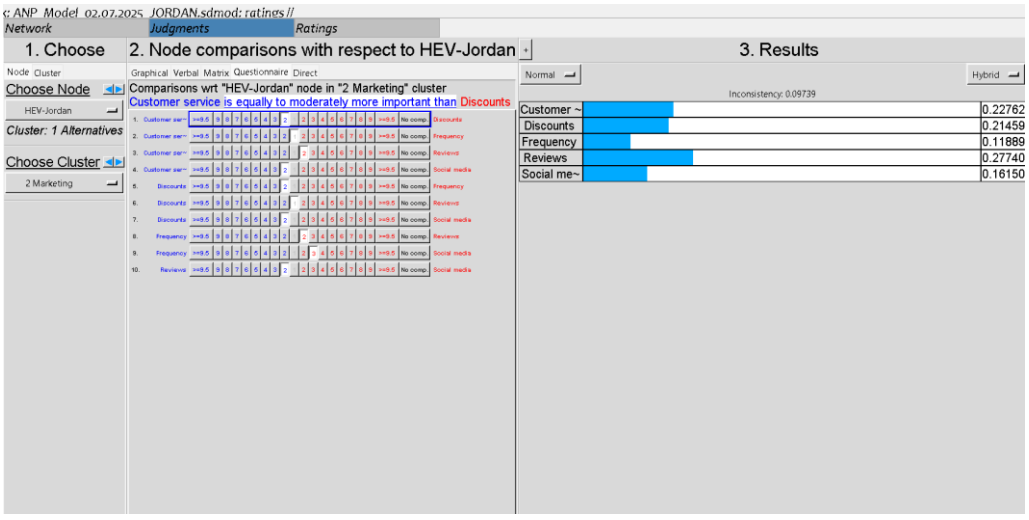

Figure 4.23: Importance of sub-criteria related to marketing for HEV-Jordan selection criteria

It is clear from the figure 4.24 that inconsistency ratio is 0.003 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 39.5%. Also, the criteria safety ranked as second among other criteria by 36.74 % and showroom appearance criteria ranked as third by 12.2% while the criteria number of dealerships was ranked as fourth (11.4%) among other criteria, respectively.

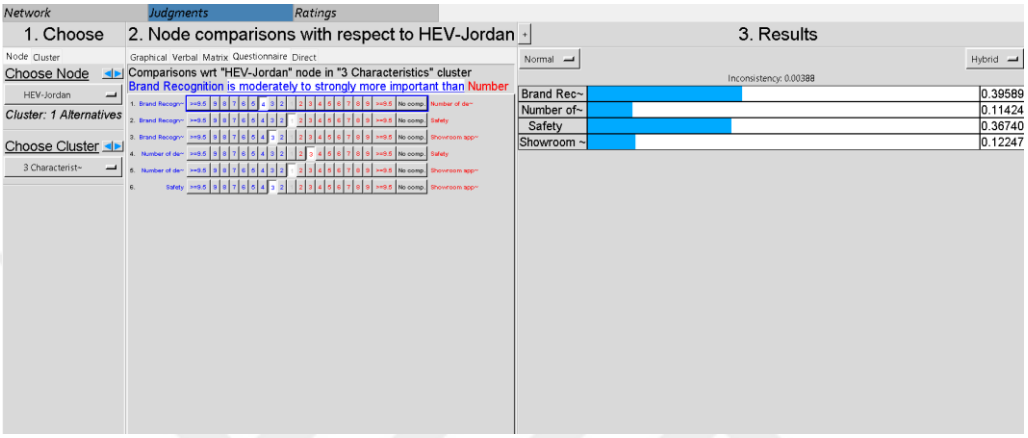

Figure 4.24: Importance of sub-criteria related to characteristics for HEV-Jordan selection criteria

It is clear from the figure 4.17 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is annual growth , obtained the highest importance among the other main selection criteria, as it obtained a percentage 66.67%. Also, the criteria current prevalence rate ranked as second among other criteria by 33.33% .

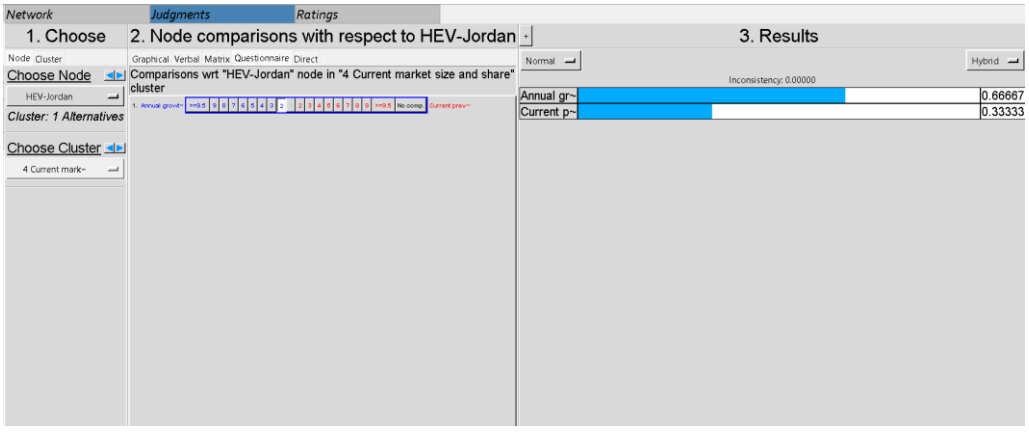

Figure 4.25: Importance of sub-criteria related to current market size and share for HEV-Jordan selection criteria

It is clear from the figure 4.26 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.96%. Also, the criteria price ranked as second among other criteria by 29.69% and fuel cost criteria ranked as third by 16.34%.

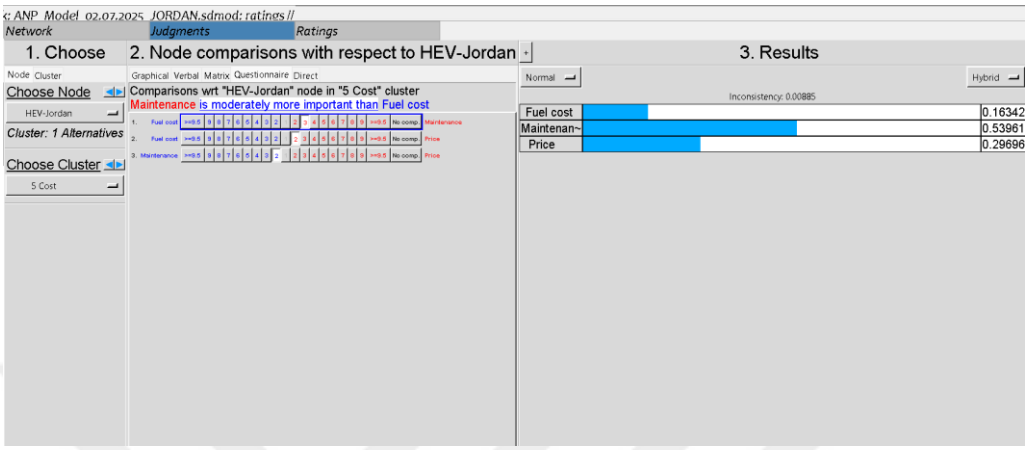

Figure 4.26: Importance of sub-criteria related to cost for HEV-Jordan selection criteria

4.1.5.4 Degree of Importance of Sub-factors Relative to Main Factors

It is clear from the Figure 4.27 that inconsistency ratio is 0.027 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 65.86%. Also, the criteria showroom appearance ranked as second among other criteria by 18.5% and number of dealerships criteria ranked as third by 15.62%.

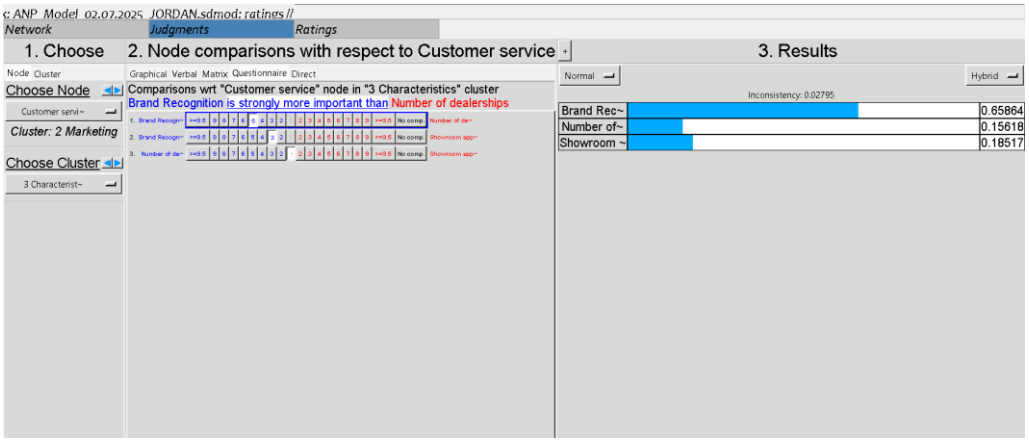

Figure 4.27: Importance of sub-criteria related to characteristics for customer service

It is clear from the Figure 4.28 that inconsistency ratio is 0.008 which is lower than 0.1. Also, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.96%. Also, the criteria maintenance ranked as second among other criteria by 29.69% and fuel cost criteria ranked as third by 16.34%.

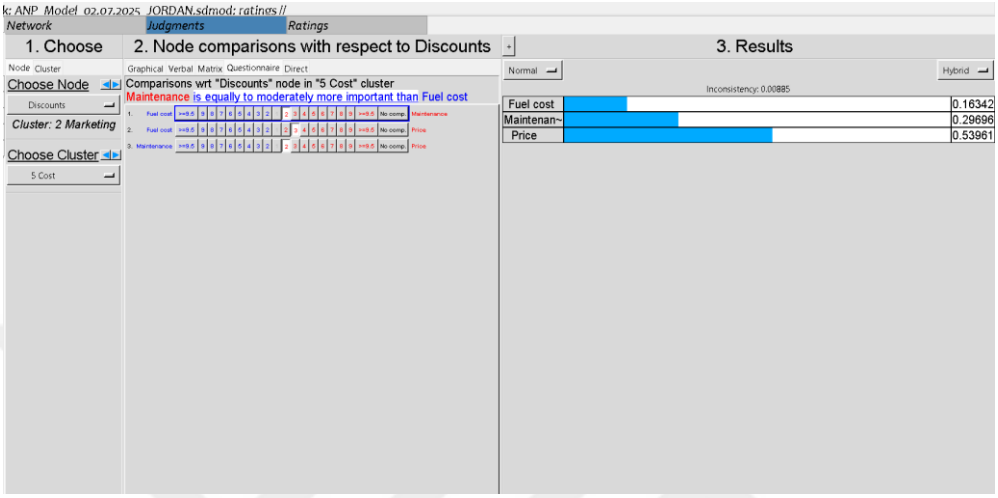

Figure 4.28: Importance of sub-criteria related to cost for discounts

It is clear from the Figure 4.29 that inconsistency ratio is 0.003 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 47.87%. Also, the criteria safety ranked as second among other criteria by 25.61% and showroom appearance criteria ranked as third by 13.8% and the criteria number of dealerships was ranked as fourth by 12.8%.

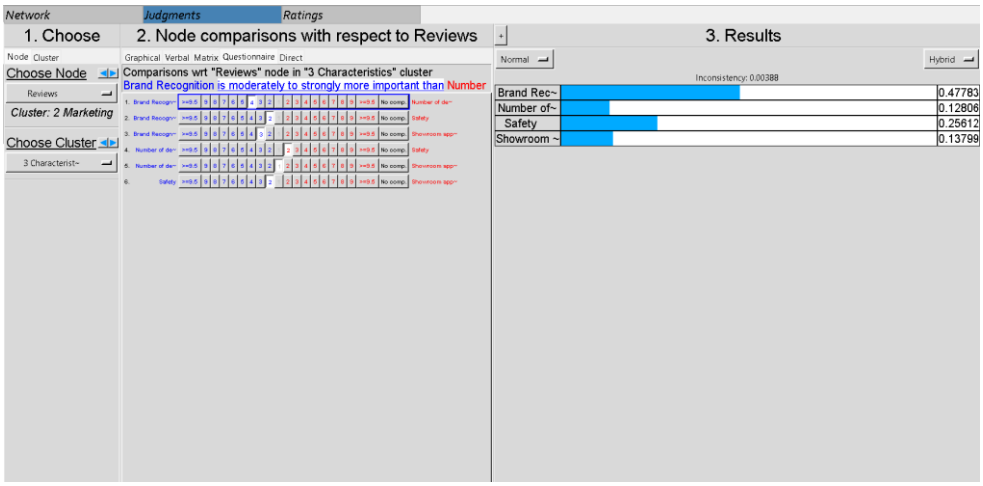

Figure 4.29: Importance of sub-criteria related to to characteristics for reviews

It is clear from the Figure 4.30 that inconsistency ratio is 0.06 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 44.47%. Also, the criteria safety ranked as second among other criteria by 25.8% and number of criteria ranked as third by 18.95% and the criteria dealerships showroom appearance was ranked as fourth by 10.75%.

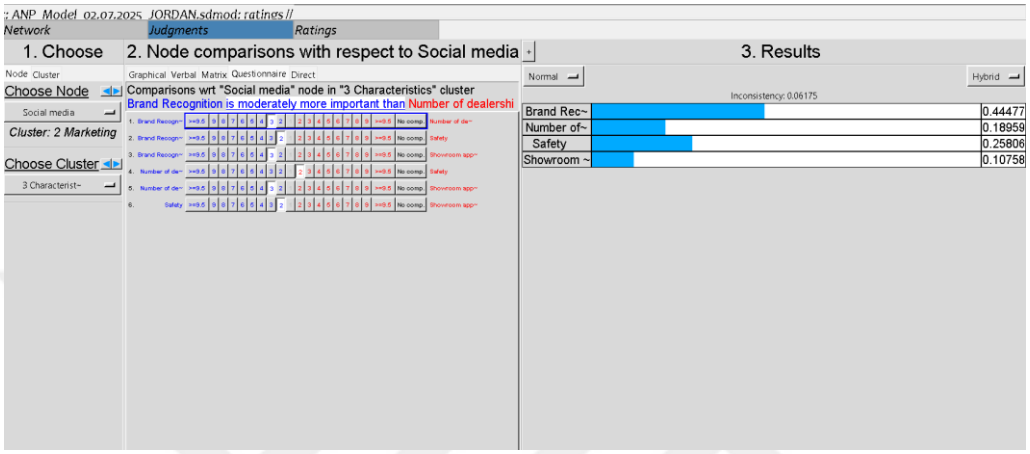

Figure 4.30: Importance of sub-criteria related to characteristics for social media

It is clear from the Figure 4.31 that inconsistency ratio is 0.01 which is lower than 0.1. Also, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 54.99 %. Also, the criteria maintenance ranked as second among other criteria by 24.02% and fuel cost criteria ranked as third by 20.98%

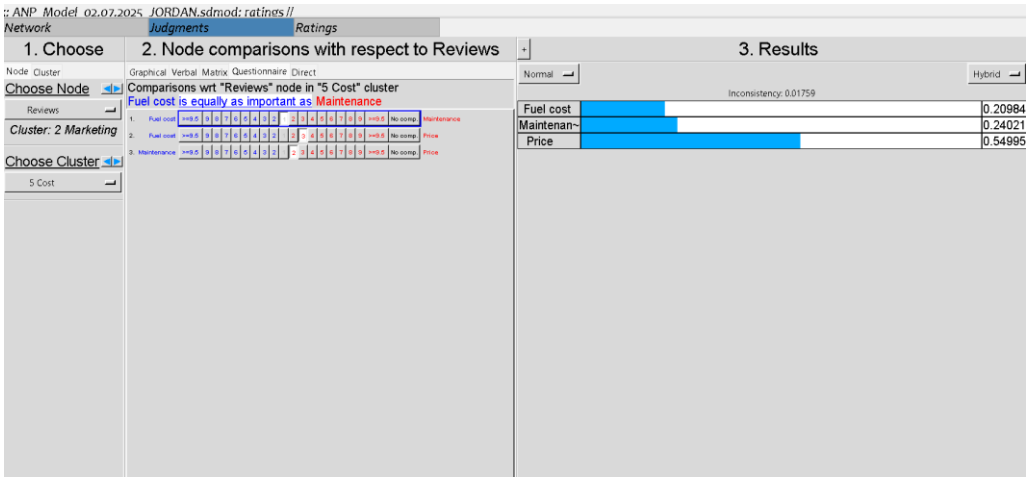

Figure 4.31: Importance of sub-criteria related to cost for reviews

It is clear from the Figure 4.3 that inconsistency ratio is 0.06 wh0ich is lower than 0.1. Also, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 67.7%. Also, the criteria current prevalence rate ranked as second among other criteria by 33.33% .

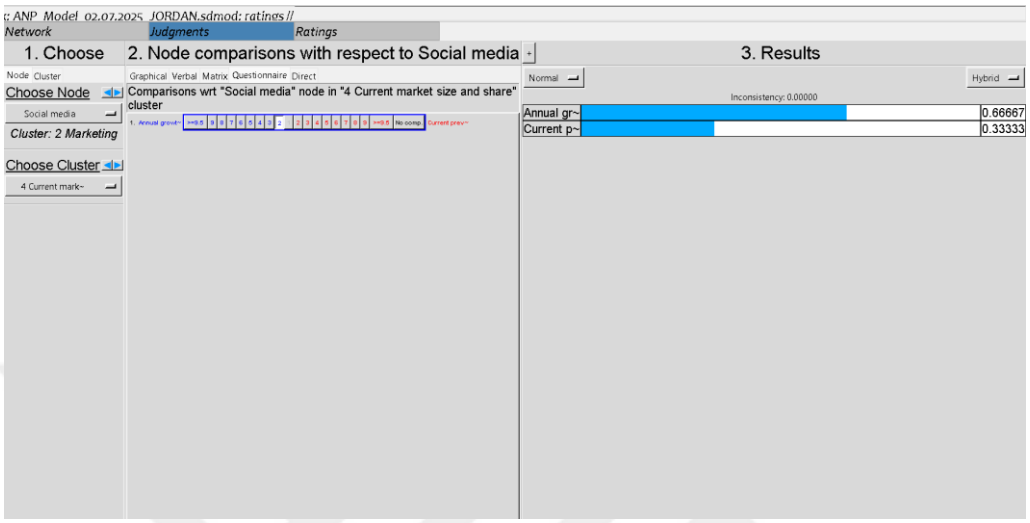

Figure 4.32: Importance of sub-criteria related to current market size and share for social media

It is clear from the Figure 4.33 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 49.33%. Also, the criteria price ranked as second among other criteria by 31.08% and fuel cost criteria ranked as third by 19.58%.

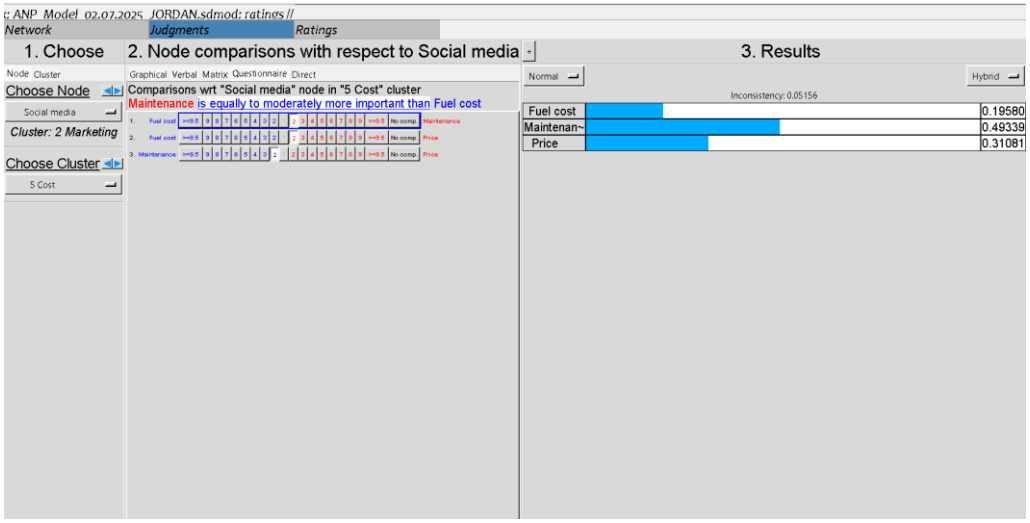

Figure 4.33: Importance of sub-criteria related to cost for social media

It is clear from the Figure 4.34 that inconsistency ratio is 0.02 which is lower than 0.1. Also, the first factor, which is reviews and social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 28.93%. Also, the criteria customer service ranked as second among other criteria by 24.6% and discounts criteria ranked as third by 17.5% .

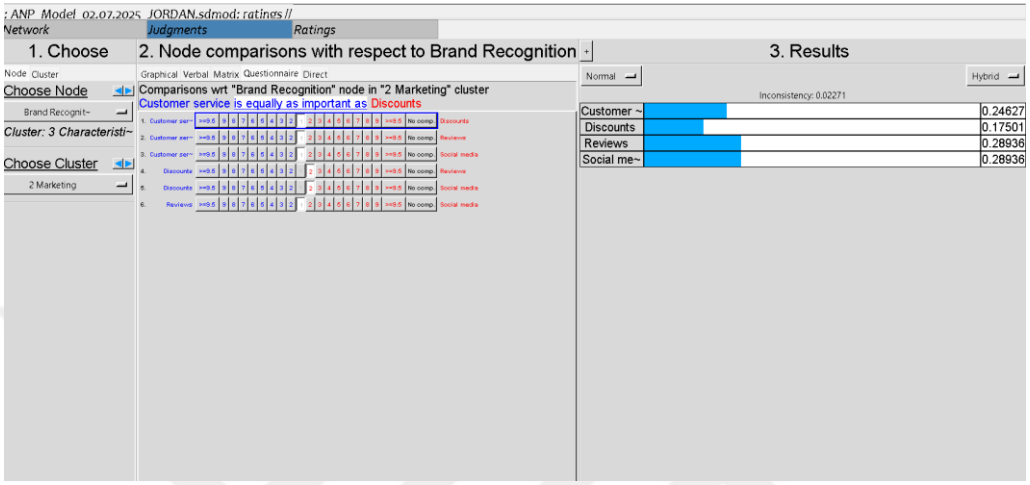

Figure 4.34: Importance of sub-criteria related to marketing for brand recognition

It is clear from the Figure 4.35 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is number of dealerships, obtained the highest importance among the other main selection criteria, as it obtained a percentage 50%. Also, the criteria safety and show room appearance ranked as second among other criteria by 25 %.

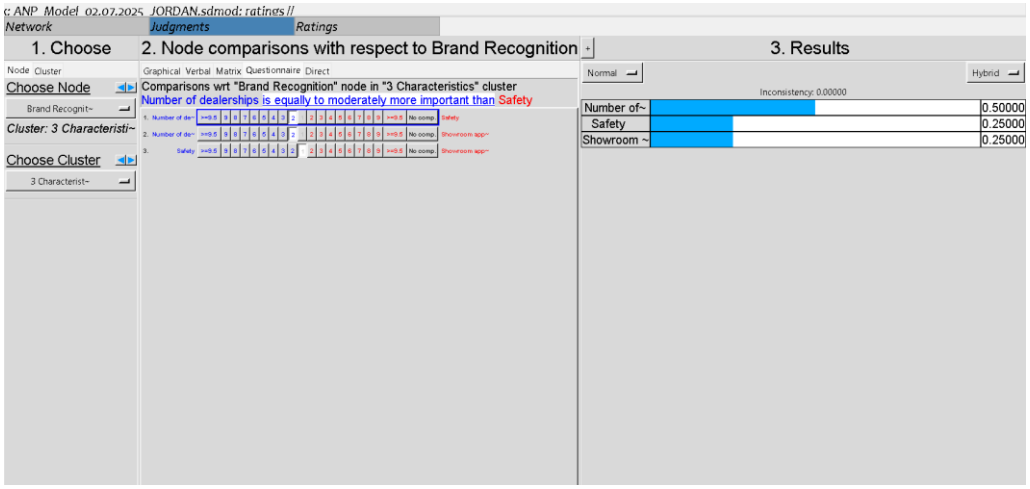

Figure 4.35: Importance of sub-criteria related to characteristics for brand recognition

It is clear from the Figure 4.36 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 66.67%. Also, the criteria current prevalence rate ranked as second among other criteria by 33.33% .

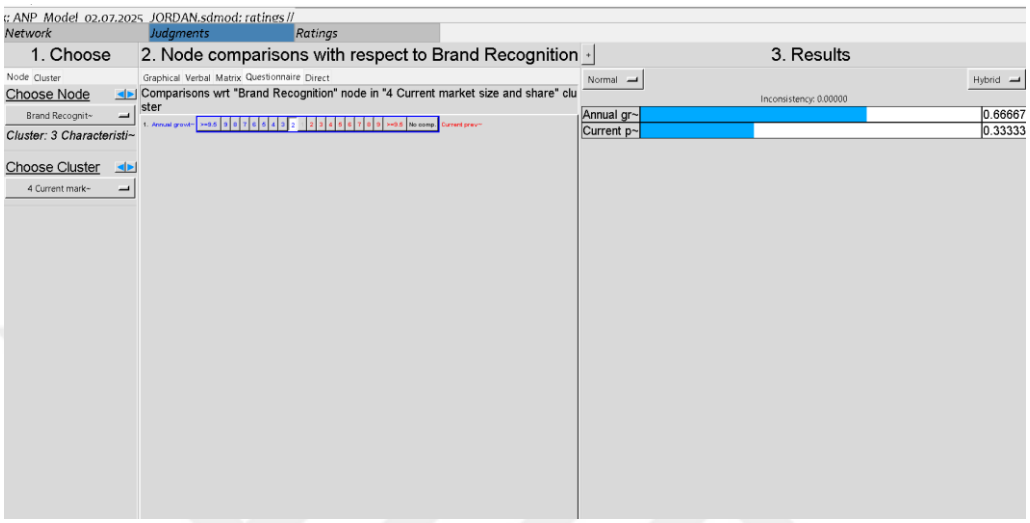

Figure 4.36: Importance of sub-criteria related to current market size and share for brand recognition

It is clear from the Figure 4.37 that inconsistency ratio is 0.06 which is lower than 0.1. Also, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 44.37%. Also, the criteria maintenance ranked as second among other criteria by 38.73% and fuel cost criteria ranked as third by 16.92%.

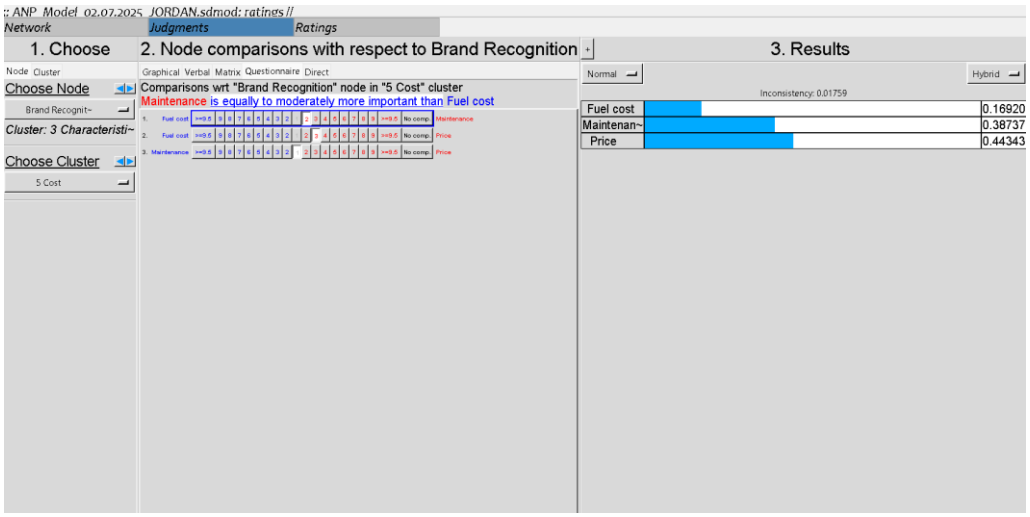

Figure 4.37: Importance of sub-criteria related to cost for brand recognition

It is clear from the Figure 4.38 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is customer service, obtained the highest importance among the other main selection criteria, as it obtained a percentage 41.26%. Also, the criteria social media ranked as second among other criteria by 32.74% and reviews criteria ranked as third by 25.99%.

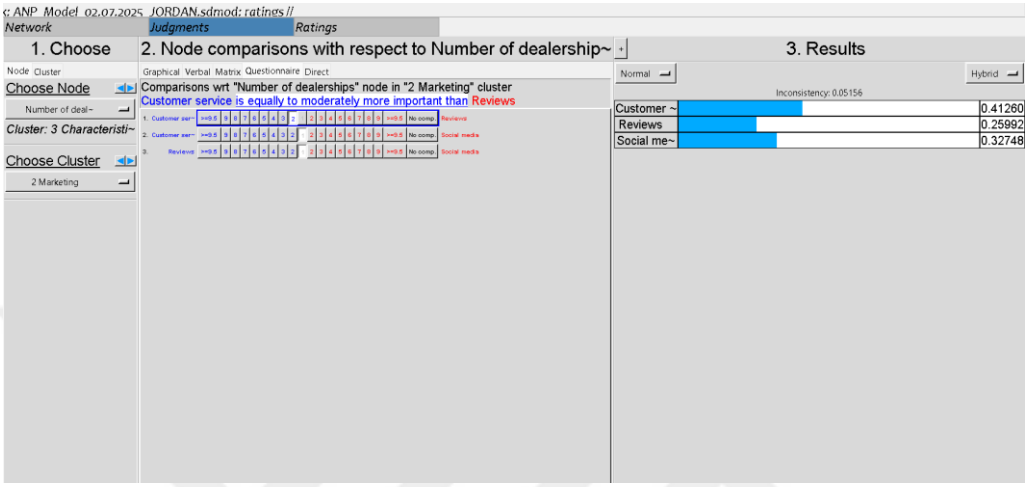

Figure 4.38: Importance of sub-criteria related to marketing for number of dealerships

It is clear from the Figure 4.39 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria showroom appearance ranked as second among other criteria by 25%.

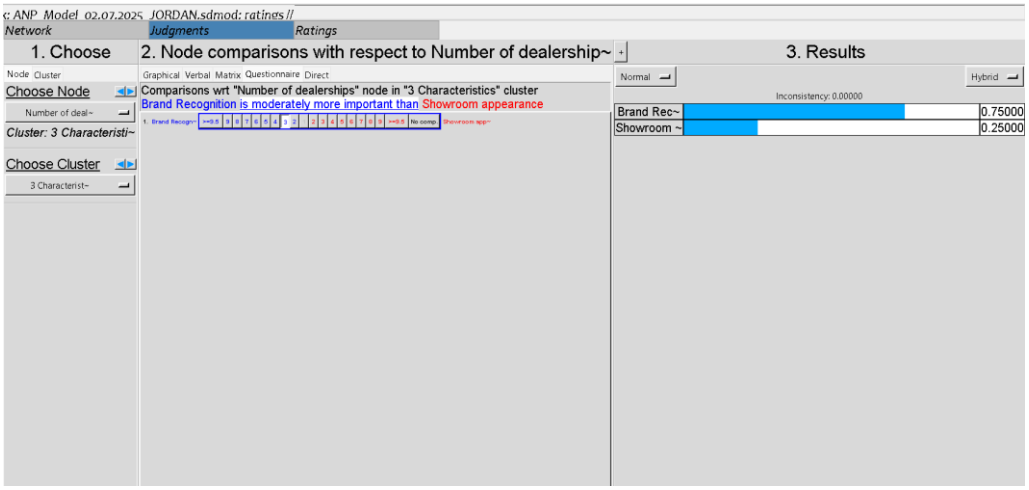

Figure 4.39: Importance of sub-criteria related to characteristics for number of dealerships

It is clear from the Figure 4.40 that inconsistency ratio is 0.00 which is lower than 0.1. both of annual growth and current prevalence rate get the same percentage 50%.

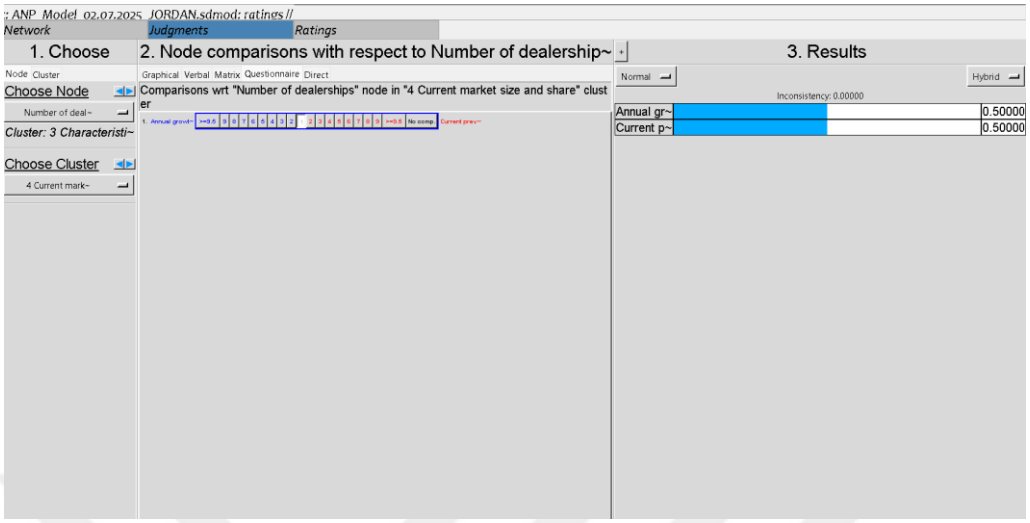

Figure 4.40: Importance of sub-criteria related to current market size and share for number of dealerships

It is clear from the Figure 4.41 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is customer service and reviews, obtained the highest importance among the other main selection criteria, as it obtained a percentage 40%. Also, the criteria social media ranked as second among other criteria by 20%.

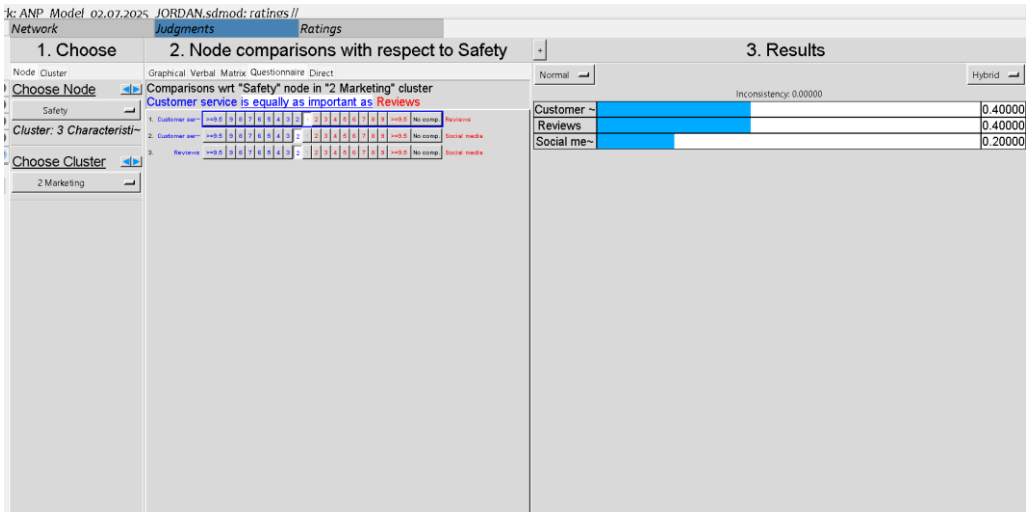

Figure 4.41: Importance of sub-criteria related to marketing for safety

It is clear from the Figure 4.42 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria current prevalence rate ranked as second among other criteria by 25% .

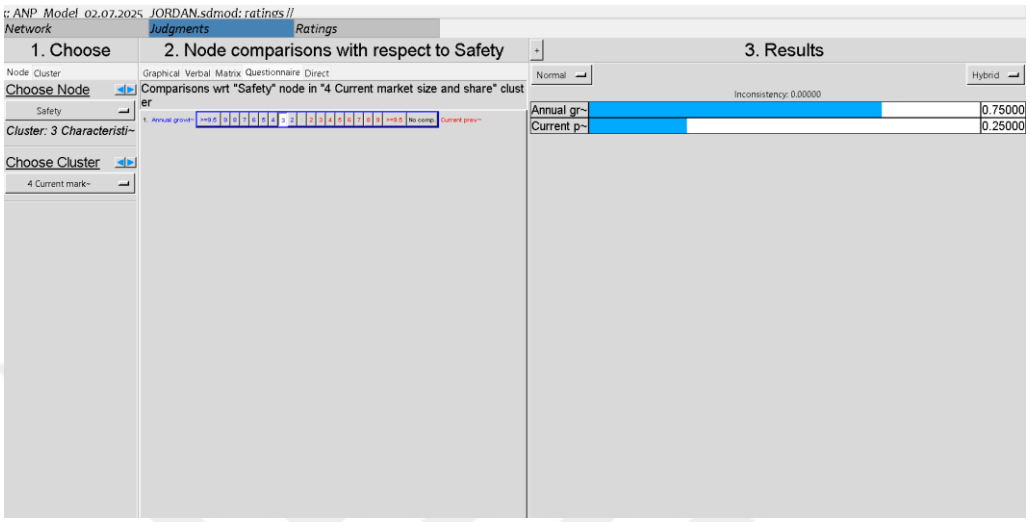

Figure 4.42: Importance of sub-criteria related to current market size and share for safety

It is clear from the Figure 4.43 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 52.78%. Also, the criteria maintenance ranked as second among other criteria by 33.25% and fuel cost criteria ranked as third by 13.96%.

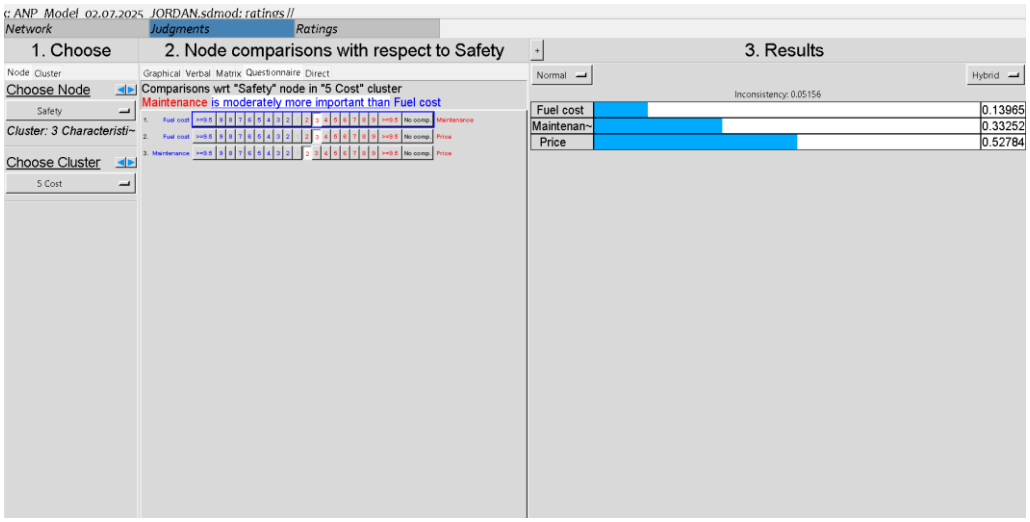

Figure 4.43: Importance of sub-criteria related to cost for safety

It is clear from the Figure 4.44 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 41.26%. Also, the criteria reviews ranked as second among other criteria by 32.74% and customer service criteria ranked as third by 25.99%.

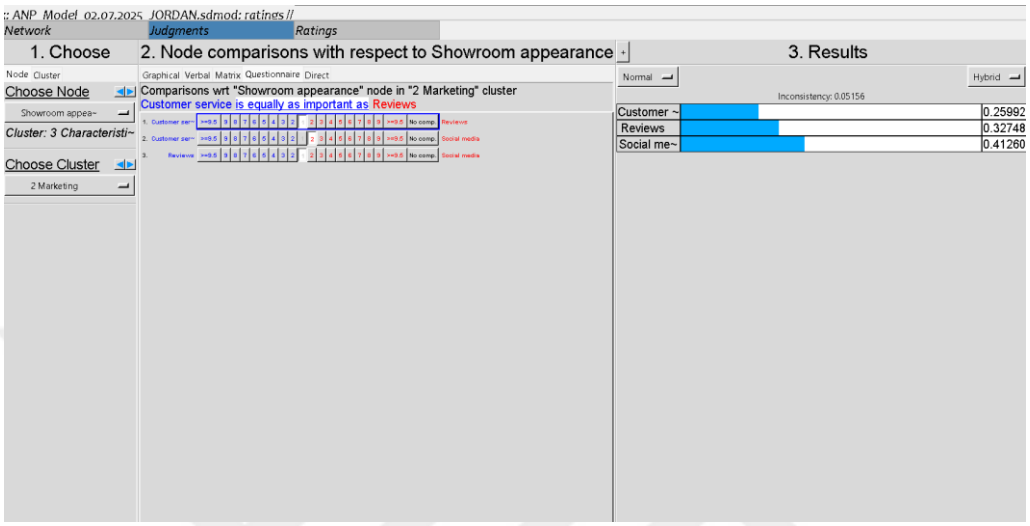

Figure 4.44: Importance of sub-criteria related to marketing for showroom appearance

It is clear from the Figure 4.45 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is number of dealer ship, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria brand recognition ranked as second among other criteria by 25% .

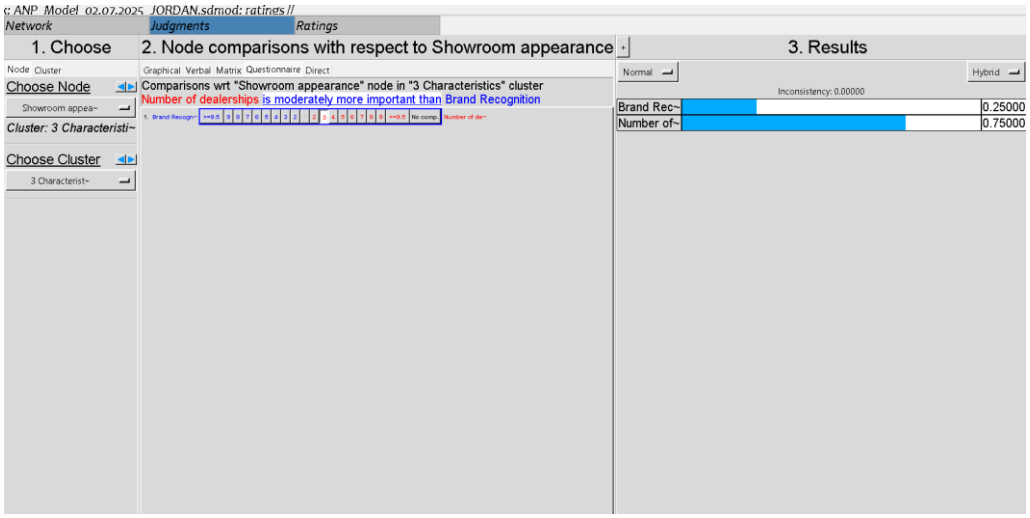

Figure 4.45: Importance of sub-criteria related to characteristics for showroom appearance

It is clear from the Figure 4.46 that inconsistency ratio is 0.04 which is lower than 0.1. Also, the first factor, which is customer service, obtained the highest importance among the other main selection criteria, as it obtained a percentage 25.4%. Also, the criteria reviews ranked as second among other criteria by24% . discounts and social media criteria ranked as third by 19% and the criteria frequency was ranked as fourth by 11.9%.

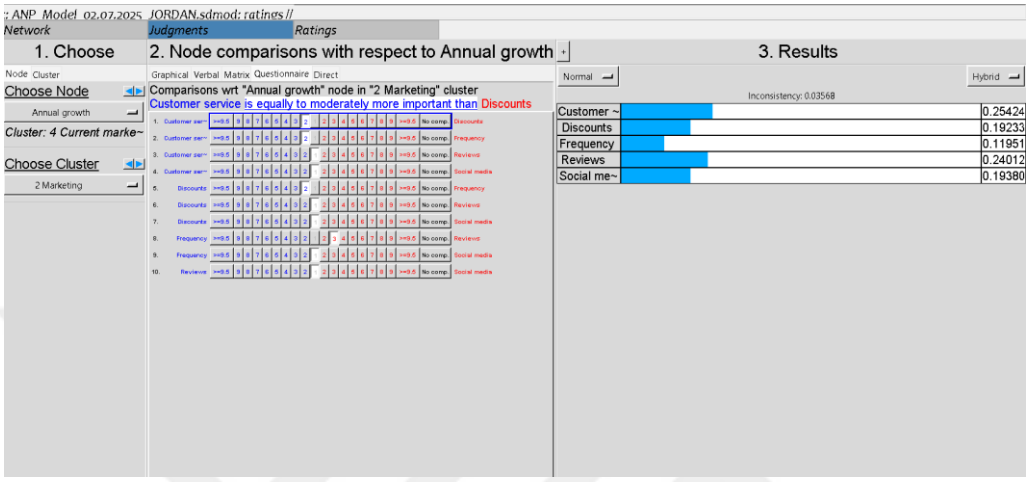

Figure 4.46: Importance of sub-criteria related to marketing for annual growth

It is clear from the Figure 4.47 that inconsistency ratio is 0.02 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 29.78%. Also, the criteria safety and showroom appearance ranked as second among other criteria by 24.6% and number of criteria ranked as third by 20.9%

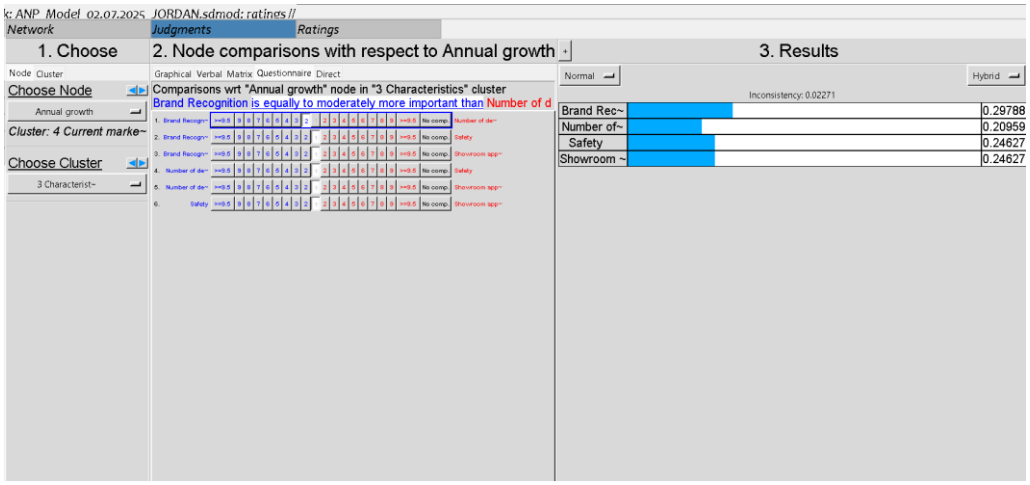

Figure 4.47: Importance of sub-criteria related to characteristics for annual growth

It is clear from the Figure 4.48 that inconsistency ratio is 0.01 which is lower than 0.1. Also, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 54.99%. Also, the criteria fuel cost ranked as second among other criteria by 24.02% and maintenance ranked as third by 20.95% .

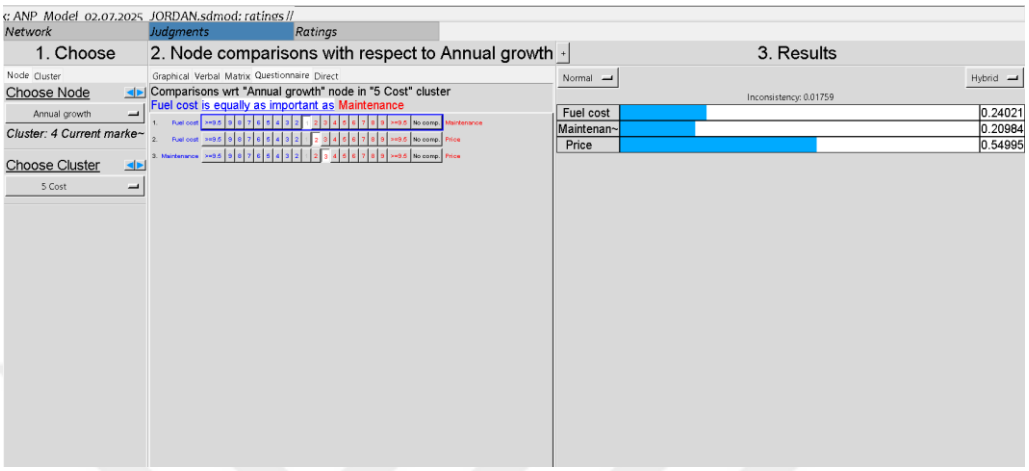

Figure 4.48: Importance of sub-criteria related to cost for annual growth

It is clear from the Figure 4.49 that inconsistency ratio is 0.06 which is lower than 0.1. Also, the first factor, which is discounts, obtained the highest importance among the other main selection criteria, as it obtained a percentage 28.25%. Also, the criteria reviews ranked as second among other criteria by 23.7% and customer service criteria ranked as third by 23.6% and the criteria frequency showroom appearance was ranked as fourth by 12.4%.the criteria social media ranked as fifth by 11.98%.

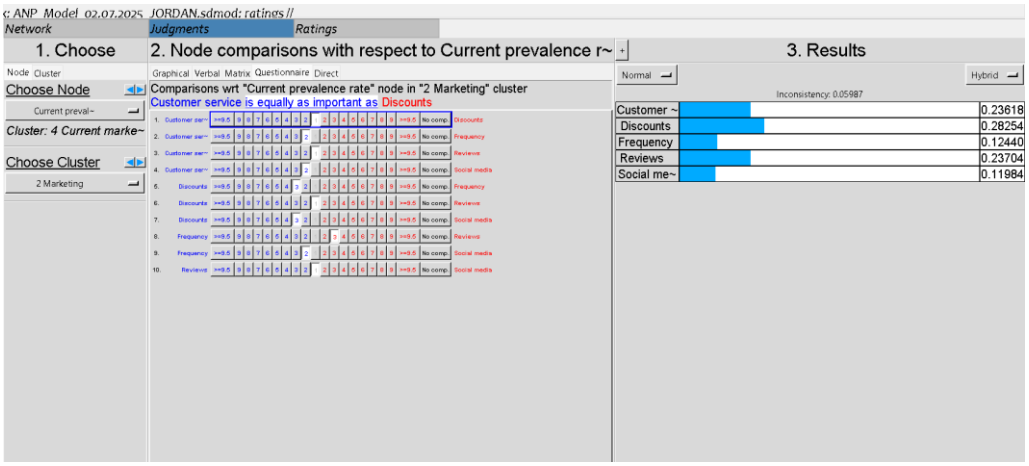

Figure 4.49: Importance of sub-criteria related to marketing for current prevalence rate

It is clear from the Figure 4.50 that inconsistency ratio is 0.02 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 29.8%. Also, the criteria safety and showroom appearance ranked as second among other criteria by 24.6% and number of dealerships criteria ranked as third by 20.95%.

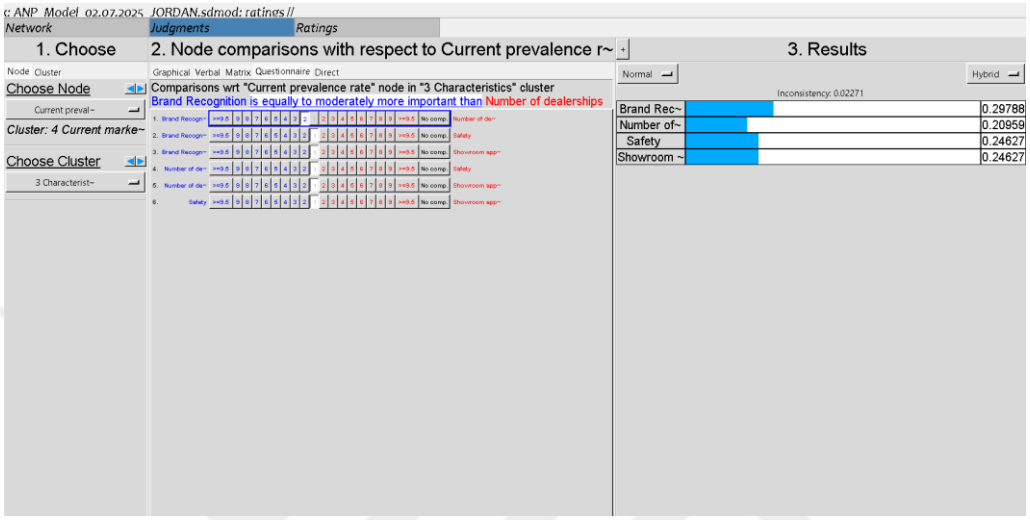

Figure 4.50: Importance of sub-criteria related to characteristics for current prevalence rate

It is clear from the Figure 4.51 that inconsistency ratio is 0.008 which is lower than 0.1. Also, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.96%. Also, the criteria price ranked as second among other criteria by 29.69% and fuel cost criteria ranked as third by 16.34% .

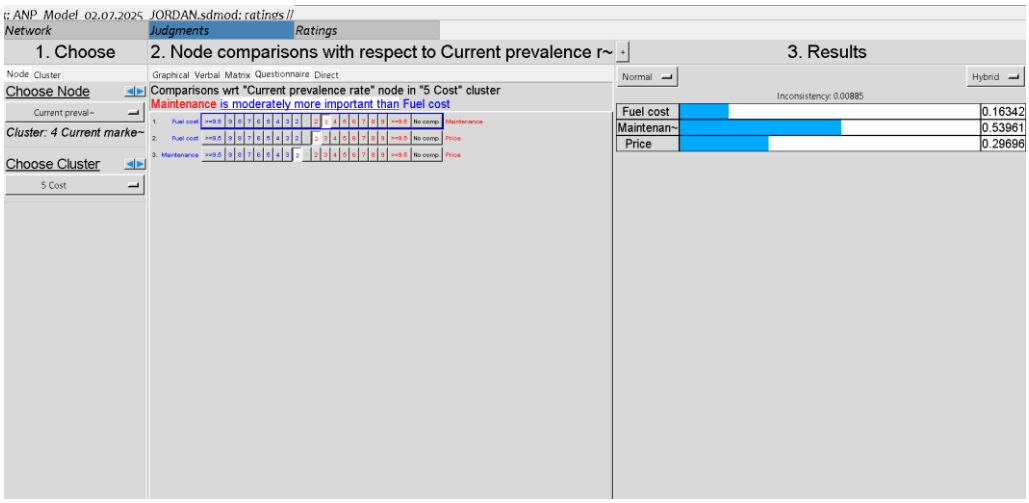

Figure 4.51: Importance of sub-criteria related to cost for current prevalence rate

It is clear from the Figure 4.30 that inconsistency ratio is 0.06 which is lower than 0.1. Also, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria current prevalence rate ranked as second among other criteria by 25%.

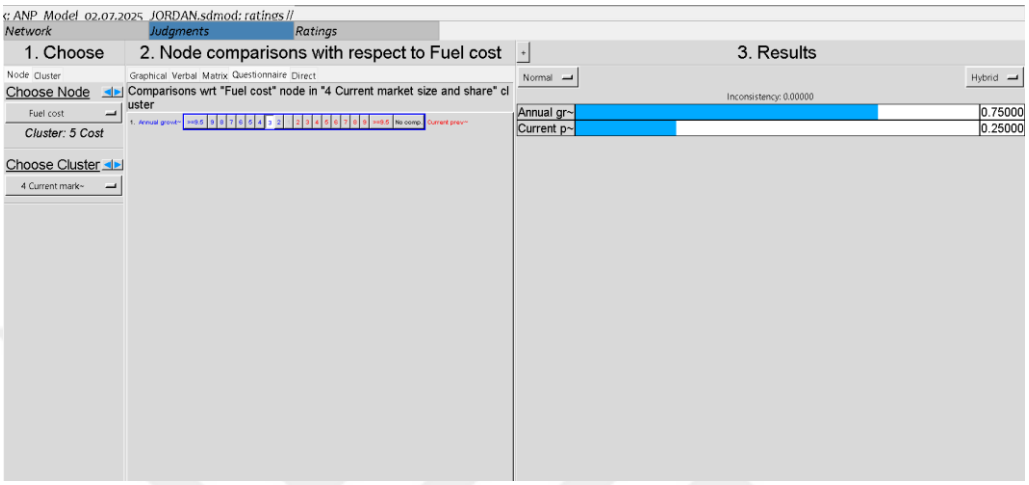

Figure 4.52: Importance of sub-criteria related to current market size and share for fuel cost

It is clear from the Figure 4.53 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is customer service , obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria discounts ranked as second among other criteria by 25% .

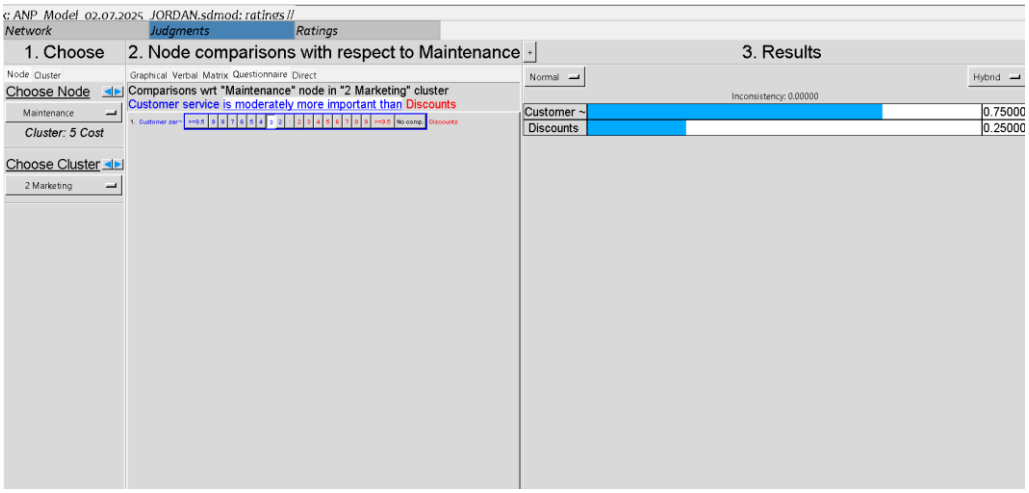

Figure 4.53: Importance of sub-criteria related to marketing for maintenance

It is clear from the Figure 4.54 that inconsistency ratio is 0.05 which is lower than 0.1. Also, the first factor, which is safety, obtained the highest importance among the other main selection criteria, as it obtained a percentage 52.78%. Also, the criteria brand recognition ranked as second among other criteria by 33.25% and number of dealerships criteria ranked as third by 13.96%.

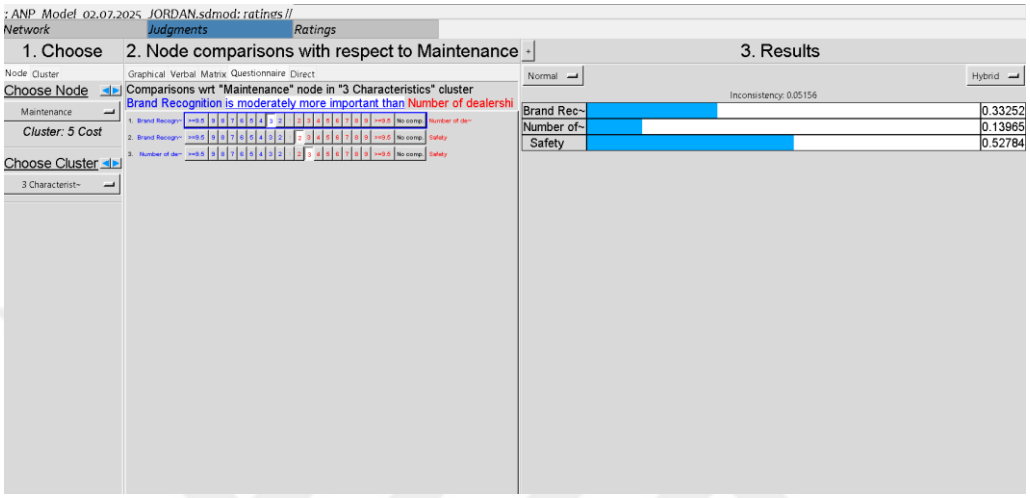

Figure 4.54: Importance of sub-criteria related to characteristics for maintenance

It is clear from the Figure 4.55 that inconsistency ratio is 0.00 which is lower than 0.1. Also, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria current prevalence rate ranked as second among other criteria by 25% .

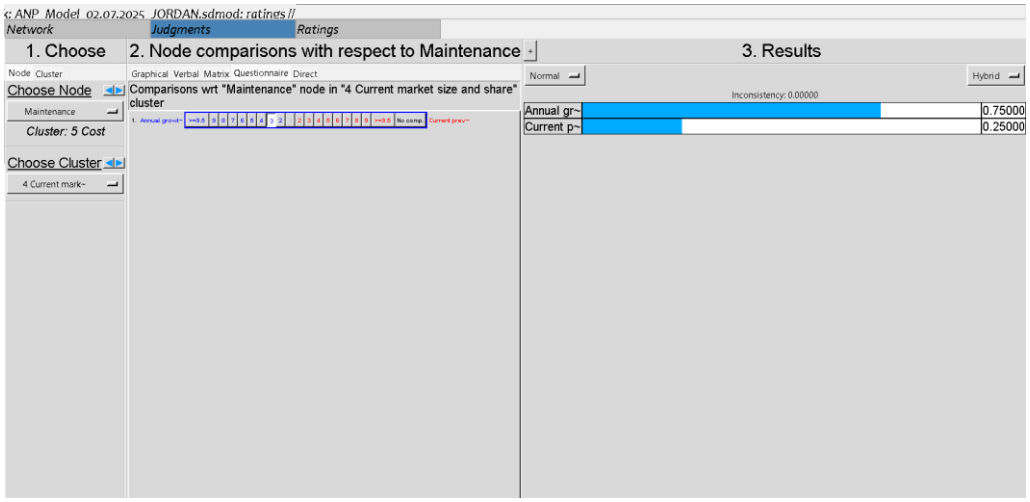

Figure 4.55: Importance of sub-criteria related to current market size and share for maintenance

It is clear from the Figure 4.56 that inconsistency ratio is 0.06 which is lower than 0.1. Also, the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.96%. Also, the criteria discounts ranked as second among other criteria by 26.69% and customer service criteria ranked as third by 16.34%.

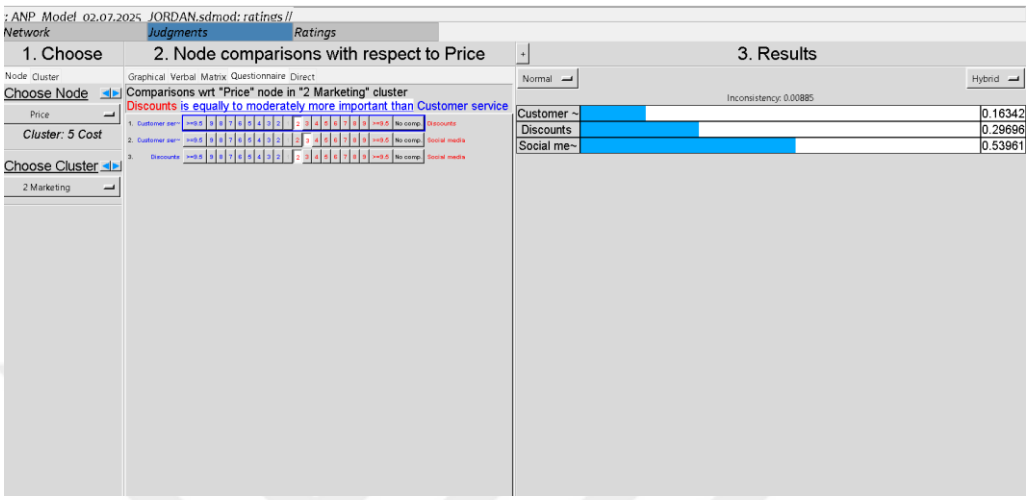

Figure 4.56: Importance of sub-criteria related to marketing for price

It is clear from the Figure 4.57 that inconsistency ratio is 0.01 which is lower than 0.1. Also, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 55.84%. Also, the criteria safety ranked as second among other criteria by 31.96% and number of criteria ranked as third by 18.95% and the criteria dealerships showroom appearance was ranked as fourth by 12.19%.

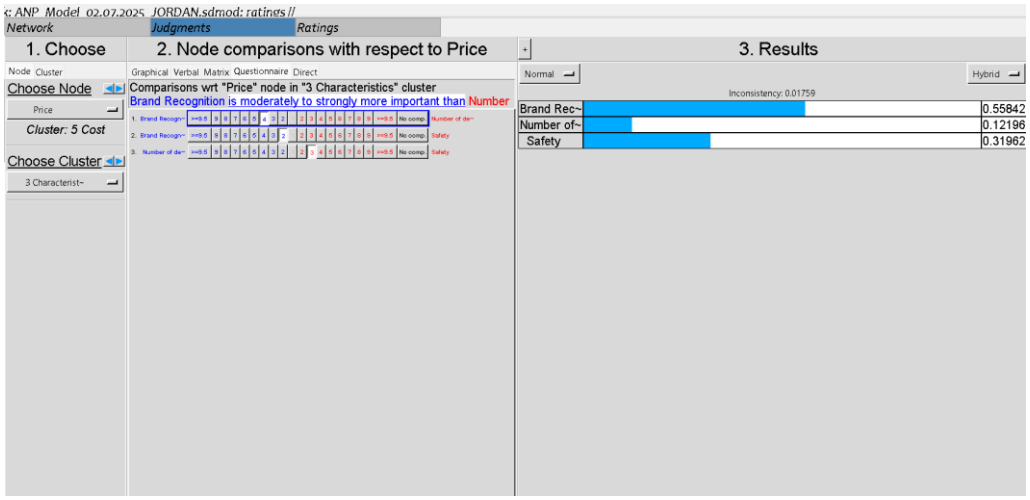

Figure 4.57: Importance of sub-criteria related to characteristics for price

It is clear from Figure 4.58 that the inconsistency ratio is 0.00, which is lower than 0.1. Also, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage of 67.67%. Also, the criteria's current prevalence rate ranked second among other criteria by 33.33%

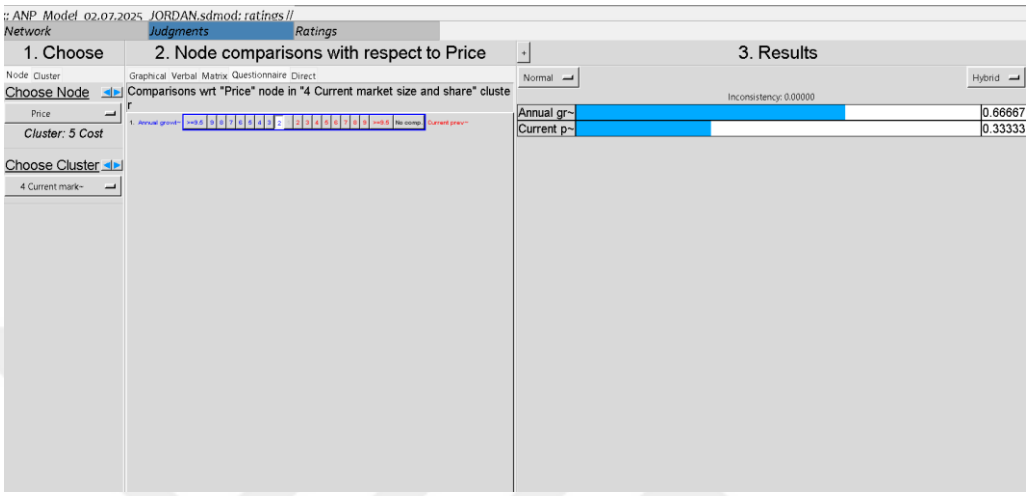

Figure 4.58: Importance of sub-criteria related to current market size and share for price

4.1.6 Estimating the Relative Weights of the ANP-Jordan Model

The pairs between the proposed evaluation criteria were compared to obtain relative weights as in Figure 4.59. The results of the relative weights showed that the priority for the alternatives is for EV-Jordan by 47.15% followed by HEV-Jordan by 37.87% and FF-Jordan got the least priority by 14.96%.

Also, priorities shows that annual growth is the most important sub-criteria by 6% followed by maintenance is the ranked as second sub criteria in terms of importance by 46% followed by brand recognition by 40.5% which ranked as third among sub criteria. Also, customer service ranked as fourth by 40.5% followed by price which was ranked as fifth among other sub criteria by 37% followed by current prevalence rate media which was ranked as sixth by 31%. safety was ranked as seventh by 27.7%.

Icon	Name	Normalized by Cluster	Limiting
No Icon	EV-Jordan	0.47155	0.128461
No Icon	FF-Jordan	0.14967	0.040773
No Icon	HEV-Jordan	0.37878	0.103186
No Icon	Customer service	0.39818	0.080268
No Icon	Discounts	0.21398	0.043137
No Icon	Frequency	0.04858	0.009794
No Icon	Reviews	0.12146	0.024486
No Icon	Social media	0.21779	0.043904
No Icon	Brand Recognition	0.40553	0.057131
No Icon	Number of dealerships	0.16994	0.023941
No Icon	Safety	0.27716	0.039046
No Icon	Showroom appearance	0.14737	0.020762
No Icon	Annual growth	0.68974	0.084433
No Icon	Current prevalence rate	0.31026	0.037979
No Icon	Fuel cost	0.16530	0.043423
No Icon	Maintenance	0.46059	0.120997
No Icon	Price	0.37411	0.098279

Figure 4.59: Relative weights of evaluation criteria of ANP model for Jordan

4.1.7 Evaluating Alternatives and Choosing the Best Car in Jordan

After obtaining the relative weights for each criterion, the relative weights of the criteria are combined with the relative weights of the alternatives to obtain the best alternative, as in Figure 4.59. Figure 4.60 shows that the best alternative for choosing a car in Jordan is the electric car at a rate of 47.15%, followed by the hybrid car alternative at a rate of 37.87%, and the last place is occupied by cars that run on fuel at a rate of 14.96%.

Name	Graphic	Ideals	Normals	Raw
EV-Jordan		1.000000	0.471556	0.128462
FF-Jordan		0.317394	0.149669	0.040773
HEV-Jordan		0.803246	0.378775	0.103186

Figure 4.60: Overall synthesized priorities for the alternative of ANP model for Jordan

4.1.8 Sensitivity Analysis of Results of the ANP Model in Jordan

The sensitivity analysis in Figure 4.61 gives some useful insights into how the decision about which car to choose depends a lot on how much importance we place on the 'Customer Service' factor. It turns out that the electric vehicle, EV-Jordan, is especially sensitive to changes in this criterion. When starting to value customer service more raising its importance from 0 all the way to 1—the overall ranking of EV-Jordan shoots up quite a bit. That strong connection suggests that what makes the electric car stand out the most is its customer support features things like a solid warranty, lower maintenance costs, and good manufacturer help. So, if these aspects are really important to the person making the decision, EV-Jordan becomes the clear top choice. In contrast, the gas-powered car (FF-Jordan) doesn't really change its ranking much regardless of how much importance is given to customer service. Its score stays pretty much the same across all the different levels of this criterion. That indicates that for this traditional vehicle, other factors—like its initial price or performance are what mainly drive the decision, while customer service quality doesn't have much impact whether it's seen as average or good. The hybrid option (HEV-Jordan) falls somewhere in between. It shows a moderate decrease in priority as customer service becomes more important, which suggests that its service levels aren't as strong possibly weaker than the electric vehicle's so when customer support is a key focus, the hybrid scores slightly lower. Overall, this analysis points out that the model's recommendation isn't set in stone. The final ranking really depends on how much weight you give to customer service. That one factor acts as a big breakthrough it favors the electric vehicle heavily when prioritized, but when it isn't, the gas and hybrid cars end up competing based on other qualities.

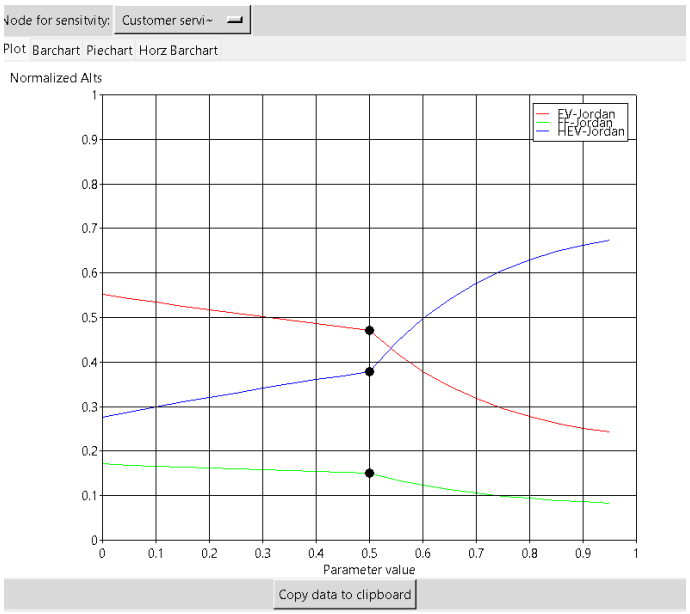

Figure 4.61: Sensitivity analysis according to customer service in Jordan

Looking at the analysis for discounts as illustrated in Figure 4.62, it turns out the hybrid vehicle (HEV-Jordan) benefits the most, while the electric (EV-Jordan) and traditional fossil fuel (FF-Jordan) options tend to be negatively affected. The graph clearly shows that as discounts become more important, the hybrid car's score goes up quite a bit. This suggests that financial incentives like promotions, government rebates, or dealer discounts—really boost the hybrid's appeal. So, if saving money quickly is top priority, the HEV-Jordan becomes the obvious choice. On the other hand, both the EV and FF options show a negative link with the discounts factor their scores drop as discounts become more critical. This might mean that traditional fossil fuel cars are already well-established, with fewer special deals compared to newer electric models. Interestingly, for EV-Jordan, this shows that its overall appeal isn't just about discounts; factors like long-term savings or environmental benefits seem more important to buyers. When immediate discounts are the focus, these other advantages tend to take a back seat. All in all, the discounts factor is a major breakthrough in deciding which vehicle comes out on top. The result really depends on how much weight someone gives to discounts. If immediate savings matter the most, the hybrid stands out as the best option. But if discounts aren't a big deal, then the other options might shine through because of their other qualities. This emphasizes how important it is for marketers pushing the hybrid to promote available discounts, while those selling the electric vehicle should focus on its long-term value, not just short-term price cuts.

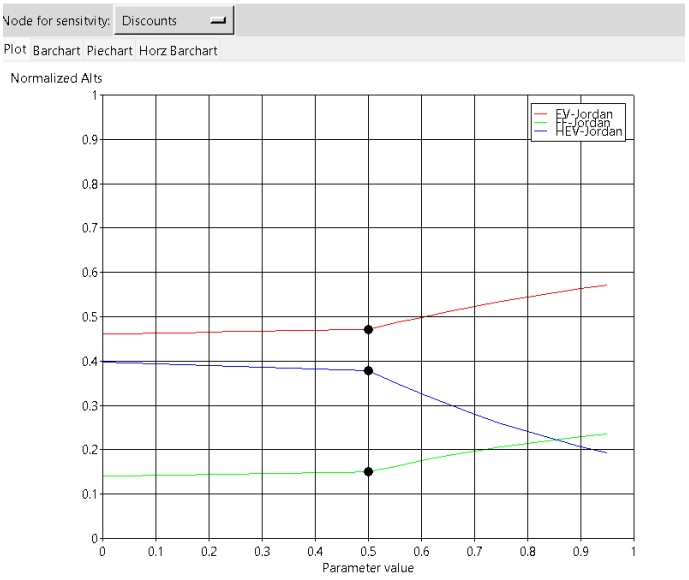

Figure 4.62: Sensitivity analysis according to discounts in Jordan

The sensitivity analysis shown in Figure 4.63 for the 'Frequency' criterion clearly shows how much it impacts the ranking of different vehicle options. When this factor is given more importance, the electric vehicle (EV-Jordan) stands out as the best choice. The analysis shows that as the priority on frequency increases, the EV-Jordan scores much higher. This suggests that electric cars are seen as more convenient because they usually require less maintenance, fewer refuels, and less frequent servicing. As people focus more on convenience and less on routine upkeep, the electric vehicle becomes the top option, thanks to its technological benefits that save owners time and effort. On the other hand, the fossil fuel vehicle (FF-Jordan) shows a strong drop in its ranking as the importance of frequency goes up. This means that traditional cars are viewed as less attractive when reducing maintenance and refueling is key. With more emphasis on how often a vehicle needs service, gas-powered cars seem more inconvenient due to their higher maintenance needs, regular refills, and more frequent servicing. The hybrid (HEV-Jordan), which likely falls between the electric and fossil fuel options, appears less sensitive to these changes. It probably offers some improvements over fossil fuel cars but doesn't match the low-maintenance appeal of electric vehicles. So, hybrids are seen as a middle-ground choice, but not a clear winner when frequency matters most. Overall, this analysis emphasizes how essential the 'Frequency' criterion is. If reducing maintenance and refueling becomes a top priority, the electric vehicle is the best bet, while fossil fuel cars become less attractive. This shows how important it is to understand what consumers value most regarding

convenience. Depending on how much weight is given to this factor, the recommendations may change. Results suggest that electric cars are especially valuable when long-term convenience and less hassle are priorities. This reinforces their competitive edge in today's car market where ease of ownership is increasingly important.

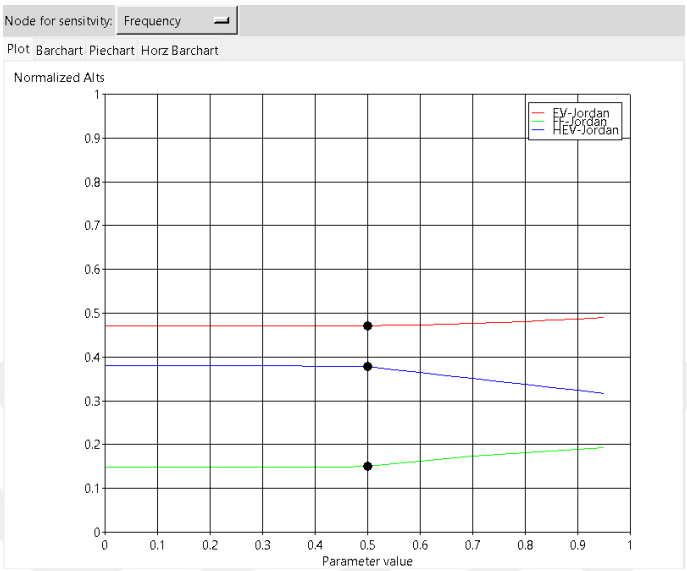

Figure 4.63: Sensitivity analysis according to frequency in Jordan

Looking at the sensitivity analysis in Figure 4.64 for the 'Reviews' factor, it's clear that the hybrid vehicle (HEV-Jordan) benefits the most. This shows that people tend to trust and value it more when there are positive reviews coming from experts or other drivers. The graph emphasizes a strong link: as the importance of reviews goes up, the hybrid's ranking gets even better. Basically, when reviews matter a lot, the HEV-Jordan seems to shine likely because of good ratings, endorsements from experts, and happy user stories. This makes it a top choice for buyers who pay close attention to what others say. When reviews are a key factor, the hybrid easily becomes the most trusted and recommended option. On the other hand, the fossil fuel car (FF-Jordan) shows the opposite trend. Its score drops when reviews become more important, meaning it isn't seen as favorably when people rely on feedback. This could be because people see traditional engines as outdated, or maybe they think it performs worse in tests, or because of negative opinions about its environmental impact or running costs. The electric vehicle (EV-Jordan) also reacts somewhat to reviews, but not as strongly and likely in a negative or neutral way. Even though it's a newer and innovative option, it may not yet have the same strong reputation as the hybrid, possibly due to worries about how far it can go on a charge, charging

station availability, or higher upfront prices. In summary, the 'Reviews' factor acts as a huge trust booster for the HEV-Jordan. The decision model shows that this factor heavily influences choices —\ a customer who puts a lot of weight on reviews and expert opinions will probably pick the hybrid. This emphasizes how much reputation and public perception matter in the car market. For brands, it suggests that gathering and sharing positive reviews and stories is essential for the hybrid. Meanwhile, makers of the fossil fuel and electric cars need to work on improving what makes people review them less favorably in comparisons.

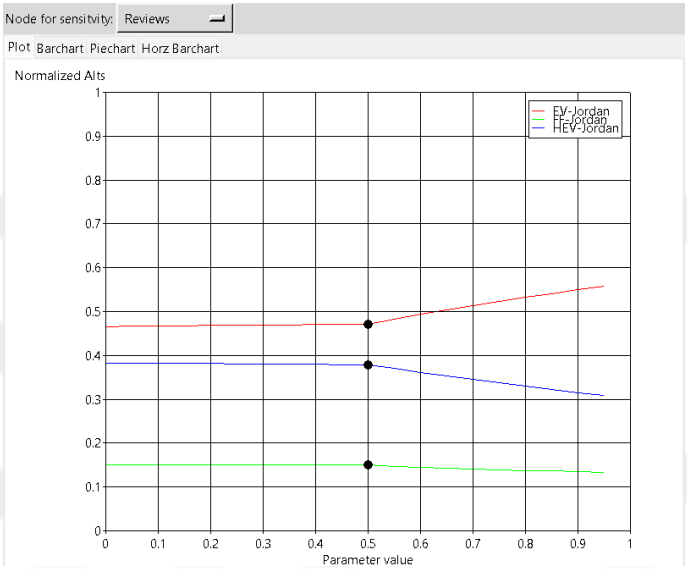

Figure 4.64: Sensitivity analysis according to reviews in Jordan

The sensitivity analysis in Figure 4.65 for the 'Social Media' factor shows that the electric vehicle (EV-Jordan) benefits the most, suggesting that it's viewed very positively online and on social platforms. The graph clearly shows a strong link between how much social media influence matters and the EV-Jordan's overall ranking. As the importance of social media increases, this electric car's position climbs quickly, which indicates it's popular online — with lots of viral posts, positive influencer mentions, and active communities talking about it. This lines up with how electric vehicles are often seen: as innovative, eco-friendly, and high-tech, making them especially appealing when social proof and peer opinions hold weight. On the other hand, the fossil fuel vehicle (FF-Jordan) shows a clear negative connection with this criterion. Its ranking drops noticeably as social media influence grows, meaning it's more negatively impacted by online opinions. This is probably because traditional gas-powered cars are frequently discussed online as being environmentally harmful, outdated, and less trendy

than newer tech options. The hybrid (HEV-Jordan) shows a moderate positive sensitivity: it gains some ground from social media attention but not as much as the fully electric version. This suggests hybrids are seen more favorably than conventional cars online, but they don't generate as much excitement or buzz as electric vehicles. In summary, the 'Social Media' factor is a key indicator of current brand perception and trends, heavily favoring EV-Jordan. The results show that this model is very sensitive to online sentiment; for anyone making decisions influenced by social media, digital communities, or the social image of the product, the electric vehicle clearly comes out on top. This analysis emphasizes how important a brand's online presence and alignment with modern values are today. It suggests that marketing efforts for EV-Jordan should keep emphasizing its strong social media profile, while the fossil fuel option needs to work on improving its online reputation or focus on channels where its traditional features are better appreciated.

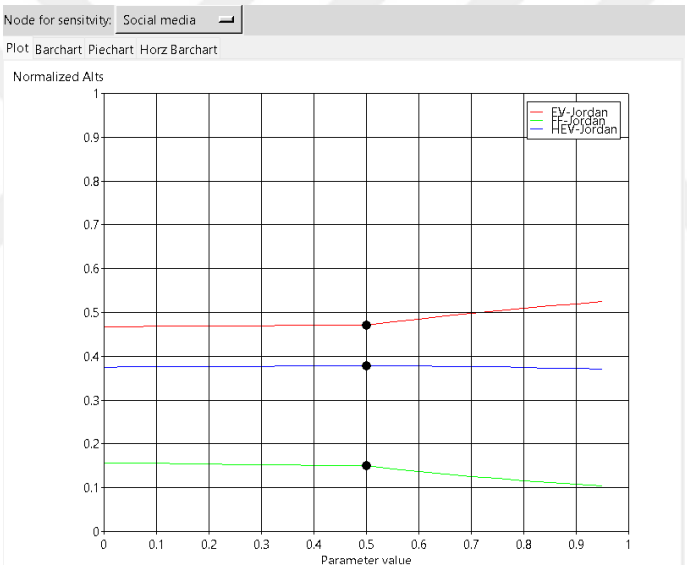

Figure 4.65: Sensitivity analysis according to social media in Jordan

The analysis in Figure 4.66 shows that well-established, traditional brands tend to hold a big advantage here. For example, the fossil fuel vehicle (FF-Jordan) scores higher as brand recognition becomes more important. That makes sense because, with long-standing history and high visibility, people often trust familiar brands more. When consumers prioritize knowing the brand and trusting it, FF-Jordan feels like the safer, more reliable choice because of its strong reputation. On the other hand, the electric vehicle (EV-Jordan) shows a clear negative link to this factor. As being recognizable becomes more important, its spot in the rankings

drops. This probably means that EV-Jordan's brand is newer or less deeply rooted in the market, so people who rely on brand familiarity might see it as less dependable. The hybrid vehicle (HEV-Jordan), likely from a more recognized manufacturer, benefits somewhat from this emphasis but not as much as the fossil fuel model, making it a good middle ground. In summary, brand recognition gives a big edge to well-established fossil fuel cars, making their success highly tied to how much buyers care about familiar brands. For decision-makers who prefer models with a proven track record, FF-Jordan is the safest pick. This also points out how tough it is for new brands and innovative tech to compete against the power of longstanding brand reputation. To stand out, electric vehicles will need to invest in building trust and brand awareness, since they can't rely on a long history and reputation right away, but must instead focus on creating a new perception of reliability and innovation.

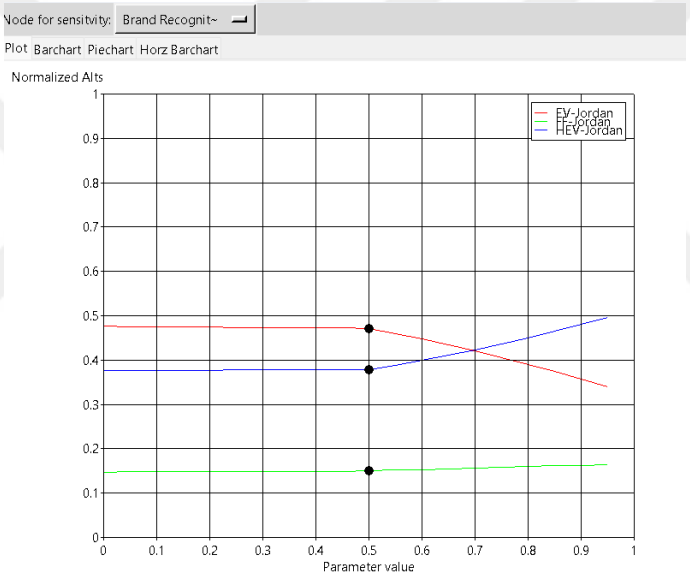

Figure 4.66: Sensitivity analysis according to brand recognition in Jordan

Looking at the analysis in Figure 4.67, it's clear that having a large, well-connected network of dealerships gives the fossil fuel vehicle (FF-Jordan) a big edge. The data shows a strong link between how important the dealer network is and how highly FF-Jordan scores. As this factor becomes more important, FF-Jordan’s ranking goes up a lot. This makes sense because a wider network means easier access for test drives, buying, maintenance, and repairs. For people who want to buy from a brand they can easily reach nearby and get good support, FF-Jordan just feels more practical and lower risk. On the other hand, the electric vehicle (EV-Jordan) shows the opposite trend. Its score drops as the deal of dealer access gets more weight. This suggests

that EV-Jordan has fewer dealerships or less coverage, which is common for newer or transitioning brands. Not having many dealerships can make it harder to buy, find knowledgeable staff, or get repairs, making it less appealing for someone who values easy access and traditional buying comforts. The hybrid vehicle (HEV-Jordan), probably sold through a more established dealership network, shows a middle ground. It benefits moderately from dealer access, with its ranking rising with the importance of the dealer network. It uses the existing fossil fuel dealership setup more than EV-Jordan but doesn't beat FF-Jordan in this regard. All in all, the 'Number of dealers' factor clearly favors the traditional fossil fuel vehicle, making the outcome very sensitive to someone's need for convenience and easy access. This analysis emphasizes how having an extensive dealership network is a major edge for existing automakers, creating a major barrier for newer competitors. For EV makers to close that gap, they need to build more sales and service locations or focus on alternative methods like online direct sales. They could also emphasize other benefits, like lower maintenance costs, to offset the smaller dealer network and appeal to consumers looking for convenience.

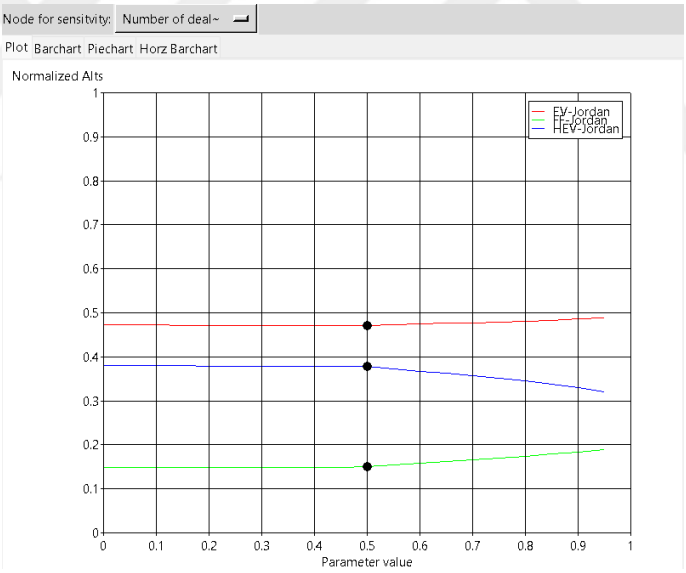

Figure 4.67: Sensitivity analysis according to number of dealerships in Jordan

When we look at how much the 'Showroom appearance' matters, it's clear that the electric vehicle (EV-Jordan) benefits the most. Its looks and design seem to be what make it stand out most in a busy showroom. The Figure 4.68 shows a strong link between how important showroom looks are and the EV-Jordan's ranking. As this importance goes up, the electric car's position improves a lot. This means the EV-Jordan has a fresh, stylish, and eye-catching design

that grabs attention and makes people interested when they see it in person. Its sleek, modern shape, clean lines, and the cool factor of being electric help it shine against more traditional cars, giving it a real edge when it comes to looks.

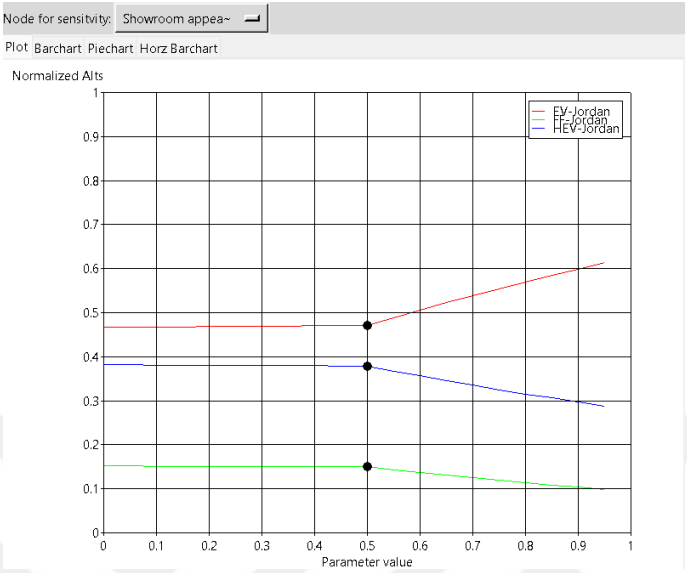

Figure 4.68: Sensitivity analysis according to showroom appearance in Jordan

The sensitivity analysis in Figure 4.69 for the "Annual growth" factor tells a pretty clear story about the future of different vehicle options, especially emphasizing how promising the EV-Jordan is. The graph shows a strong positive link between how much importance you give to annual growth and the top ranking of EV-Jordan. When this importance goes up, EV-Jordan's position gets even better. That points to people seeing EV-Jordan as having the most growth potential, fitting into a market that's expanding thanks to new tech, stricter environmental rules, and changing consumer tastes. So, when decision-makers want to invest in a technology that's on the rise and likely to last, electric vehicles come out as the obvious choice representing innovation and a future-proof option. On the other hand, the fossil fuel vehicle (FF-Jordan) shows a strong negative link to this factor. Its score drops as more importance is placed on annual growth, which suggests it's seen as part of a stagnant or shrinking market. Traditional cars with internal combustion engines are facing more regulations, losing market share, and are being phased out in favor of greener options. This negative sensitivity shows a real risk: fossil fuel cars could become outdated and less competitive in a future market that favors sustainability. The hybrid vehicle (HEV-Jordan), meanwhile, likely falls somewhere in the middle. It benefits from being seen as a bridge technology better growth prospects than

conventional vehicles, but it doesn't have the same explosive potential as fully electric cars. In summary, the "Annual growth" criterion is a key factor that really pushes EV-Jordan to the top, making the final decision highly influenced by how future-focused a decision-maker is. For those who care about sustainability, innovation, and long-term market trends, electric cars are clearly the best choice. This analysis emphasizes how important it is to pick products aligned with where the market is headed. While fossil fuel vehicles might seem attractive now, their declining growth outlook is a drawback. The strong positive response to EVs shows they're not just a product they're a growth opportunity that's likely to become more valuable and relevant as the world shifts toward electric mobility.

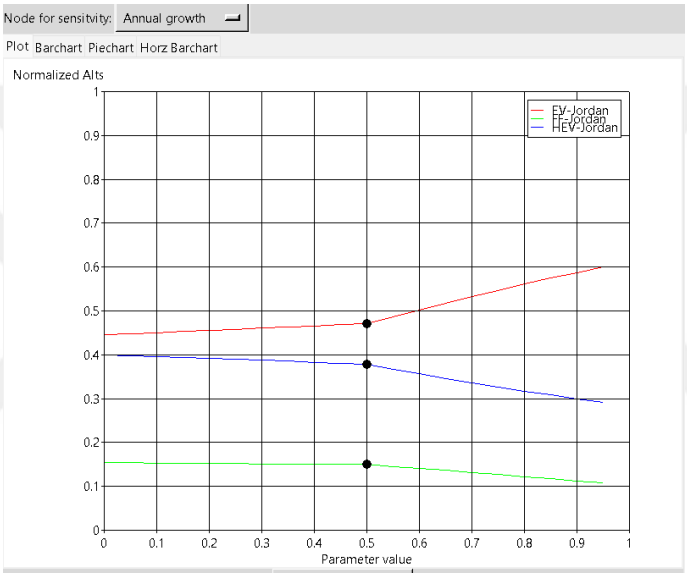

Figure 4.69: Sensitivity analysis according to annual growth in Jordan

The sensitivity analysis in Figure 4.70 for the "Current prevalence" factor shows how much the importance of knowing how common a vehicle is affects decisions. It clearly favors traditional, established cars—like the fossil fuel vehicle (FF-Jordan). As people place more weight on how widespread a vehicle currently is, the priority for the fossil fuel option jumps up a lot. This makes sense because traditional cars are everywhere—they're familiar, well-established, and have a long history of use. For folks who prefer choosing a vehicle that's common, trusted, and backed by lots of experience, sticking with fossil fuels feels like the safest bet. Its dominance now makes it seem more reliable and reduces the perceived risk for those who like things to stay the way they are. On the other hand, electric vehicles (EV-Jordan) show a strong negative link to this criterion. As the importance of current prevalence rises, their

priority tends to go down. That's because electric cars are still relatively new and not as widely adopted yet, so they seem less familiar and might be seen as a riskier choice for people who associate market presence with reliability. The hybrid vehicle (HEV-Jordan), in comparison, probably falls somewhere between the two—it benefits from having a better established presence than fully electric cars, but isn't as dominant as traditional vehicles. It offers a middle ground, blending familiarity with some modern features, so it appeals to consumers who want a bit of both. In summary, the "Current prevalence" factor really works in favor of traditional fossil fuel cars, making the overall model very sensitive to how much a person values well-known, standard options. This emphasizes the ongoing tug-of-war between sticking with what's familiar now and moving toward the future. For decision-makers focused on today's common choices, FF-Jordan is the obvious pick. But because emerging tech like electric vehicles is less familiar, they face an uphill battle convincing people that newer options are reliable and safe. While electric vehicles may outperform traditional ones on other measures, they still have to overcome the challenge of being less recognized and trusted in the market today.

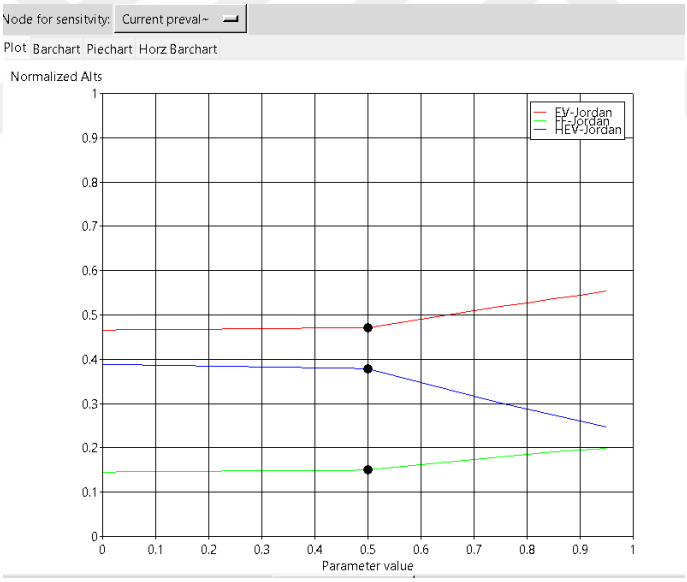

Figure 4.70: Sensitivity analysis according to current prevalence rate in Jordan

The sensitivity analysis shown in Figure 4.71 for the 'Fuel cost' factor clearly shows that the electric vehicle (EV-Jordan) has a strong edge when it comes to saving money during use. The chart emphasizes a clear positive link between how much importance people give to fuel costs and the ranking of EV-Jordan. As people place more emphasis on lowering fuel expenses, the electric car jumps higher in the rankings. This makes sense because electric cars usually cost

less to run per mile since electricity is typically cheaper than gasoline or diesel. For anyone whose main concern is saving money over time and operating costs, EV-Jordan is the best choice by far, offering big savings over the car's lifespan.

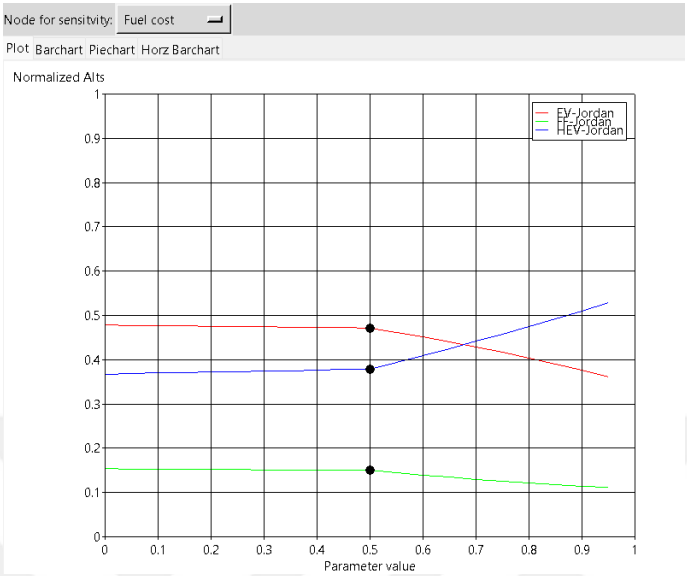

Figure 4.71: Sensitivity analysis according to fuel cost in Jordan

The sensitivity analysis shown in Figure 4.72 for the 'Maintenance' factor clearly emphasizes how the electric vehicle (EV-Jordan) stands out as the best choice. It clearly shows that this EV is more reliable and cheaper to keep in the long run. The graph reveals a strong positive link between how much people care about maintenance and how high the EV-Jordan ranks. When the importance of easy, low-cost maintenance increases, this electric car's score skyrockets. Electric vehicles are naturally more straightforward to maintain because they don't have many parts that need regular service, like oil changes, spark plugs, or exhaust repairs. So, if cutting down on the hassle and costs of maintaining a car is a big deal, the EV-Jordan is a no-brainer offering great convenience and savings. On the other hand, the fossil fuel vehicle (FF-Jordan) shows a clear negative link with this factor. Its score drops sharply as maintenance becomes more important, pointing out its main weakness: internal combustion engines tend to require high, predictable maintenance, which is expensive and time-consuming. This makes it the most costly to take care of over time. Meanwhile, the hybrid vehicle (HEV-Jordan) usually falls somewhere in between, with a moderate positive relation. It has less maintenance needed than regular cars, especially because of brake regeneration and less engine strain, but it still doesn't match the minimal upkeep of a fully electric car, since it has a complex gas engine alongside

its electric parts. In summary, the 'Maintenance' factor really sets the electric vehicle apart, making the outcome very sensitive to how much a person values long-term ease and lower costs. This analysis shows a shift in what's important when choosing a vehicle drivers who want to avoid future problems and surprise repair bills will find the EV's simple mechanics and low maintenance a huge plus. This not only saves money but also boosts reliability and peace of mind. Overall, the EV-Jordan becomes the most logical option for people who want hassle-free ownership.

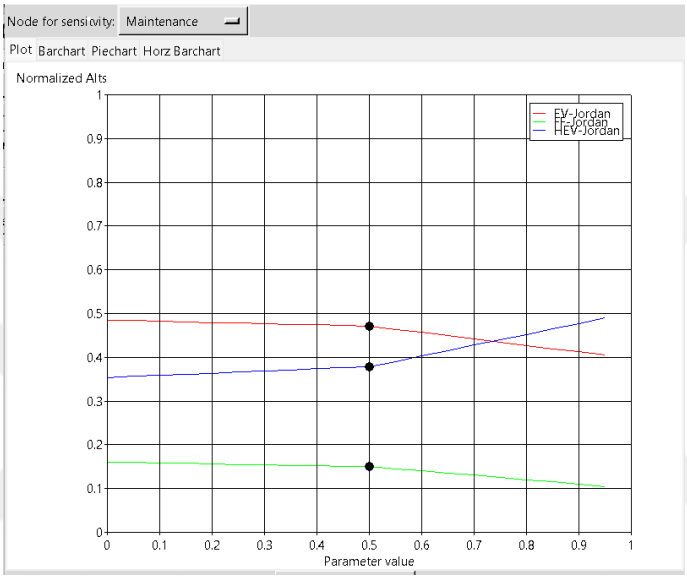

Figure 4.72: Sensitivity analysis according to maintenance in Jordan

The sensitivity analysis in Figure 4.73 for the "Price" criterion reveals a fundamental and expected advantage for the fossil fuel vehicle (FF-Jordan), highlighting its strength as the most economically accessible option in the short term. The graph demonstrates a strong positive correlation between the importance of purchase price and the priority score of the FF-Jordan. As the parameter value increases, meaning consumers place greater emphasis on minimizing the initial upfront cost, the overall ranking of the traditional car rises significantly. This indicates that the fossil fuel vehicle benefits from a lower sticker price compared to its hybrid and electric counterparts, a common market reality driven by the established manufacturing processes and less expensive technology associated with internal combustion engines. For cost-conscious consumers who prioritize immediate affordability and a lower financial barrier to entry, the FF-Jordan represents the most practical and least financially burdensome choice.

Conversely, the electric vehicle (EV-Jordan) exhibits a pronounced negative correlation with this criterion. Its priority score declines sharply as the importance of purchase price grows, underscoring its primary weakness: a higher initial investment. This is typically due to the costly battery technology and advanced components required for electric vehicles, making them the most expensive option to acquire upfront. The hybrid vehicle (HEV-Jordan) likely shows a moderate negative correlation, positioned between the other two. It is generally more expensive than a traditional fossil fuel car but less costly than a fully electric vehicle, resulting in a performance that is penalized by a focus on price, though not as severely as the EV-Jordan.

In conclusion, the "Price" criterion serves as a powerful factor that heavily favors the fossil fuel vehicle, making the model's outcome highly sensitive to a consumer's budget constraints and focus on initial cost. This analysis underscores the classic trade-off between upfront investment and long-term savings. While the electric vehicle may offer superior performance on other criteria like fuel cost and maintenance, its high purchase price presents a significant barrier to adoption for budget-focused buyers. This suggests that the FF-Jordan remains the dominant choice for consumers who prioritize immediate financial outlay, while the economic case for the EV-Jordan must be made on the basis of its long-term operational savings rather than its initial affordability.

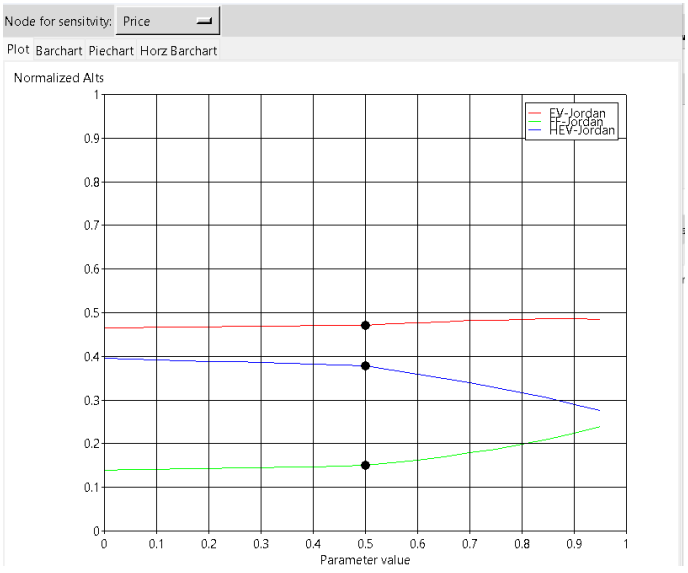

Figure 4.73: Sensitivity analysis according to price in Jordan

4.2 Analysis of Turkiye Survey Data

The relative weights are obtained through a questionnaire to a group of 10 experts in the field of automobile marketing in Turkiye. Pairwise comparisons are made between the proposed evaluation criteria, relative weights are calculated, and priorities are set. Then the consistency ratio matrix is obtained. After obtaining the relative weights for each criterion, the relative weights of the criteria are synthesized to obtain the best alternative for cars in Turkiye.

4.2.1 Priority of Alternatives in terms of Marketing Criteria

This section deals with the study of determining the priority of alternatives according to the main criterion “marketing”, which includes sub-criteria, namely:customer service, reviews, social media, frequency ,discounts.

Inconsistency ratio is lower than 0.1 for all investigations conducted and all the pairwise comparison are illustrated in Appendix B .Also, best alternative according to the customer service criterion is EV-Turkey alternative by percentage 54.99%, followed by HEV-Turkey alternative by 24%, followed by FF-Turkey alternative by 20.98% illustrated in Appendix B

Also, best alternative according to the discounts criterion is EV-Turkey alternative by percentage 54.99%, followed by FF-Turkey alternative by 24.02 %, followed by HEV-Turkey alternative by20.98% .The best alternative according to the frequency criterion is EV-Turkey alternative by percentage 49.33%, followed by HEV-Turkey alternative by 31.08 %, followed by FF-Turkey alternative 19.58%.The best alternative according to the reviews criterion is HEV-Turkey alternative by percentage 44.34%, followed by EV-Turkey alternative by 38.73 %, followed by FF-Turkey alternative by16.92%.The best alternative according to the social media criterion is EV-Turkey alternative by percentage 60.98%, followed by HEV-Turkey alternative by 22.46 %, followed by FF-Turkey alternative by16.5%.

4.2.2 Priority of Alternatives in terms of Characteristics Criteria

This section addresses determining the priority of alternatives according to the main criterion “characteristics”, which includes sub-criteria, namely brand recognition, safety, showroom appearance, numbers of dealer ships.

best alternative according to the Brand Recognition criterion is HEV-Turkey alternative by percentage 53.96%, followed by EV-Turkey alternative by 29.7 %, followed by FF-Turkey alternative by16.34%.

The best alternative according to the Number of Dealerships criterion is EV-Turkey alternative by percentage 49.33%, followed by HEV-Turkey alternative by 31.08 %, followed by FF-Turkey alternative by19.58%.The best alternative according to the Safety criterion is EV-Turkey alternative by percentage 52.78%, followed by HEV-Turkey alternative by 33.25 %, followed by FF-Turkey alternative by13.9%.The best alternative according to Showroom Appearance criterion is HEV-Turkey alternative by percentage 53.96%, followed by EV-Turkey alternative by 29.69 %, followed by FF-Turkey alternative by 16.34 %.

4.2.3 Priority of Alternatives in terms of Current Market Size and Share Criteria

This section addresses determining the priority of alternatives according to the main criterion "current market size and share", which includes sub-criteria, namely: Annual growth and current prevalence rate.

The best alternative according to the annual growth criterion is HEV-Turkey alternative by percentage 65.48%, followed by H EV-Turkey alternative by 24.98 %, followed by FF-Turkey alternative by 9.5 %.The best alternative according to the current prevalence rate criterion is EV-Turkey alternative by percentage 54.99%, followed by FF-Turkey alternative by 24.02 %, followed by HEV-Turkey alternative by 20.98%.

4.2.4 Priority of Alternatives in terms of Cost Criteria

This section addresses determining the priority of alternatives according to the main criterion "cost", which includes sub-criteria, namely: Fuel cost, maintenance and price.The best alternative according to the Fuel cost criterion is HEV-Turkey and EV-Turkey alternative by percentage 40%, followed by FF-Turkey alternative by 20 %.The best alternative according to the maintenance criterion is EV-Turkey alternative by percentage 58.41%, followed by FF-Turkey alternative by 23.18 %, followed by HEV-Turkey alternative by 18.4%.The best alternative according to the price criterion is EV-Turkey alternative by percentage 59.36%, followed by HEV-Turkey alternative by 24.9 %, followed by HEV-Turkey alternative by 15.7%.

4.2.5 Degree of Importance of Sub-factors in Alternative Selection

4.2.5.1 Degree of Importance of Sub-factors in FF-Turkey Selection

This section is concerned with identifying the most important criteria by arranging them in terms of their importance according to relative weight in FF-vehicle selection.

The first factor, which is customer service, obtained the highest importance among the other main selection criteria, as it obtained a percentage of 36.02%. Also, the criteria social media ranked as second among other criteria by 24.73% and reviews criteria ranked as third by 21.22% while the criteria Discounts and Frequency were ranked as fourth(9.1%) and fifth(8.8%) among other criteria, respectively.

As for characteristics, the first factor, which is brand recognition and showroom appearance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 39.6%. Also, the criteria safety ranked as second among other criteria by 11.7 % and safety criteria ranked as third by 21.19% while the criteria number of dealerships was ranked as fourth (9.1%) among other criteria, respectively.

As for current market size and share ,the first factor, which is current prevalence rate , obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria annual growth ranked as second among other criteria by 25% .

As for cost, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.96%. Also, the criteria fuel cost ranked as second among other criteria by 29.69% and price criteria ranked as third by 16.34%.

4.2.5.2 Degree of Importance of Sub-factors in EV-Turkey Selection

This section is concerned with identifying the most important criteria by arranging them in terms of their importance according to relative weight in EV-vehicle selection.

As for marketing the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage37.58 %. Also, the criteria reviews ranked as second among other criteria by 24.98% and customer service criteria ranked as third

by 18.4% while the criteria discounts and frequency were ranked as fourth(10.4%) and fifth(8.6%) among other criteria, respectively.

As for characteristics, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 42.69%. Also, the criteria show room appearance ranked as second among other criteria by 23.5% and number of dealership criteria ranked as third by 20.08 % while the criteria safety was ranked as fourth (13.65%) among other criteria, respectively.

As for current market size and share the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 80%. Also, the criteria current prevalence rate ranked as second among other criteria by 20%.

As for cost, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 55.9%. Also, the criteria price ranked as second among other criteria by 35.22% and fuel cost criteria ranked as third by 8.8%.

4.2.5.3 Degree of Importance of Sub-factors in HEV-Turkey Selection

As for marketing, the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 37.44%. Also, the criteria reviews ranked as second among other criteria by 22.9% and customer service criteria ranked as third by 19.9% while the criteria discounts and frequency were ranked as fourth(12.07%) and fifth(7.6%) among other criteria, respectively.

As for characteristics ,the first factor, which is showroom appearance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 42.48%. Also, the criteria brand recognition ranked as second among other criteria by 27 % and safety criteria ranked as third by 16.12% while the criteria number of dealerships was ranked as fourth (14.3%) among other criteria, respectively.

As for current market size and share, the first factor, which is annual growth , obtained the highest importance among the other main selection criteria, as it obtained a percentage 66.67%. Also, the criteria current prevalence rate ranked as second among other criteria by 33.33% .

As for cost, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.68%. Also, the Fuel cost ranked as second among other criteria by 36.4% and fuel cost criteria ranked as third by 9.9%.

4.2.5.4 Degree of Importance of Sub-factors Relative to Main Factors

As for characteristics, the first factor, which is brand recognition and show room appearance, obtained the highest importance among the other main selection criteria, as it obtained a percentage %. Also, the criteria numbers of dealers ranked as second among other criteria by 20% .

Comparing to discounts with cost criteria, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 46.64%. Also, the criteria maintenance ranked as second among other criteria by 43.3% and fuel cost criteria ranked as third by 10%.

Comparing to reviews with characteristics criteria, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 45.97%. Also, the criteria showroom appearance ranked as second among other criteria by 31.85% and number of dealers criteria ranked as third by 13.6% and the criteria safety was ranked as fourth by 8.5%.

Comparing to social media with characteristics, the first factor, which is show room appearance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 37.42%. Also, the criteria brand recognition ranked as second among other criteria by 25.8% and safety criteria ranked as third by 13.99% and the criteria number of dealers was ranked as fourth by 11.7%.

Comparing to reviews with cost criteria the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 41.26 %. Also, the criteria maintenance ranked as second among other criteria by 32.75 % and fuel cost criteria ranked as third by 25.99%

Comparing to social media to current market size, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a

percentage 80%. Also, the criteria current prevalence rate ranked as second among other criteria by 20% .

Comparing to social media with cost criteria, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 54.99%. Also, the criteria price ranked as second among other criteria by 24.02% and fuel cost criteria ranked as third by 20.98%.

Comparing to brand recognition with marketing criteria, the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 36%. Also, the criteria customer service ranked as second among other criteria by 31.5% and reviews criteria ranked as third by 25.36% while discount ranked as fourth by 7% among other criteria.

Comparing to brand recognition to characteristics criteria, the first factor, which is number of dealerships, obtained the highest importance among the other main selection criteria, as it obtained a percentage 47.42%. Also, the criteria show room appearance ranked as second among other criteria by 37.64 % while safety ranked as third among other criteria by 14.93%.

Comparing to brand recognition to current market size criteria, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 66.67%. Also, the criteria current prevalence rate ranked as second among other criteria by 33.33% .

Comparing to brand recognition to cost criteria, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 55.84%. Also, the criteria maintenance ranked as second among other criteria by 31.96% and fuel cost criteria ranked as third by 12.19%.

Comparing to number of dealers to marketing criteria, the first factor, which is customer service and reviews, obtained the highest importance among the other main selection criteria, as it obtained a percentage 40 %. Also, the criteria social media ranked as second among other criteria by 20%.

Comparing number of dealers to characteristics, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 80%. Also, the criteria showroom appearance ranked as second among other criteria by 20%.Comparing number of dealers to current market size, both of annual growth and current prevalence rate get the same percentage 50%.Comparing safety to marketing, the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 41.26%. Also, the criteria reviews ranked as second among other criteria by 32.74%.comparing safety to current market size, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 80%. Also, the criteria current prevalence rate ranked as second among other criteria by 20% .comparing safety to cost , the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 46.64%. Also, the criteria maintenance ranked as second among other criteria by 43.3% and fuel cost criteria ranked as third by 10%.

Comparing showroom appearance to marketing , the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 46.64%. Also, the criteria reviews ranked as second among other criteria by 43.3% and customer service criteria ranked as third by 10%.

Comparing to showroom appearance to characteristics, the first factor, which is number of dealer ship, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria brand recognition ranked as second among other criteria by 25% .

Comparing to annual growth to marketing, the first factor, which is social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 35.18%. Also, the criteria reviews ranked as second among other criteria by27.93 % and customer service ranked as third by 23.11% and the criteria frequency and discounts were ranked as fourth by 6%.

Comparing annual growth to characteristics, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a

percentage 29.78%. Also, the criteria safety and showroom appearance ranked as second among other criteria by 24.6% and number of criteria ranked as third by 20.9%

Comparing annual growth to cost, the first factor, which is price, obtained the highest importance among the other main selection criteria, as it obtained a percentage 54.96%. Also, the criteria maintenance ranked as second among other criteria by 34.45% and fuel cost ranked as third by 10.85 % .

It is clear from the Figure 4.49 that inconsistency ratio is 0.06 which is lower than 0.1. comparing current prevalence rate service to marketing, the first factor, which is customer service and social media, obtained the highest importance among the other main selection criteria, as it obtained a percentage 26.82%. Also, the criteria reviews ranked as second among other criteria by 24% and discounts criteria ranked as third by 14.18% and the criteria frequency was ranked as fourth by 8%.

Comparing current prevalence rate to characteristics criteria, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 41.92%. Also, the criteria showroom appearance ranked as second among other criteria by 34.66% and number of dealerships criteria ranked as third by 14.74% and safety ranked as fourth by 8%.

Comparing current prevalence rate to cost criteria, the first factor, which is maintenance, obtained the highest importance among the other main selection criteria, as it obtained a percentage 44.34%. Also, the criteria fuel cost ranked as second among other criteria by 38.73% and price criteria ranked as third by 16.9% .Comparing fuel cost to current market size criteria, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria current prevalence rate ranked as second among other criteria by 25%.

Comparing maintenance to marketing criteria, the first factor, which is discounts, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria customer service ranked as second among other criteria by 25% .

Comparing maintenance to characteristics criteria, the first factor, which is safety, obtained the highest importance among the other main selection criteria, as it obtained a percentage 67.38%. Also, the criteria number of dealers ranked as second among other criteria by 22.54% and brand recognition criteria ranked as third by 10%.Comparing maintenance to current market size criteria, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria current prevalence rate ranked as second among other criteria by 25% .Comparing price to marketing criteria, the first factor, which is customer service, obtained the highest importance among the other main selection criteria, as it obtained a percentage 53.96%. Also, the criteria social media ranked as second among other criteria by 26.69% and discounts criteria ranked as third by 16.34% .Comparing price to characteristics criteria, the first factor, which is brand recognition, obtained the highest importance among the other main selection criteria, as it obtained a percentage 48.36%. Also, the criteria number of dealerships ranked as second among other criteria by 34.87% and safety criteria ranked as third by 16.76%. Comparing price to current market size criteria, the first factor, which is annual growth, obtained the highest importance among the other main selection criteria, as it obtained a percentage 75%. Also, the criteria current prevalence rate ranked as second among other criteria by 25%.

4.2.6 Estimating the Relative Weights of the ANP Turkiye Model

The pairs between the proposed evaluation criteria were compared to obtain relative weights as in Figure 4.73. The results of the relative weights showed that the priority for the alternatives is for EV-Turkey by 49.21% followed by HEV-Turkey by 31.28% and FF-Turkey got the least priority by 14.5%.

Also, priorities shows that annual growth is the most important sub-criteria by 69.7% followed by maintenance is the ranked as second sub criteria in terms of importance by 44.18% followed by price by 40% which ranked as third among sub criteria. Also, brand recognition ranked as fourth by 37% followed by current prevalence rate which was ranked as fifth among other sub criteria followed by customer service and social media which was ranked as sixth by 28%.Showroom appearance and number of dealerships were ranked as seventh by 25%.

Here are the priorities.

Icon	Name	Normalized by Cluster	Limiting
No Icon	EV-Turkey	0.49212	0.088524
No Icon	FF-Turkey	0.19505	0.035087
No Icon	HEV-Turkey	0.31283	0.056273
No Icon	Customer service	0.28595	0.043010
No Icon	Discounts	0.19917	0.029957
No Icon	Frequency	0.03122	0.004696
No Icon	Reviews	0.20163	0.030327
No Icon	Social media	0.28203	0.042421
No Icon	Brand Recognition	0.37082	0.088430
No Icon	Number of dealerships	0.24528	0.058492
No Icon	Safety	0.13201	0.031482
No Icon	Showroom appearance	0.25189	0.060069
No Icon	Annual growth	0.69706	0.146899
No Icon	Current prevalence rate	0.30294	0.063843
No Icon	Fuel cost	0.15663	0.034535
No Icon	Maintenance	0.44181	0.097417
No Icon	Price	0.40156	0.088541

Figure 4.74: Relative weights of evaluation criteria of ANP model of Turkiye

4.2.7 Evaluating the Three Alternatives and Choosing the Best Car in Turkiye

After obtaining the relative weights for each criterion, the relative weights of the criteria are combined with the relative weights of the alternatives to obtain the best alternative, as in Figure 4.74. Figure 4.75 shows that the best alternative for choosing a car in Turkey is the electric car at a rate of 49.21%, followed by the hybrid car alternative at a rate of 31.28%, and the last place is occupied by cars that run on fuel at a rate of 19.5%.

Name	Graphic	Ideals	Normals	Raw
EV-Turkey		1.000000	0.492117	0.088524
FF-Turkey		0.396361	0.195056	0.035087
HEV-Turkey		0.635675	0.312827	0.056273

Figure 4.75: Overall synthesized priorities for the alternative of ANP model of Turkiye

4.2.8 Sensitivity Analysis of Results of the ANP Model in Turkiye

The analysis shown in Figure 4.76 focuses on how much the importance placed on customer service influences the appeal of electric vehicles (EV-Turkey) in the Turkish market. It clearly shows that when Turkish consumers prioritize things like warranties, maintenance, and reliable

support after buying, the EV-Turkey ranks much higher. The graph emphasizes a strong positive link: as the value given to customer service increases, the electric vehicle's overall score in the market also climbs. This means that people's perception of the EV's quality and attractiveness in Turkey really depends on solid customer service think comprehensive battery warranties, easy access to charging stations, and reliable maintenance options. For those who care a lot about long-term dependability and trustworthy manufacturers, especially with new tech, EV-Turkey becomes a much more appealing choice. On the other hand, traditional fuel-powered vehicles (FF-Turkey) tend to do worse as the importance of customer service becomes more important. Their scores drop when consumers put greater emphasis on after-sales support, suggesting they're seen as lacking here compared to EVs. This could be because they offer more generic, less personalized service, or because consumers feel traditional car brands aren't competitive enough with their after-sales deals. Hybrid vehicles (HEV-Turkey) show a moderate negative impact: their scores decrease as customer service importance grows, but not as sharply as gas-powered cars. This places them somewhere in the middle, but still not as strong as EVs, which benefit greatly from the service-focused approach. In summary, the 'Customer Service' factor plays a key role in Turkey, heavily favoring electric vehicles. It makes the EV's success highly sensitive to how much weight is given to after-sales support. This indicates that Turkish buyers see strong customer service as essential for accepting electric cars, especially to reduce concerns around adopting new technology. For carmakers, this emphasizes the importance of building solid service networks and offering competitive warranties in Turkey to tap into this trend and boost EV sales. While traditional and hybrid vehicles might compete in other ways, they need to upgrade their customer service to stay attractive to consumers who value support after the sale.

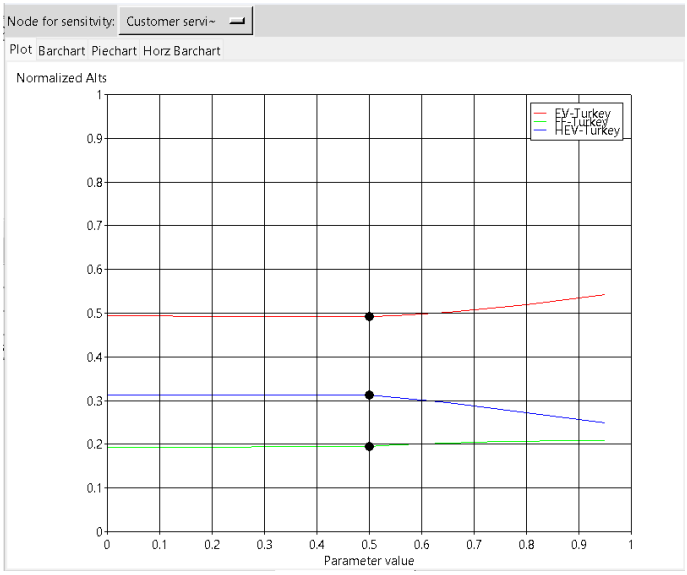

Figure 4.76: Sensitivity analysis according to customer service in Turkiye

The sensitivity analysis shown in Figure 4.77 for the 'Discounts' factor clearly favors the hybrid vehicle (HEV-Turkey), suggesting that how much people value financial incentives strongly influences its position in the market. The graph shows a clear positive relationship: as the importance of discounts goes up—like better deals, discounts, or rebates—the hybrid's overall score also increases quite a bit. This means that the hybrid model really benefits from things like manufacturer offers, government incentives for electrified cars, and a pricing approach that makes discounts especially attractive. For buyers who are budget-conscious and looking for quick savings, the HEV-Turkey turns out to be the most appealing choice. On the other hand, the electric vehicle (EV-Turkey) shows a different pattern: its score drops when discounts are more important. Despite usually having a higher initial price, this electric car's value doesn't rely much on short-term financial perks. Instead, people might find it more appealing due to long-term savings on fuel and upkeep, or because of its eco-friendliness and advanced tech, which discounts don't fully reflect. The fossil fuel vehicle (FF-Turkey) also shows a negative trend, but probably less strongly, indicating that although discounts are sometimes available, they don't have a big impact on its competitiveness compared to hybrids. This could be because discounts are common in traditional cars but don't often sway buyers as much. Overall, the 'Discounts' criterion plays a big role in favoring the hybrid vehicle, making the results very sensitive to how much importance consumers place on immediate savings. This emphasizes how targeted promotions can influence buying decisions, especially when consumers are very

price-sensitive. For car makers and policymakers, this suggests that offering discounts or subsidies on hybrids can help boost their sales. Meanwhile, electric cars might need different approaches, like emphasizing their long-term benefits or environmental impact, to attract more customers. Traditional fuel vehicles, meanwhile, are at a disadvantage when discounts are a key factor, which shows that electrified vehicles are becoming more attractive in today's market.

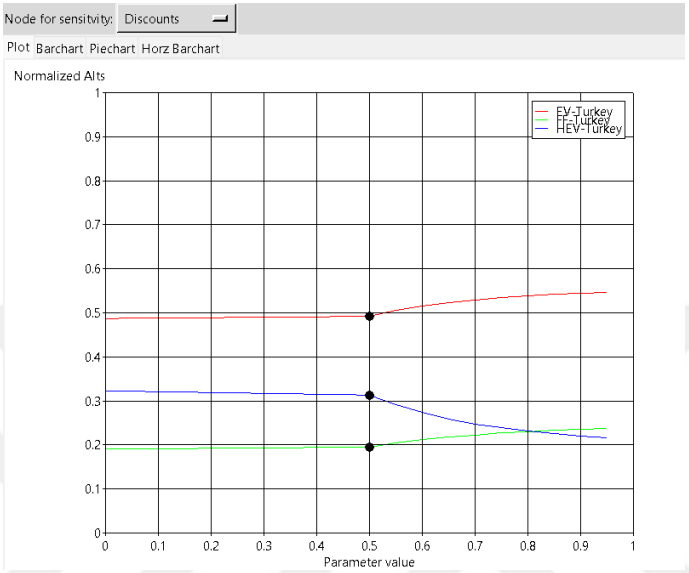

Figure 4.77: Sensitivity analysis according to discounts in Turkiye

The sensitivity analysis shown in Figure 4.78 for the "Frequency" criterion emphasizes a clear advantage for the electric vehicle (EV-Turkey), showing that it's generally better for people who care about convenience and long-term reliability. The graph indicates a strong positive relationship between how much importance someone places on frequency—probably meaning how often they need maintenance or refuel—and how highly they rate EV-Turkey. When this importance goes up, especially for those who want fewer routine tasks and more ease of use, the electric car's ranking improves a lot. This makes sense because electric vehicles generally need less upkeep—they don't have oil changes, have fewer moving parts, and can be charged at home, meaning fewer trips to the gas station. If avoiding regular service and refueling is a priority, the EV-Turkey stands out as the best option.

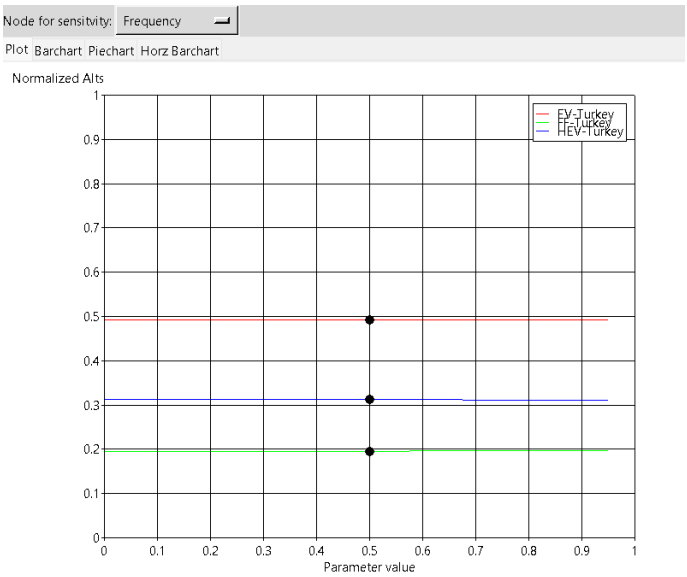

Figure 4.78: Sensitivity analysis according to frequency in Turkiye

The analysis shown in Figure 4.79 about the 'Reviews' factor emphasizes that the hybrid vehicle (HEV-Turkey) is the option most positively impacted by this criterion. It seems that people tend to trust and recommend it more when they see good reviews and feedback from others. The graph clearly shows that as the importance of reviews grows meaning consumers care more about ratings, expert opinions, and what users saythe HEV-Turkey's rank improves a lot. This indicates that positive reviews really help boost its reputation, probably because it offers a good balance as a transitional car—better fuel economy and lower emissions without the worries about charging stations or range that fully electric vehicles often face. For shoppers who depend on reviews to feel confident about their choices, the hybrid becomes the most trusted and recommended option. On the other hand, the fossil fuel vehicle (FF-Turkey) shows a clear negative connection with this criterion. Its score drops as reviews matter more, suggesting that people see it less favorably in overall assessments and public opinion. This could be because it's seen as outdated technology, more harmful to the environment, or not as good when compared to newer, more modern options. The electric vehicle (EV-Turkey) also shows a negative link, but the decline isn't as sharp. That hints that while it is viewed as innovative, it still gets mixed feedbackissues like charging availability, higher upfront costs, or battery concerns might be factors. Overall, this makes the EV a more divisive choice that struggles to get a consensus in reviews compared to the hybrid. To sum up, the 'Reviews' factor is a key element that heavily influences trust and perception, giving a big advantage to the hybrid

vehicle and making the model's ranking very sensitive to how much people value outside opinions. This analysis shows that reputation and perceived dependability are critical in consumer decision-making. For the HEV-Turkey, positive reviews are a major asset, reinforcing its image as a practical and reliable choice. Meanwhile, the fossil fuel and electric vehicles need to work on improving how they are viewed in reviewswhether that's through better technology, changing public opinion, or clearly communicating what makes them goodso they can compete more effectively in a review-driven market.

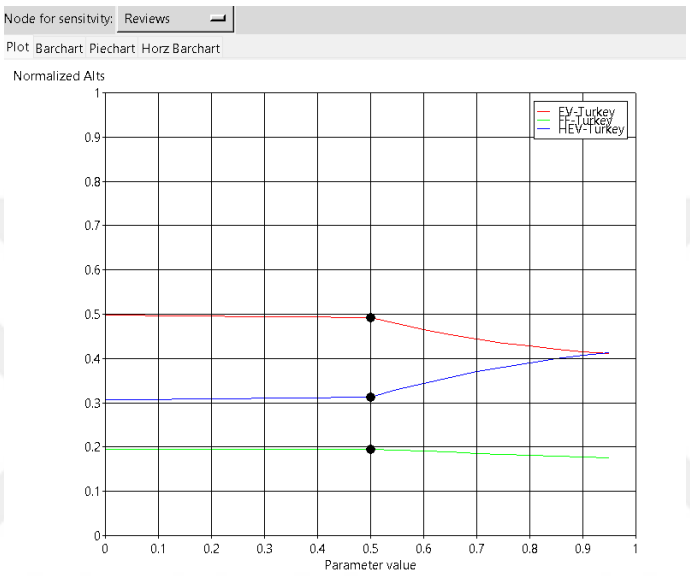

Figure 4.79: Sensitivity analysis according to reviews in Turkiye

The sensitivity analysis shown in Figure 4.80 for the 'Social media' factor points to a clear strength for the electric vehicle, EV-Turkey. It really emphasizes how well the car fits with modern digital habits and what today's consumers care about. The graph clearly shows a strong positive link between how much people care about social media influence and EV-Turkey's score. As the importance of things like online buzz, influencer support, and peer reviews increases, the ranking of this electric vehicle jumps up noticeably. This suggests that EV-Turkey benefits from a lively and prominent presence on social media, where it's often seen as innovative, eco-friendly, and tech-savvy. For people who follow digital trends and want products that boost their social image, this electric car becomes the top choice more aspirational and desirable than the others. On the other hand, the fossil fuel car, FF-Turkey, shows a clear negative relationship with this same factor. Its score drops sharply as social media's importance grows, pointing to a perception that it's become outdated and less relevant in online discussions.

Internal combustion engine vehicles are frequently mentioned on social media in conversations about pollution, environmental impact, and staying in line with modern sustainability ideas. That makes them less appealing for consumers who care about the environment and social responsibility. The hybrid vehicle, HEV-Turkey, likely falls somewhere in between with a moderate positive connection. It gets some positive attention on social media because it's more efficient than traditional cars, but it doesn't generate the same excitement or viral buzz as the fully electric EV. The electric model is seen as a more forward-looking, revolutionary choice. In summary, the 'Social media' factor is a key difference-maker, greatly favoring the electric car. It makes the overall results very sensitive to how much importance consumers place on online influence and peer opinions. This shows how important a brand's digital footprint has become in shaping what people prefer. For EV-Turkey, its strong social media presence is a big advantage that appeals to modern, connected buyers. Meanwhile, the negative link for the fossil fuel vehicle emphasizes its struggle to stay relevant in a market that's increasingly digital. The hybrid sits in the middle, attracting some interest but lacking the groundbreaking appeal of the fully electric. This points to needing traditional automakers to innovate not just with new technology but also with their digital marketing strategies if they want to stay competitive.

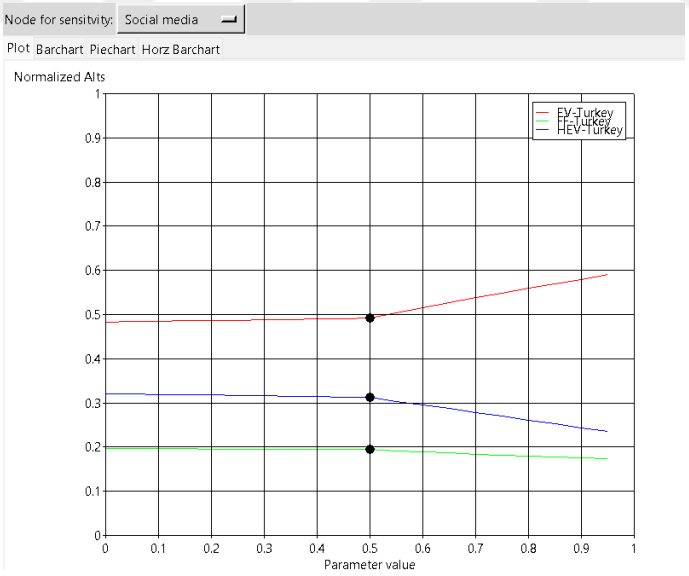

Figure 4.80: Sensitivity analysis according to social media in Turkiye

The sensitivity analysis presented in Figure 4.81 regarding the "Brand Recognition" criterion in the Turkish automotive market clearly highlights the prevailing dominance of fossil fuel vehicles (FF-Turkey) among consumers. Long-established automotive brands, with decades of

market presence, continue to shape purchasing decisions in Turkey. The data reveal a strong positive correlation between the importance consumers assign to brand recognition and the priority score attributed to FF-Turkey. As Turkish consumers place increasing value on brand familiarity, reputation, and historical reliability, the ranking of traditional vehicles rises markedly. This outcome reflects the considerable trust and loyalty that legacy automotive manufacturers have cultivated, underlining brand familiarity as a crucial driver of perceived quality, durability, and resale value.

In contrast, the analysis demonstrates a negative correlation*for electric vehicles (EV-Turkey) with respect to this criterion. As brand recognition becomes more significant to consumers, the priority score for electric vehicles declines. This suggests that brands associated with electric vehicles are either relatively new to the Turkish market or have yet to establish the same level of trust and market penetration as conventional automakers. The resulting credibility gap presents a substantial barrier to widespread electric vehicle adoption, emphasizing the need for these brands to invest in building robust brand equity and consumer confidence.

Hybrid vehicles (HEV-Turkey), typically offered by established global manufacturers, occupy an intermediate position with a moderate positive correlation. Hybrids benefit from the brand strength of their parent companies while introducing consumers to newer technologies. This dynamic enables hybrids to function as a transitional option, offering lower perceived risk for consumers who prioritize both brand reliability and a degree of innovation.

In summary, the criterion of “Brand Recognition” serves as a pivotal and potentially limiting factor within the Turkish automotive market, significantly favoring fossil fuel vehicles and amplifying the model’s sensitivity to consumer preferences regarding brand familiarity. The analysis underscores the formidable challenge faced by new entrants, particularly electric vehicle manufacturers, in overcoming established brand loyalty. For electric vehicles to gain traction, strategic investments in brand-building, local partnerships, and visible demonstrations of reliability will be essential. The intermediate standing of hybrid vehicles suggests they are well-positioned to act as a bridge between traditional and emerging technologies, facilitating a gradual transition for Turkish consumers in a market highly attuned to brand reputation.

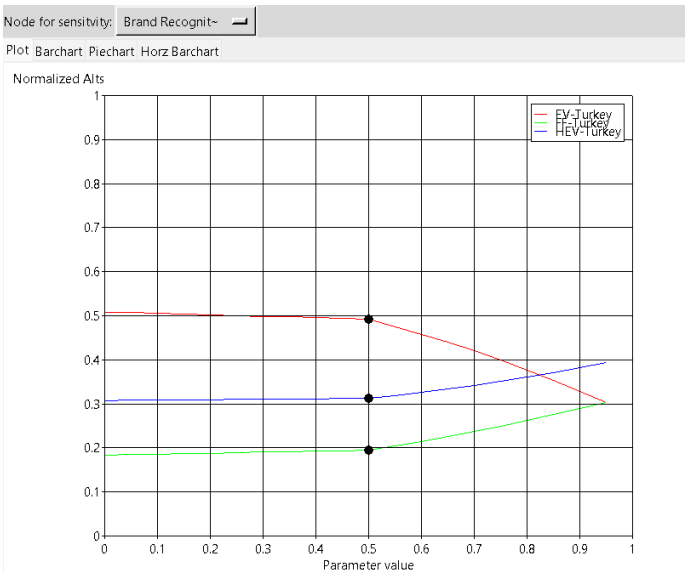

Figure 4.81: Sensitivity analysis according to brand recognition in Turkiye

The sensitivity analysis presented in Figure 4.82 regarding the "Number of dealers" criterion distinctly underscores a structural advantage for the fossil fuel vehicle (FF-Turkey). This advantage is closely linked to a robust and expansive dealer network, which remains a pivotal factor in consumer decision-making. As the analysis illustrates, there is a strong positive correlation between the weighting of dealer network size and the priority score assigned to the FF-Turkey. In essence, as consumers place greater importance on the convenience of numerous, accessible dealerships for test drives, purchases, and ongoing maintenance, the ranking of the traditional fossil fuel vehicle rises markedly. This outcome reflects the legacy infrastructure established by long-standing automotive brands, which provides consumers with both practical access and a sense of reliability.

In contrast, the electric vehicle (EV-Turkey) demonstrates a pronounced negative correlation with the dealer network criterion. As the importance of this factor increases in the analysis, the EV-Turkey's priority score declines notably. This can largely be attributed to the relatively limited and less mature sales and service infrastructure maintained by many electric vehicle brands or by established companies that are still developing specialized EV support networks. For consumers who prioritize immediate accessibility and streamlined service, this limitation represents a significant deterrent.

Hybrid vehicles, such as the HEV-Turkey, typically occupy an intermediate position. Their moderate positive correlation with the criterion is due to their integration into the existing dealer networks of conventional manufacturers, making them more accessible than fully electric models, but still not reaching the widespread coverage of traditional fossil fuel vehicles.

In summary, the "Number of dealers" criterion emerges as a substantial determinant, especially favoring fossil fuel vehicles given their entrenched and extensive dealer networks. This analysis highlights a major challenge for electric vehicle adoption: the urgent need for manufacturers to expand their physical presence beyond charging infrastructure. Addressing this gap—either through the development of additional dealerships, innovative direct-to-consumer models, or expanded mobile service offerings—will be critical for electric vehicles to achieve broader market acceptance. The strong positive sensitivity of fossil fuel vehicles to dealer network size ultimately reaffirms the enduring importance of convenience and accessibility within the automotive sector.

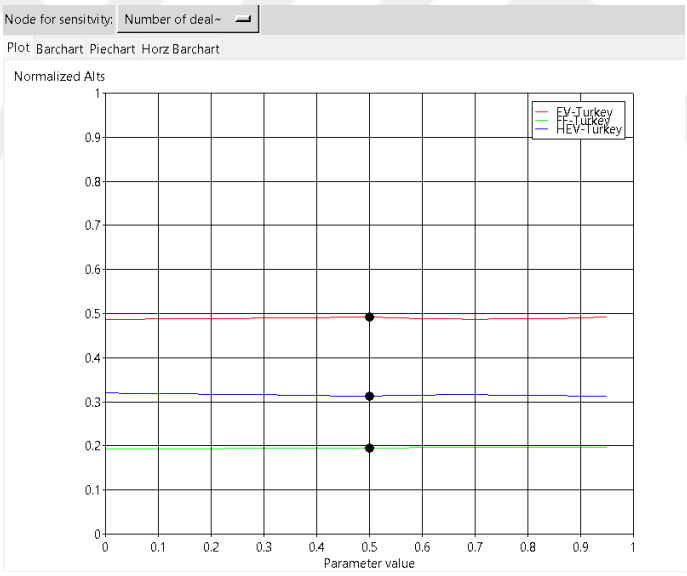

Figure 4.82: Sensitivity analysis according to number of dealerships in Turkiye

The sensitivity analysis presented in Figure 4.83 underscores the significant influence of showroom appearance on consumer preferences, particularly in the context of the electric vehicle (EV-Turkey). As the analysis demonstrates, there exists a strong positive correlation between the importance attributed to showroom aesthetics and the priority score achieved by the EV-Turkey. In practical terms, this means that as consumers place increasing value on

elements such as exterior styling, interior design, and overall visual impact during their dealership experience, the electric vehicle's standing improves markedly. The EV-Turkey's contemporary, innovative design—characterized by clean lines and a distinctive, modern aesthetic appears to provide it with a pronounced competitive advantage in visually-driven purchasing decisions.

Conversely, the fossil fuel vehicle (FF-Turkey) exhibits a pronounced negative correlation in this regard. Its priority score diminishes as the emphasis on showroom appearance increases, suggesting that its more traditional or familiar design fails to resonate as strongly with consumers prioritizing visual appeal. The hybrid vehicle (HEV-Turkey) demonstrates a moderate positive correlation, reflecting a design that, while more current than its fossil-fuel counterpart, does not reach the same level of novelty or impact as the electric model.

Overall, the evidence suggests that showroom appearance functions as a critical differentiator favoring the electric vehicle, particularly among aesthetically-motivated consumers. This highlights the broader importance of design and first impressions within the automotive market, where emotional and psychological factors often intersect with rational evaluation. For the EV-Turkey, visual presentation is not merely a superficial attribute, but a central factor influencing its market success. Consequently, marketing strategies for electric vehicles should emphasize their design advantages through high-quality showroom displays and visually-oriented advertising. Traditional manufacturers, meanwhile, may need to invest further in design innovation to maintain competitiveness in an increasingly appearance-driven marketplace looks.

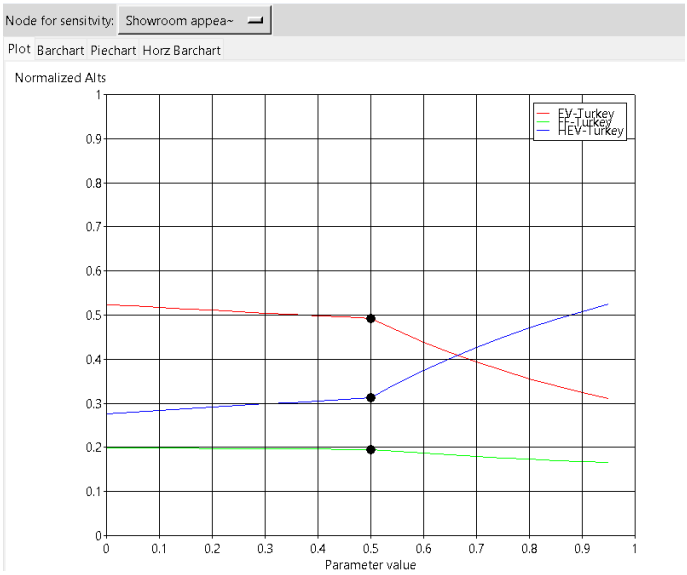

Figure 4.83: Sensitivity analysis according to showroom appearance in Turkiye

The sensitivity analysis in Figure 4.84 concerning the "Annual growth" criterion in Turkey clearly illustrates a pronounced advantage for electric vehicles (EVs). As the analysis demonstrates, there is a robust positive relationship between the prioritization of annual growth and the ranking of EVs within the Turkish market. In contexts where consumers or investors attribute greater significance to future market expansion, technological progress, and anticipated returns, electric vehicles consistently emerge as the most favorable option. This pattern aligns with broader global trends toward electrification, as well as the increasing prevalence of policy incentives and societal emphasis on sustainability. For stakeholders who value long-term innovation and market positioning, the data strongly suggests that electric vehicles represent a forward-looking and strategic investment.

In contrast, internal combustion engine vehicles (fossil fuel vehicles) exhibit a marked negative correlation with the annual growth criterion. Their relative appeal diminishes as the importance of future growth becomes more pronounced, reflecting the sector's ongoing regulatory challenges, environmental scrutiny, and gradual decline. These factors combine to make conventional vehicles less attractive to those focused on sustainable, future-oriented choices.

Hybrid vehicles, meanwhile, occupy an intermediate position. Their correlation with the "Annual growth" criterion is moderately positive, indicating some alignment with growth-oriented preferences. Hybrids benefit from transitional status and incremental efficiency

improvements, but they do not match the disruptive potential or market momentum of fully electric vehicles.

In summary, the "Annual growth" criterion acts as a key differentiator in the Turkish automotive market, substantially enhancing the attractiveness of electric vehicles for growth-conscious decision-makers. This finding underscores the importance of aligning automotive strategies with emergent technological and economic trends. For policymakers and manufacturers, emphasizing the growth trajectory and future relevance of electric vehicles is likely to resonate with a forward-looking audience. Conversely, traditional vehicles may need to innovate or reposition themselves to remain viable as market dynamics continue to evolve. Hybrid vehicles, while pragmatic, may ultimately find it challenging to compete with the compelling growth narrative associated with full electrification.

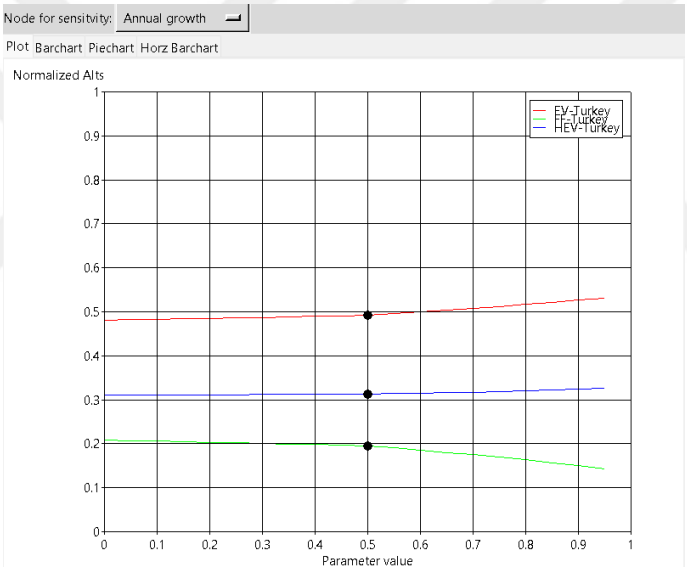

Figure 4.84: Sensitivity analysis according to annual growth in Turkiye

A sensitivity analysis in Figure 4.85 of the "Current prevalence" criterion reveals a marked advantage for the fossil fuel vehicle (FF-Turkey), highlighting the significant influence of market familiarity and established presence in shaping consumer preferences. The data indicate a robust positive correlation between the weight assigned to current prevalence and the priority score for the FF-Turkey. In practical terms, as consumers place greater emphasis on the ubiquity and familiarity of a vehicle type, the relative ranking of the conventional internal combustion vehicle rises correspondingly. This underscores the enduring value of historical usage,

widespread availability, and the consumer reassurance associated with established technologies. For individuals prioritizing ease of service, reliability, and the security of well-developed product ecosystems, fossil fuel vehicles continue to represent a lower-risk, highly dependable option.

In contrast, electric vehicles (EV-Turkey) demonstrate a pronounced negative correlation with the "Current prevalence" criterion. As the importance of this factor increases for consumers, the priority score of the EV-Turkey declines, reflecting its status as a less familiar and less prevalent alternative. Despite the promise of technological advancement, electric vehicles currently face limited market penetration, which translates into a perception of increased risk or uncertainty among consumers who equate familiarity with reliability. Hybrid vehicles (HEV-Turkey) occupy an intermediate position, exhibiting a moderate positive correlation with the criterion. They benefit from greater market presence than electric vehicles while still incorporating elements of innovation, thus appealing to consumers seeking gradual adoption of new technologies without a wholesale departure from established norms.

In summary, "Current prevalence" functions as a powerful defensive mechanism for incumbent technologies, particularly fossil fuel vehicles. The analysis demonstrates that consumer preferences for established market solutions significantly shape model outcomes, presenting a formidable challenge for the adoption of new alternatives such as EVs. For electric vehicles to achieve broader acceptance, strategies focused on increasing public visibility, fostering consumer trust, and building comprehensive support infrastructures are essential. The enduring positive sensitivity of fossil fuel vehicles to this criterion reaffirms the critical role of market familiarity in influencing consumer automotive choices.

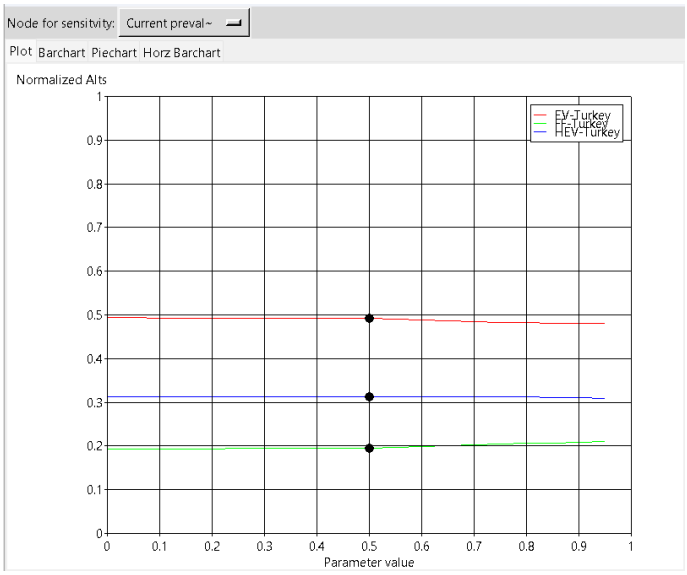

Figure 4.85: Sensitivity analysis according to current prevalence rate in Turkiye

The sensitivity analysis presented in Figure 4.86 regarding the "Fuel cost" criterion in the Turkish context strongly demonstrates the clear advantage of electric vehicles (EV-Turkey) in terms of economic efficiency. The results indicate that as Turkish consumers place increasing importance on minimizing ongoing fuel expenses an especially pressing concern given the volatility of fuel prices in Turkey the priority score and overall ranking of the electric vehicle rise significantly. This relationship points to a robust positive correlation between concerns over fuel costs and the appeal of EVs, largely due to their substantially lower energy costs per kilometer compared to internal combustion vehicles. Electricity in Turkey tends to be both more affordable and less volatile than gasoline or diesel, further reinforcing this advantage.

Cost-conscious consumers in Turkey, for whom operational expenses are a central consideration, will find the electric vehicle to be the optimal choice, as it offers substantial financial benefits over the vehicle's lifetime and provides a degree of insulation from unpredictable fuel markets. In contrast, the fossil fuel vehicle (FF-Turkey) exhibits a marked negative correlation with the fuel cost criterion. Its priority score drops steeply as the significance of fuel costs increases, highlighting its fundamental weakness: high vulnerability to Turkey's fluctuating fuel prices and lower energy efficiency. Consequently, it emerges as the most expensive option to operate when ongoing costs are a major concern for households and businesses.Hybrid vehicles (HEV-Turkey) occupy an intermediate position. While they offer improved fuel efficiency relative to traditional combustion vehicles—resulting in some

operational savings—they cannot match the extensive cost reductions provided by full electrification. The hybrid's moderate positive correlation with fuel cost sensitivity reflects this partial, but not complete, mitigation of fuel price volatility.

In summary, the "Fuel cost" criterion is a decisive factor in the Turkish automotive market, significantly favoring electric vehicles. The analysis highlights a fundamental shift in total cost of ownership calculations, especially relevant within Turkey's current economic climate. For consumers who intend to use their vehicles extensively and are concerned with long-term operating expenses, the higher initial purchase price of an electric vehicle is justified and offset by substantially lower fueling costs. This dynamic presents a compelling economic rationale for the adoption of electric vehicles, while underscoring the increasing financial disadvantage of traditional fossil fuel vehicles. Hybrid vehicles represent a transitional solution, but do not offer the full economic benefits associated with complete electrification.

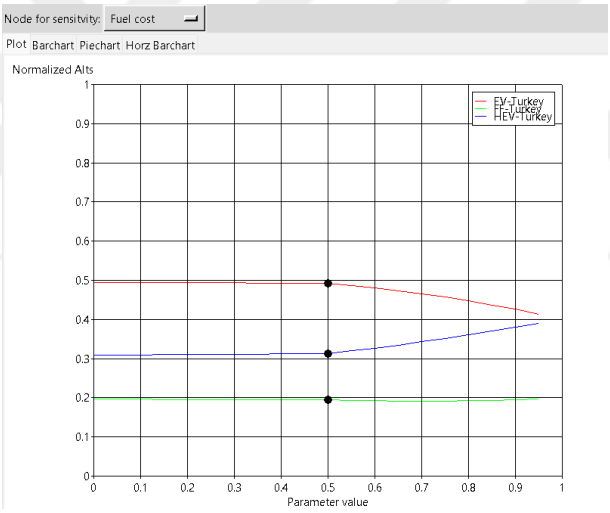

Figure 4.86: Sensitivity analysis according to fuel cost in Turkiye

Figure 4.87 presents a clear advantage for the EV-Turkey in terms of the "Maintenance" criterion. As the analysis adjusts the importance of maintenance, the electric vehicle's ranking improves markedly. This outcome is hardly surprising. Electric vehicles, by design, have far fewer mechanical complexities—no oil changes, no spark plugs, no transmission repairs, and thanks to regenerative braking, even the brake pads last longer. The low frequency and predictability of required service make the EV-Turkey the most appealing choice for those prioritizing long-term ownership ease and cost reduction.

In contrast, the FF-Turkey (fossil fuel vehicle) demonstrates a significant disadvantage as maintenance becomes more important. Its score drops off rapidly, underlining the ongoing reality that internal combustion engines demand more frequent and often more costly care. More moving parts and regular fluid changes drive up both the hassle and the expense, which is reflected in its negative correlation with the maintenance criterion.

The HEV-Turkey (hybrid) occupies a middle ground. It offers some reduction in maintenance—particularly in terms of less brake wear and reduced engine strain—but it retains both combustion and electric systems. This means it cannot fully match the simplicity and cost savings of a purely electric vehicle, though it does outperform the traditional fossil fuel alternative in this respect.

Overall, maintenance emerges as a decisive factor, strongly favoring the electric vehicle. For decision-makers who wish to minimize long-term inconvenience, expense, and unpredictability, the EV-Turkey represents a compelling option. The analysis underscores a broader shift in the automotive landscape: as consumers prioritize reliability and low-maintenance ownership, the electric vehicle's structural simplicity and reduced servicing needs make it the rational choice. The hybrid serves as a reasonable compromise, while the traditional fossil-fuel vehicle increasingly fails to meet the expectations of maintenance-conscious buyers.

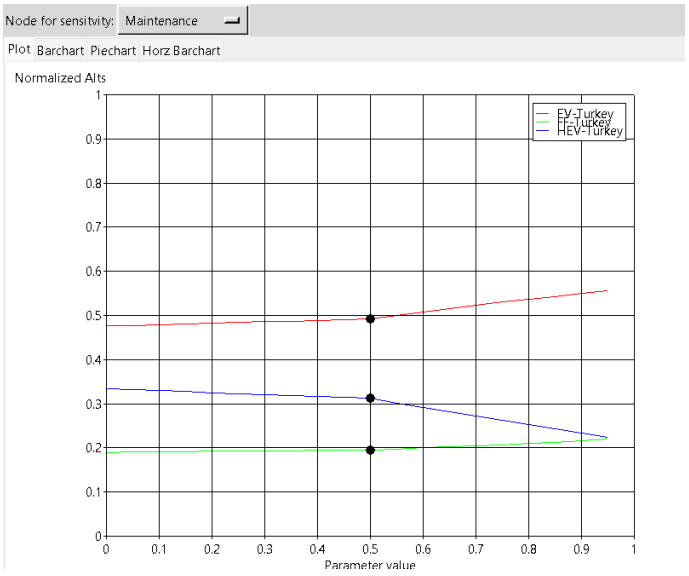

Figure 4.87: Sensitivity analysis according to maintenance in Turkiye

Figure 4.88 shows sensitivity analysis for the “Price” criterion clearly demonstrates a distinct advantage for the fossil fuel vehicle (FF-Turkey), especially when considering short-term financial accessibility. As the graph shows, there’s a strong positive correlation between how much importance consumers place on the initial purchase price and the FF-Turkey’s priority score. Simply put: the more buyers care about paying less up front, the better this traditional vehicle performs in the rankings. This is hardly surprising, given the lower manufacturing costs, established production practices, and relatively inexpensive technology behind internal combustion engines.

Conversely, the electric vehicle (EV-Turkey) exhibits a pronounced negative correlation with the price criterion. Its ranking drops steeply as the focus on purchase price increases, highlighting a well-recognized barrier: higher initial investment. This is primarily driven by costly battery technology, advanced electronics, and ongoing research and development—factors that keep electric vehicles more expensive at the point of sale.

The hybrid (HEV-Turkey) predictably falls somewhere between the two. It’s not as affordable as the FF-Turkey, but it doesn’t require the same up-front outlay as the EV-Turkey. This results in a moderate negative correlation—hybrids are penalized for their higher price, but not to the same extent as electric vehicles.

In summary, the “Price” criterion is a powerful differentiator that significantly favors the fossil fuel vehicle, making purchase cost a primary driver of consumer preference. This underscores the classic trade-off observed in the automotive sector: lower initial cost versus potential long-term savings. While electric vehicles may surpass their counterparts in terms of fuel efficiency, reduced maintenance, and environmental impact, their higher initial price remains a substantial hurdle for cost-sensitive buyers. The hybrid vehicle, meanwhile, offers a middle-ground solution for those willing to pay a moderate premium for improved efficiency without fully committing to electrification. Overall, the fossil fuel vehicle remains the dominant choice for buyers focused on immediate affordability.

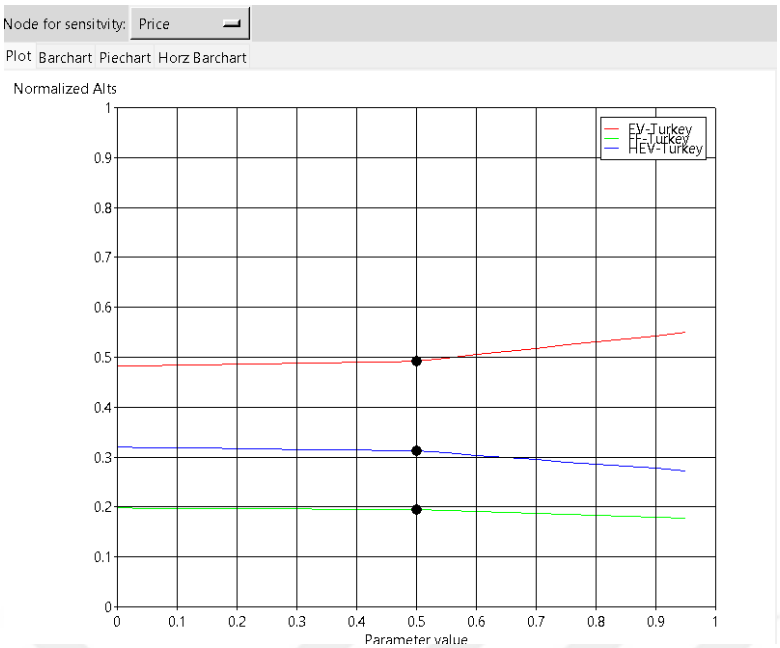

Figure 4.88: Sensitivity analysis according to price in Turkiye

5 CONCLUSION AND RECOMMENDATIONS

5.1 Comments on Results of Turkey and Jordan ANP Models

Drawing from the revised analysis of questionnaire data in Jordan, interpreted through the Analytic Network Process (ANP) model, it is evident that electric vehicles (EVs) have emerged as the preferred choice among experts. Specifically, EVs secured the highest priority score at 47.15%, followed by hybrid electric vehicles (HEVs) at 37.87%, with fossil fuel vehicles (FFVs) significantly trailing at 14.96%. This distribution signals a distinct shift within the Jordanian market towards environmentally sustainable and technologically progressive transportation alternatives.The evaluation spanned four primary criteria—marketing, vehicle characteristics, current market size and share, and cost—each comprising several sub-criteria. Within marketing, EVs demonstrated strong performance in areas such as discounts (59.36%), frequency (49.33%), reviews (61.44%), and social media presence (59.73%), whereas HEVs excelled in customer service (68.17%). Regarding vehicle characteristics, HEVs led in brand recognition (53.96%), while EVs were favored for safety (55.84%), showroom appearance (62.67%), and number of dealerships (49.33%).In the category of current market size and share, HEVs were recognized for superior annual growth (65.48%), whereas EVs maintained a dominant current prevalence rate (58.41%). Finally, in terms of cost, HEVs proved advantageous in fuel cost (54.69%), while EVs outperformed in both maintenance (61.44%) and price (55.84%).Collectively, these findings illustrate the growing preference for electric vehicles in Jordan, highlighting their strengths across multiple evaluative dimensions, while also acknowledging the competitive presence of hybrid vehicles. Fossil fuel vehicles, by contrast, appear to be losing favor in the current market context. The sensitivity analysis demonstrates that adjustments to the weighting of individual sub-criteria can substantially shift vehicle rankings. For example, when customer service is prioritized, electric vehicles (EVs) tend to rank higher, reflecting the significance of after-sales support and warranty offerings. Similarly, the introduction of financial incentives, such as discounts, enhances the competitive position of hybrid electric vehicles (HEVs), underscoring the influence of economic factors in

consumer decision-making. Lower maintenance and refueling requirements confer notable advantages to EVs, as these factors contribute to reduced ongoing costs. Expert and user reviews appear to positively influence HEVs, indicating that trust in third-party assessments remains a key element in vehicle selection. Social media presence further elevates the attractiveness of EVs, suggesting that digital engagement is increasingly relevant in shaping consumer perceptions.

Fossil-fuel vehicles (FFVs) continue to benefit from strong brand recognition and extensive dealership networks, elements that contribute to their ongoing relevance within the automotive market. The visual appeal and design quality of showrooms, particularly those dedicated to electric vehicles (EVs), further underscore the importance of presentation and consumer experience in shaping purchasing decisions.

EVs present significant growth prospects, largely attributed to their operational efficiencies—namely, lower fuel and maintenance costs. While FFVs remain widespread due to their established presence and comparatively lower initial purchase prices, EVs are increasingly favored for their long-term economic benefits. Consumers mindful of upfront costs may still gravitate toward FFVs, but the overall market demonstrates a gradual shift toward electrification.

Specifically in the context of Jordan, recent analyses suggest an accelerating market transition toward EVs. This trend is driven by reduced operating expenses, minimal maintenance requirements, favorable social media sentiment, and the anticipation of future growth. Nevertheless, conventional fossil fuel vehicles retain certain advantages, such as affordability, entrenched brand loyalty, and widespread availability. Hybrid vehicles, positioned between these two extremes, attract consumers through financial incentives and positive evaluations.

These findings offer valuable insights for policymakers, manufacturers, and marketers aiming to understand consumer preferences and formulate effective strategies to encourage vehicle adoption in Jordan.

Drawing upon a thorough analysis of questionnaire data from Turkeyinterpreted via the ANP methodologythe findings reveal a marked preference for electric vehicles (EVs) over hybrid (HEV) and fossil fuel (FF) alternatives. EVs command 49.21% of the overall preference share,

while HEVs and FF vehicles account for 31.28% and 19.5%, respectively. This distribution signifies a notable shift toward electrification within the Turkish automotive sector, influenced by economic, environmental, and societal considerations.

Delving into the specifics, the data further elucidates how EVs outperform their counterparts across several marketing-related sub-criteria. These include customer service (54.99%), discounts (54.99%), frequency of exposure (49.33%), and social media presence (60.98%). Yet, in the realm of user and expert reviews, HEVs lead with a 44.34% share, suggesting that hybrids are still perceived as more reliable or satisfactory by consumers and professionals alike. Thus, while EVs are highly regarded for their contemporary appeal and promotional strengths, hybrids continue to maintain an advantage in terms of perceived dependability and user satisfaction.

In terms of characteristics, HEV-Turkey stands out with notable brand recognition and impressive showroom presence, each at 53.96%. This reflects a considerable level of consumer trust in established hybrid models and the physical spaces representing them. Meanwhile, EV-Turkey demonstrates superiority in perceived safety (52.78%) and dealership availability (49.33%), pointing to increasing public confidence in electric vehicle safety and a growing support infrastructure.

With respect to current market size and share, HEV-Turkey exhibits remarkable annual growth (65.48%), indicating robust market expansion and rising consumer adoption. Conversely, EV-Turkey leads in current prevalence (54.99%), suggesting heightened visibility and acceptance of electric vehicles in the Turkish market.

Regarding cost considerations, EV-Turkey performs strongly in maintenance (58.41%) and overall pricing (59.36%). This underscores the long-term economic advantages of electric vehicles, despite their higher initial purchase costs. Notably, both EV-Turkey and HEV-Turkey are equal in fuel cost efficiency (40% each), underscoring the effectiveness of electrified powertrains. In contrast, FF-Turkey significantly trails at 20%, highlighting its comparative inefficiency.

The sensitivity analysis adds further nuance to these findings. In particular, customer service emerges as a significant strength for EV-Turkey, suggesting that comprehensive after-sales

support substantially enhances its attractiveness. Discounts appear to benefit HEV-Turkey, positioning it as the preferred option for cost-sensitive consumers seeking immediate financial advantages. Additionally, both social media presence and annual growth reinforce the appeal of EV-Turkey, consistent with its innovative image and market momentum. On the other hand, brand recognition and dealership network size continue to favor FF-Turkey, underscoring the enduring influence of established automotive brands.

Overall, the Turkish market demonstrates a clear shift toward electric vehicles, motivated by factors such as reduced operating costs, environmental considerations, and modern design. Nevertheless, hybrid vehicles maintain competitiveness, owing to their established reputation, positive consumer feedback, and transitional technological features. While fossil fuel vehicles retain relevance largely due to brand loyalty and the breadth of dealership support they are increasingly viewed as less desirable in a market that is progressively prioritizing sustainability and innovation. These insights offer valuable guidance for policymakers, manufacturers, and marketers seeking to adapt to and capitalize on changing consumer preferences in Turkey.

5.2 Comparison Between Market Share of EV and HEV Results of Turkey and Jordan

The data clearly shows that electric vehicles (EVs) dominate preferences in both Jordan and Turkey, although the degree of preference varies. In Jordan, EVs lead with a preference rate of 47.15%, followed by hybrid electric vehicles (HEVs) at 37.87%, and fossil fuel vehicles (FFVs) trailing behind at 14.96%. In Turkey, the trend holds, with EVs preferred by 49.21% of respondents, HEVs at 31.28%, and FFVs at 19.5%. These figures highlight a pronounced shift toward electrification in both countries, with Turkey exhibiting a slightly stronger inclination. Nonetheless, hybrids continue to maintain a significant presence in both markets. Fossil fuel vehicles, meanwhile, appear to be steadily losing favor.

- Marketing Criteria: In Jordan, electric vehicles (EVs) demonstrate a clear advantage in areas such as discounts (59.36%), brand visibility (49.33%), online reviews (61.44%), and presence on social media platforms (9.73%). However, hybrid electric vehicles (HEVs) outperform EVs in customer service, achieving a notable 68.17%. In contrast, Turkey presents a slightly different pattern: EVs lead in customer service (54.99%), discounts (54.99%), frequency (49.33%), and social media engagement (60.98%), while HEVs are

rated more favorably in reviews (44.34%). These findings suggest that while EVs generally excel in marketing-related criteria, HEVs maintain a relative advantage in perceived reliability and customer satisfaction, a trend particularly pronounced in the Jordanian context.

- Characteristics Criteria: In Jordan, hybrid electric vehicles (HEVs) demonstrate notable brand recognition, with approximately 54% of respondents expressing familiarity with established brands. Conversely, electric vehicles (EVs) are more highly regarded in terms of perceived safety (approximately 56%), showroom presentation (over 62%), and dealership availability (nearly 50%). A similar pattern emerges in Turkey, where HEVs again lead in both brand recognition and showroom presence (each at roughly 54%), while EVs are considered safer (nearly 53%) . These findings suggest that, while consumers in both markets exhibit considerable trust in hybrid brands, EVs are consistently perceived as offering superior safety and a more contemporary image.
- Current Market Size and Share: In Jordan, hybrid electric vehicles (HEVs) demonstrate remarkable annual growth at 65.48%, yet electric vehicles (EVs) currently hold a higher prevalence rate, accounting for 58.41% of the market. A similar pattern emerges in Turkey, where HEVs lead in annual growth (65.48%), while EVs outpace HEVs in present market share (54.99%). These trends indicate that although hybrids appear to have significant growth potential, electric vehicles have already established a stronger presence within both markets.
- Cost Criteria: In Jordan, hybrid vehicles demonstrate a significant advantage regarding fuel costs, with 54.69% of respondents favoring them in this category. However, electric vehicles surpass hybrids in both maintenance (61.44%) and price considerations (55.84%). In Turkey, the comparison for fuel costs is evenly matched, with both hybrids and electric vehicles each at 40%. Nonetheless, electric vehicles maintain their lead in maintenance (58.41%) and price (59.36%). These findings suggest that, despite higher initial investment requirements, electric vehicles offer notable long-term economic benefits, particularly in maintenance and overall cost-effectiveness**.**
- Sensitivity Analysis: The sensitivity analysis indicates distinct trends across both markets. Customer service, social media engagement, and maintenance considerations appear to significantly favor electric vehicles (EVs). In contrast, factors such as brand recognition and

the number of dealerships continue to support fossil fuel (FF) vehicles. Notably, discounts and user reviews tend to bolster the appeal of hybrids, particularly among consumers who are motivated by cost-effectiveness and trust in peer feedback. In Turkey, heightened sensitivity to annual growth and fuel costs further strengthens the case for EV adoption, suggesting a market that is both future-oriented and economically pragmatic. Jordan, meanwhile, presents a more balanced landscape, with traditional factors like customer service and brand loyalty maintaining considerable influence alongside increasing interest in EVs and hybrids.

Overall, both markets are experiencing a clear shift toward electric vehicles, driven by the promise of lower operating costs, environmental sustainability, and contemporary design. Hybrids remain competitive, benefiting from established brand reputations and positive reviews, while fossil fuel vehicles, though still relevant in terms of trust and dealership networks, are gradually losing favor. Turkey demonstrates a stronger inclination toward innovation and sustainability, whereas Jordan's market reflects a more measured transition, balancing modern preferences with established loyalties. These findings underscore the need for context-specific marketing strategies: for EVs, emphasizing long-term advantages and technological features; for hybrids, leveraging trust and financial incentives; and for traditional vehicles, strengthening service networks to maintain competitiveness.

Table 5.1: Priority comparison between Türkiye and Jordan according to criteria

Sub-criteria	Jordan	Türkiye
Customer service	HEV (68.17%)	EV (54.99%)
Discounts	EV (59.36%)	EV (54.99%)
Frequency	EV (49.33%)	EV (49.33%)
Reviews	EV (61.44%)	HEV (44.34%)
Social media	EV (59.73%)	EV (60.98%)
Brand recognition	HEV (53.96%)	HEV (53.96%)
Number of Dealerships	EV (49.33%)	EV (49.33%)
Safety	EV (55.84%)	EV (52.78%)
Showroom appearance	EV (62.67%)	HEV (53.96%)
Annual growth	HEV (65.48%)	HEV (65.48%)
Current prevalence rate	EV (58.41%)	EV (54.99%)
Fuel cost	HEV (54.69%)	EV & HEV (40%)
Maintenance	EV (61.44%)	EV (58.41%)
Price	EV (55.84%)	EV (59.36%)

5.3 Recommendations

Jordan's policy recommendations are:

- Subsidization efforts should extend beyond mere EV purchase incentives. Policymakers ought to prioritize support for home charging infrastructure, offer targeted reductions in electricity tariffs specific to EV charging, and introduce tax benefits for EV ownership. Such measures would enhance the overall attractiveness and feasibility of EV adoption.
- The development of a comprehensive public charging network remains crucial. Addressing range anxiety often a significant, though understated, barrier to adoption requires a robust and reliable infrastructure accessible throughout the nation.
- Given the current momentum of hybrid electric vehicles (HEVs) in Jordan, policy frameworks should further facilitate hybrid adoption as a pragmatic transitional strategy. This approach supports a gradual movement toward full fleet electrification while achieving meaningful carbon emissions reductions in the interim.

Jordan's policy recommendations are:

- Turkey's EV market demonstrates considerable momentum, warranting further reinforcement through aggressive policy support. Substantial financial incentives for EV purchases, coupled with mandates and investments for a nation-wide, high-speed charging infrastructure, should be institutionalized.
- Taxation policies targeting high-emission vehicles can further tip the economic balance in favor of EVs, rendering them the more attractive choice for consumers.
- Policymakers should also prioritize the growth of domestic EV and battery manufacturing. Strategic incentives for local production can drive down costs, foster job creation, and enhance EV accessibility.

For future research;

- Expand the Comparative Analysis Between Jordan and Turkey: It's not enough to simply present findings side by side delve into the underlying reasons for the discrepancies.
- Future research needs to include vital aspects such as environmental impact, government incentives, and charging infrastructure. These elements are central to forming a

comprehensive understanding of electric vehicle adoption and should not be overlooked in subsequent analyses.

- Enhance Validation Through Broader Data Collection.

6 BIBLIOGRAPHY

A. Gorener, "Comparing AHP and ANP: An application of strategic decisions making in a manufacturing company", Int. J. Bus. Soc. Sci., vol. 3, no. 11, pp. 194-208, 2012

A. Singh, "Major MCDM Techniques and their application-A Review", IOSR J. Eng., vol. 4, no. 5, pp. 15-25, 2014.

Afzali A, Sabri S, Rashid M, Samani J, Ludin A (2014) Inter-municipal landfill site selection using analytic network process Water resources management 28:2179-2194

Al-Alawi BM, Bradley TH (2013) Total cost of ownership, payback, and consumer preference modeling of plug-in hybrid electric vehicles. Appl Energy 103(1):488–506

Albayrak E, Erensal Y (2004) Using analytic hierarchy process (AHP) to improve human performance: An application of multiple criteria decision making problem Journal of intelligent Manufacturing 15:491-503

Alves J, Baptista PC, Goncalves GA, Duarte GO. Indirect methodologies to estimate energy use in vehicles: application to battery electric vehicles. Energy ConversManage 2016;124:116–29.

Asan, U., & Soyer, A, dentifying strategic management concepts: An analytic network process approach. *Computers & Industrial Engineering, 2009, 56*(2), 600-615.

Asdrubali F, Carrese S, Patella SM, Sabatini L (2018) Development of electric urban mobility: comparative research and preliminary survey. Eur J Sustain Devt 2(3):32

Azhar, N. A., Radzi, N. A., & Wan Ahmad, W. S. H. M. (2021). Multi-criteria decision making: a systematic review. Recent Advances in Electrical & Electronic Engineering (Formerly Recent Patents on Electrical & Electronic Engineering), 14(8), 779-801.

Bai, S., & Liu, C. (2021). Overview of energy harvesting and emission reduction technologies in hybrid electric vehicles. Renewable and Sustainable Energy Reviews, 147, 111188.

Barić D., Pilko H., Strujić J.: An analytic hierarchy process model to evaluate road section design. Transport. 2016, 31(3), 312–321, DOI: 10.3846/16484142.2016.1157830.

Baric, D., & Zeljko, L. (2021). Multi-criteria decision-making on road transport vehicles by the AHP method. Archiwum Motoryzacji, 94(4), 17-26.

Barmaki R, Ilkhani M, Salehpour S. Investigation of Energy Usage and Emissions on Plug-in and Hybrid Electric Vehicle. Tehnicki Vjesnik-Technical Gazette 2016;23(3):899–906.

Biswas TK, Das MC (2018) Selection of hybrid vehicle for green environment using multi-attributive border approximation area comparison method. Management Science letters 8(2):121–130

Biswas TK, Das MC (2019) Selection of commercially available electric vehicle using fuzzy AHP-MABAC. Journal of The Institution of Engineers (India): Series C 100(3):531–537

Biswasa TK, Saha P (2019) Selection of commercially available scooters by new MCDM method. Int J Data Netw Sci 3(2): 137–144.

Borajee M, Yakchali S Using the AHP-ELECTRE III integrated method in a competitive profile matrix. In: International Conference on Financial Management and Economics, 2011. pp 68-72

Çabukoglu E, Georges G, Küng L, Pareschi G, Boulouchos K. Fuel cell electric vehicles: an option to decarbonize heavy-duty transport? Results from a Swiss casestudy. Transp Res Part D: Transp Environ 2019;70:35–48.

Chen J, Xu CF, Wu CS, Xu WH. Adaptive fuzzy logic control of fuel-cell-battery hybrid systems for electric vehicles. IEEE Trans Ind Inf 2018;14(1):292–300.

Cuma MU, Koroglu T. A comprehensive review on estimation strategies used in hybrid and battery electric vehicles. Renew Sustain Energy Rev 2015;42:517–31.

Ecer, F. (2021). A consolidated MCDM framework for performance assessment of battery electric vehicles based on ranking strategies. Renewable and Sustainable Energy Reviews, 143, 110916.

Ehsani, M., Singh, K. V., Bansal, H. O., & Mehrjardi, R. T. (2021). State of the art and trends in electric and hybrid electric vehicles. Proceedings of the IEEE, 109(6), 967-984.

Faria R,Moura P, Delgado J, Almeida AT (2012) A sustainability assessment of electric vehicles as a personal mobility system. Energy Convers Manag 61(1):19–30.

Feyzioglu O, Ersoy M, Buyukozkan G (2008) Multi-criteria selection of alternatives for sustainable urban transportation, Singapore, IEEE.

Gencer, C., & Gürpinar, D, "Analytic network process in supplier selection: A case study in an electronic firm", *Applied Mathematical Modelling, 2007, 31*(11), 2475-2486.

Gökgöz, F., & Yalçın, E. (2022, October). Electric vehicle selection with Multi-Criteria decision-making approach in european market. In 6th International Conference on Advanced Research in Social Sciences & Humanities (pp. 14-16).

Gomes, C. F. S., Sousa, F., Pereira, T., Oliveira, M., & Torres, L. N. M. (2023). Multicriteria Methodology for Selection of a Personal Electric Vehicle. Brazilian Journal of Operations & Production Management, 20(2), 1415-1415.

Gopal AR, Park WY, Witt M, Phadke A. Hybrid- and battery-electric vehicles offer low-cost climate benefits in China. Transp Res Part D-Transp Environ 2018;62:362–71.

Görener A (2012) Comparing AHP and ANP: an application of strategic decisions making in a manufacturing company International Journal of Business and Social Science 3

H.C. Lee, and C.T. Chang, "Comparative analysis of MCDM methods for ranking renewable energy sources in Taiwan", Renew.Sust. Energ Rev., vol. 92, pp. 883-896, 2018.

Huang I, Keisler J, Linkov I (2011) Multi-criteria decision analysis in environmental sciences: ten years of applications and trends Science of Total Environment 409:3578-3594

J. Kangas, A. Kangas, P. Leskinen, and J. Pykalainen, "MCDM methods in strategic planning of forestry on state-owned lands in Finland: Applications and experiences", J. Multi-Criteria Decis. Anal., vol. 10, no. 5, pp. 257-271, 2001.

J-P. Brans, and B. Mareschal, "Chapter 5 promethee methods",Multiple Criteria Decision Analysis: State of the Art Surveys, pp. 163-186, 2005.

K.D. Goepel, "Implementing the analytic hierarchy process as a standard method for multi-criteria decision making in corporate enterprises – a new AHP excel template with multiple inputs", In:Proceedings of the International Symposium on the Analytic Hierarchy Process, vol. 2, 2013, pp. 1-10.

Kolli A, Gaillard A, De Bernardinis A, Bethoux O, Hissel D, Khatir Z. A review on DC/DC converter architectures for power fuel cell applications. Energy Convers Manage 2015;105:716–30.

Lak Kamari, M., Isvand, H., & Alhuyi Nazari, M. (2020). Applications of multi-criteria decision-making (MCDM) methods in renewable energy development: A review. Renewable Energy Research and Applications, 1(1), 47-54.

Lipman TE, Elke M, Lidicker J. Hydrogen fuel cell electric vehicle performance and user-response assessment: results of an extended driver study. Int J Hydrogen Energy 2018;43(27):12442–54.

Longo M, Foiadelli F, Yaïci W (2018) Electric vehicles integrated with renewable energy sources for sustainable mobility. In: Martínez LR, Prieto MD (eds) Ir New Trends in Electrical Vehicle Powertrains. IntechOpen, London, pp 203–224

Lu XQ, Miao X, Liu WM, Lu J. Extension control strategy of a single converter for hybrid PEMFC/battery power source. Appl Therm Eng 2018;128:887–97.

Lü, X., Wu, Y., Lian, J., Zhang, Y., Chen, C., Wang, P., & Meng, L. (2020). Energy management of hybrid electric vehicles: A review of energy optimization of fuel cell hybrid power system based on genetic algorithm. Energy Conversion and Management, 205, 112474.

Mahmud K, Town GE, Morsalin S, Hossain MJ. Integration of electric vehicles and management in the internet of energy. Renew Sustain Energy Rev 2018;82:4179–203.

Mardani, A., Jusoh, A., & Zavadskas, E. K. (2015). Fuzzy multiple criteria decision-making techniques and applications–Two decades review from 1994 to 2014. Expert systems with Applications, 42(8), 4126-4148.

Nykvist B, Nilsson M (2015) Rapidly falling costs of battery packs for electric vehicles. Nat Clim Chang 5:329–332

Obileke, K., Onyeaka, H., Meyer, E. L., & Nwokolo, N. (2021). Microbial fuel cells, a renewable energy technology for bio-electricity generation: A mini-review. Electrochemistry Communications, 125, 107003

Orecchini F, Santiangeli A, Valitutti V (2011) Sustainability science: sustainable energy for mobility and its use in policy making. Sustainability 3(10):1855–1865

Ou S et al (2019) Light-duty plug-in electric vehicles in China: an overview on the market and its comparisons to the United States. Renew Sust Energ Rev 112(1):747–761

Prakash, A., & Mohanty, R. P. (2017). DEA and Monte Carlo simulation approach towards green car selection. Benchmarking: An International Journal, 24(5), 1234-1252.

Qin, Y., Tang, X., Jia, T., Duan, Z., Zhang, J., Li, Y., & Zheng, L. (2020). Noise and vibration suppression in hybrid electric vehicles: State of the art and challenges. Renewable and Sustainable Energy Reviews, 124, 109782.

R. Kiani Mavi, N. Zarbakhshnia, and A. Khazraei, "Bus rapid transit (BRT): A simulation and multi criteria decision making (MCDM) approach", Transport Policy, vol. 72, pp. 187-197, 2018.

Ramadhani F, Hussain MA, Mokhlis H, Fazly M, Ali JM. Evaluation of solid oxide fuel cell based polygeneration system in residential areas integrating with electric charging and hydrogen fueling stations for vehicles. Appl Energy 2019;238:1373–88.

Saaty R (1987) The analytic hierarchy process—what it is and how it is used Mathematical modelling 9:161-176

Saaty T (1977) A scaling method for priorities in hierarchical structures Journal of mathematical psychology 15:234-281

Saaty T (1996) Decision making with dependence and feedback: The analytic network process vol 4922. RWS publications Pittsburgh,

Saaty T (2008) The analytic network process Iranian Journal of Operations Research 1:1-27

Saaty T.L.: Transport Planning with Multiple Criteria - the Analytic Hierarchy Process Applications and Progress Review. Journal of Advanced Transportation. 1995, 29(1), 81–126, DOI: 10.1002/atr.5670290109.

Sonar, H. C., Kulkarni, S. D. (2021). An integrated AHP-MABAC approach for electric vehicle selection. Research in Transportation Business & Management, 41, 100665

Srikanth R (2018) Role of electric mobility in a sustainable, and energysecure future for India. Curr Sci 114(4):732–739

T.L. Saaty, "Fundamentals of the analytic network process", In: Proceedings of the ISAHP, 1999, pp. 1-14.

V. Penadés-Plà, T. García-Segura, J. V. Martí, and V. Yepes, "A review of multi-criteria decision-making methods applied to the sustainable bridge design", Sustainability, vol. 8, no. 12, 2016

Wang J, Gong C, Wen S, Liu H, Qin C, Xiong C, et al. Proton exchange membrane based on chitosan and solvent-free carbon nanotube fluids for fuel cells applications.Carbohydr Polym 2018;186:200–7.

Waseem, M., Amir, M., Lakshmi, G. S., Harivardhagini, S., & Ahmad, M. (2023). Fuel cell-based hybrid electric vehicles: An integrated review of current status, key

challenges, recommended policies, and future prospects. Green Energy and Intelligent Transportation, 2(6), 100121.

Wee BV, Maat K, Bont CD (2012) Improving sustainability in urban. Eur Plan Stud 20(1):95–110.

Yang Y, Shieh H, Leu J, Tzeng G (2008) A novel hybrid MCDM model combined with DEMATEL and ANP with applications International journal of operations research 5:160-168

Yüksel I, Dagdeviren M (2007) Using the analytic network process (ANP) in a SWOT analysis–A case study for a textile firm Information Sciences 177:3364-3382

YunHe L Chen Y (2013) Thou shalt drive electric and hybrid vehicles: Scenario analysis on energy air 40

Zhang, H., Peng, Y., Tian, G., Wang, D., & Xie, P. (2017). Green material selection for sustainability: A hybrid MCDM approach. PloS one, 12(5), e0177578.

Ziemba, P. (2021). Selection of Electric Vehicles for the Needs of Sustainable Transport under Conditions of Uncertainty—A Comparative Study on Fuzzy MCDA Methods. Energies, 14(22), 7786

APPENDICES

APPENDIX A: EXPERT SURVEY

The attached survey is prepared to obtain information for the graduate study at Istanbul Kultur University.

IMPORTANT NOTE: For the accuracy and reliability of the data, please carefully read the information provided in the filling survey and then answer the questions completely. Thanks in advance for your kindness and assistance.

We would like you to answer all questions completely for the attached survey. The information abouthow you answer the questions in the survey is explained under the title of the evaluation method. The aim of this study is to analyse the market share of electric and hybrid vehicles in Jordan. The following Table illustrates description of each criterion and sub-criteria regarded to car market share.

Criteria	Sub-criteria	Description
1 Alternative	EV-Jordan	Electrical vehicles in Jordan
	HEV-Jordan	Hybrid electrical vehicles in Jordan
	FF-Jordan	Fossil fuel vehicles in Jordan
2 Marketing	Discounts	
	Frequency	
	Social media	
	Reviews	
	Customer service	The level of satisfaction of consumers has had from previous experiences with electric or hybrid vehicles.
3 Characteristics	Brand Recognition	
	Safety	
	Appearance	
	Number of dealerships	Distribution & locations of dealers in a specific area
4 Current market size and share	Annual growth	Annual growth rate of electric and hybrid cars
	Current prevalence rate	Percentage of electric & hybrid cars in current market
5 Cost	Fuel cost	Expresses the amount of energy (electricity or fuel) that a vehicle consumes to travel a distance per km
	Maintenance	Expenses required to operate and maintain vehicle
	Vehicle price	Cost of buying an electric or hybrid car

THE EVALUATION METHOD OF SURVEY

During the evaluation of the survey, we would like you to mark the relative importance of the criterion with respect to the main criterion with pairwise comparison questions. Please put a tick mark at a point which is nearer to your opinion, in each of the following scales (1-9). 1=Equal 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Example Question 1: Mark the relative importance of "Marketing's sub-criteria" with respect to marketing using the following scales. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for marketing?

1=Equal 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Frequency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media

Example Evaluation 1: If you think that Frequency and social media are equally important, put a tick mark on the center portion of the scale. 1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Frequency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media

Example Evaluation 2: If you think that Frequency is very strongly important than social media, please use the left-hand side of the scale and put a tick mark on the 7=very strongly point. 1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Frequency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media

Example Evaluation 3 If you think that the Frequency are between slightly and strongly important than social media, please use the right-hand side of the scale and put a tick on the 4 points. 1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely.

1=Equal 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Frequency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media

SURVEY SHEET

Question 1. Mark the relative importance of "Customer service" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	5	6	**7**	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	HEV-Jordan

Question 2. Mark the relative importance of "Discounts" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	**8**	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	HEV-Jordan

Question 3. Mark the relative importance of "Frequency" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	HEV-Jordan

Question 4. Mark the relative importance of "Reviews" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	HEV-Jordan

Question 5. Mark the relative importance of "Social media" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	5	6	**7**	8	9	HEV-Jordan

Question 6. Mark the relative importance of "Brand recognition" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	**1**	2	3	4	5	6	7	8	9	HEV-Jordan

Question 7. Mark the relative importance of "Number of dealerships" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	**1**	2	3	4	5	6	7	8	9	HEV-Jordan

Question 8. Mark the relative importance of "Safety" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	HEV-Jordan

Question 9. Mark the relative importance of "Showroom appearance" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	HEV-Jordan

Question 10. Mark the relative importance of "Annual growth" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	HEV-Jordan

Question 11. Mark the relative importance of "Current prevalence rate" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	HEV-Jordan

Question 12. Mark the relative importance of "Fuel cost" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	HEV-Jordan

Question 13. Mark the relative importance of "Maintenance" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	HEV-Jordan

Question 14. Mark the relative importance of "Price" given on the two sides of the scale with respect to alternatives. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for alternatives?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

EV-Jordan	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	FF-Jordan
EV-Jordan	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	HEV-Jordan
FF-Jordan	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	HEV-Jordan

Question 15. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "FF-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Discounts
Customer service	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Frequency
Customer service	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Reviews
Customer service	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Social media
Discounts	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Frequency
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Reviews
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Social media
Frequency	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Reviews
Frequency	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Social media

Question 16. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "FF-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Safety
Brand recognition	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Showroom appearance

Question 17. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "FF-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Current prevalence rate

Question 18. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "FF-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Price
Maintenance	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Price

Question 19. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "EV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Discounts
Customer service	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Frequency
Customer service	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Reviews
Customer service	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Social media
Discounts	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Frequency
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Reviews
Discounts	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Social media
Frequency	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Reviews
Frequency	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Social media

Question 20. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "EV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Safety
Brand recognition	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Showroom appearance

Question 21. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "EV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 22. Evaluate the comparative importance of the two criteria presented on each side of the scale about"Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "EV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	**7**	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	**9**	Price
Maintenance	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Price

Question 23. Evaluate the comparative importance of the two criteria presented on each side of the scale about"Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "HEV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Discounts
Customer service	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Frequency
Customer service	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Reviews
Customer service	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Social media
Discounts	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Frequency
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Reviews
Discounts	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Social media
Frequency	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Reviews
Frequency	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	2	**1**	2	3	4	5	6	7	8	9	Social media

Question 24. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "HEV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Safety
Brand recognition	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Showroom appearance

Question 25. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "HEV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 26. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "HEV-Jordan"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Price
Maintenance	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Price

Question 27. Evaluate the comparative importance of the two criteria presented on each side of the scale about"Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Customer service"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	6	5	4	3	**2**	1	**2**	3	4	5	6	7	8	9	Showroom appearance

Question 28. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Discounts"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Price
Maintenance	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Price

Question 29. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Reviews"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Safety
Brand recognition	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Showroom appearance

Question 30. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Social media"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Safety
Brand recognition	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	**1**	2	3	4	5	6	7	8	9	Showroom appearance

Question 31. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Reviews"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Price
Maintenance	9	8	7	6	5	4	3	2	**1**	2	3	4	5	6	7	8	9	Price

Question 32. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Social media"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 33. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Social media"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Price
Maintenance	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Price

Question 34. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Brand Recognition"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Discounts
Customer service	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Reviews
Customer service	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Social media
Discounts	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Reviews
Discounts	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Social media

Question 35. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Brand recognition"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Number of dealerships	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Showroom appearance

Question 36. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Brand recognition"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 37. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Brand recognition"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	**7**	8	9	Price
Maintenance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	**8**	9	Price

Question 38. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Number of dealerships"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Reviews
Customer service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	**7**	8	9	Social media
Reviews	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Social media

Question 39. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Number of dealerships"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand Recognition	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Showroom appearance

Question 40. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Number of dealerships"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 41. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Safety"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Reviews
Customer service	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Social media

Question 42. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Safety"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 43. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Safety"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	**7**	8	9	Price
Maintenance	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Price

Question 44. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Showroom appearance"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Reviews
Customer service	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Social media

Question 45. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Showroom appearance"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand Recognition	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Showroom appearance

Question 46. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Annual growth"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Discounts
Customer service	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Frequency
Customer service	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Reviews
Customer service	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media
Discounts	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Frequency
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Reviews
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Social media
Frequency	9	8	7	6	5	4	3	2	1	2	**3**	4	5	6	7	8	9	Reviews
Frequency	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Social media

Question 47. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Annual growth"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Safety
Brand recognition	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Showroom appearance

Question 48. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Cost". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Annual growth"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	**8**	9	Price
Maintenance	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Price

Question 49. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Current prevalence rate"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Discounts
Customer service	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Frequency
Customer service	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Reviews

Customer service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Frequency
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Reviews
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media
Frequency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Reviews
Frequency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media
Reviews	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media

Question 50. Evaluate the comparative importance of the two criteria presented on each side of the scale about “Characteristics”. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for “Current prevalence rate”?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Safety
Brand recognition	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Showroom appearance
Number of dealerships	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Showroom appearance
Safety	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Showroom appearance

Question 51. Evaluate the comparative importance of the two criteria presented on each side of the scale about “Cost”. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for “Current prevalence rate”?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Maintenance
Fuel cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Price
Maintenance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Price

Question 52. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Fuel cost"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 53. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Marketing". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Maintenance"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	**8**	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Discounts

Question 54. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Characteristics". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Maintenance"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	4	3	**2**	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Safety

Question 55. Evaluate the comparative importance of the two criteria presented on each side of the scale about "Current market size and share". Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for "Maintenance"?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Current prevalence rate

Question 56. Evaluate the comparative importance of the two criteria presented on each side of the scale about “Marketing”. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for “Price”?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Customer service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Discounts
Customer service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media
Discounts	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Social media

Question 57. Evaluate the comparative importance of the two criteria presented on each side of the scale about “Characteristics”. Please put a tick mark on the number of your choice on each scale. Among each pair of given criteria, which is more important for “Price”?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Brand recognition	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Number of dealerships
Brand recognition	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Safety
Number of dealerships	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Safety

Question 58. Evaluate the comparative importance of the two criteria presented on each side of the scale about “Current market size and share”. Please put a tick mark on the number of your choice on scale. Among each pair of given criteria, which is more important for “Price”?

1=Equally 3=Moderately 5=Strongly 7=Very Strongly 9=Absolutely

Annual growth	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Current prevalence rate