The Comparative Analysis of Affecting Factors on Purchasing Domestic and Imported Cars in Iran Market - Using AHP Technique

Seyed Fathollah Amiri Aghdaie   (Corresponding author)

Assistant professor, Dep. of management

University of Isfahan, Isfahan, Iran

Tel: 98-311-793-5251   E-mail: aghdaie@mang.ui.ac.ir

Ehsan Yousefi

M.A. Candidate, Dep. of management

University of Isfahan, Isfahan, Iran

Tel: 98- 916-817-8702   E-mail: yosefi.ehsan@gmail.com

Abstract

Nowadays the most important aspect in designing new products is to consider the needs and demands of the market. Understanding customer requirements and incorporating them into the conceptual vehicle design is the first step of automotive products development. The goal of this research is the Comparative Analysis of affecting Factors on Purchasing Domestic and Imported Cars by using AHP technique, in Iran market.

The type of this paper is descriptive-cognition and the related information for this scope have been collected from questionnaire designed by researchers. Statistical society of present study includes car's buyers in Isfahan city.

The result indicate that the most important criteria for domestic cars purchasers, includes the technical performance, economic aspect, and after sale services, and for imported cars includes, technical performance ,beauty of the car as well as its safety.

Keywords: Automotive industry, Country of origin, Purchasing criteria, Analysis Hierarchical Process (AHP)

1. Introduction

Economic security of each country is based on principles and regulations that most important of them is regulations of import and export. Changing of these regulations can affect cost price of goods, so the consumer will obtain some goods cheaper and some goods more expensive than before. Annexation of Iran to the world trade organization (WTO), will lead to intensive competition in all parts of industry and market. After Iran's membership in the world trade organization, omitting of nontariff obstacles and reducing of tariff rates will be executed. Automotive industry is an efficient industry on Iran economic framework. After joining Iran to WTO, foreign automaker can access to Iran's market cheaper than before. Therefore, research about the future of Iran's automotive industry gains a special importance in dynamic competitive environment that is influenced by structural transition in the world automotive industry and regulations of the world trade organization. With regard to the increasing competition in the automobile market and the import of foreign cars into Iran's market, local manufactures have to preserve their business life in this competitive environment, and this needs a scientific and efficient planning. understanding customer requirements and incorporating them into the conceptual vehicle design is the first step of automotive product development.

Buying a new car is regarded as a decision-making problem and a reflection of customer preference. Before someone shops for a new car, he or she wants to take a look at finances and options. The possible budget is then a constraint in the decision on which car to buy. In many cases, there are times when the price and special features do not match the budget. Many customers seek advice from car experts or friends when purchasing a car. Most people shopping for a new car rank safety high among their purchase considerations. Other important

attributes include fuel economy; comfort and convenience features; insurance information; specification and warranties and resale value. Constant changes in customer demands lead manufactures to produce new and improved designs. Automation of manufacturing technologies allows this (Hoffman1984). Recently the production life cycle has become shorter. For example, General Motors in the USA is leading the industry in developing groundbreaking technologies to improve the driving experience and to meet the changing needs and life styles of modern drivers. They are making efforts to lower the cost of the technology to a level that will make advanced cars an attractive purchase. As the automobile market becomes more competitive, the industry has no choice but to adopt innovation that brings better customer service.

2. Subjective Literature

Automotive industry has been one of the most important driving forces of economic growth in the twentieth century. This industry with a history of one hundred years has profound links with other industries. It includes extensive experiences and a strong position with an accumulation of technical knowledge and capital. A considerable amount of Iran's income (about 3.5% of GDP) is allocated to this industry and about five hundred thousand (500,000) are employed in this economic section directly and indirectly. The published reports by UNKTAD show the fact that importance of this industry on the international scale is in a way that average indicator for twelve large automotive companies in the world is about 50%. These companies are in the list of one hundred superior companies of the world.

2.1 Automotive Industry in Iran

History of Iran's automotive industry can be divided into four phases with due attention to transitions of the country. The first phase is related to assembling like many newfangled countries in this industry (such as Korea). The role of the government in this phase is to create a free market for automakers. Then it includes the period after the Islamic revolution and the war period that because of the characteristic of this period, automobile industry has had a limited production. Moreover, production has been active in the field of special applications like building of armored and martial cars.

In the second phase, the government has been looking for supplying of raw materials and essential equipments of this industry.

The third phase of this industry is related to years after Iran and Iraq war. Paying attention to this industry again and building of productions made in Iran are characteristic of this period.   Role of the government in this phase has been supporting from Iranian producers, so at this time national law of automobile is being approved.

Fourth period includes transitions of this industry at the present time. Paying attention to common cooperation with automakers of the world and developing of cooperative strategies and using of the platform strategy is the common characteristic of this period. Now the government's strategy is to encourage foreign automakers to invest in Iran. Of course this measure has been pursued with regard to other fields. The most obvious example of operational activities related to this period is the well-known contract of L90. This contract is the greatest foreign contract in the history of Iran's automobile worth 375 million euro.

Now Iran's automotive industry is the biggest producer of automobile in the Middle East after traversing of various productive phases. It has the highest productive contribution in this region.

Over one million and eighty four thousand automotives were produced in Iran which constituted 1.43% of the total automotives produced in the world. There over 25 automakers in Iran, actively producing both light and heavy vehicles. These automakers are in joint venture with several popular international automakers such as Peugeot (France), Citroen (France), Volkswagen (Germany), Nissan (Japan), Toyota (Japan), Kia Motors (South Korea), Proton (Malaysia), Chery (China) and many other established producers of light and heavy vehicles. These automakers produce a wide range of automotives including motorbikes, passenger cars, vans, mini trucks, medium sized trucks, heavy duty trucks, minibuses, large size buses and other heavy automotives used in commercial and private activities in the country.

However, despite high production levels, it is unanimously believed by experts that the demand for automotives far outstrips the supply. According to estimates, the current demand stands at 1.5 million vehicles, which currently cannot be met by the local producers. More than half of the vehicles in Iran are over 25 years old and vehicle density is relatively low at 55 cars per 1000 people.

In recent year, the government lowered the automotive import tariff levels to 90%(from 150% in last years) for light weight vehicles and since then a huge influx of imported vehicles has been witnessed in the country. The tariff level for import of heavy vehicles is even lower at 20%, due to low levels of local production and high demand. As a result, a variety of automotive brands are being presently imported into Iran including Toyota,

BMW, Mercedes Benz (these three being the expensive and/or luxury brands), Rover, Sangyong, Audi, Subaru, Rio LS, Hyundai (Sonata and Azar1), Citroen, Daimler-Chrysler, Proton, Countach, Volkswagen, Renault Leon, and else.

2.2 Country-of-Origin (coo)

As the manufacture of automobile and the quest for consumers become increasingly global activities, international marketing research takes on greater importance. One such area, the study of country-of-origin effects (COO), seeks to understand how consumers perceive products emanating from a particular country. The COO phenomenon mirrors the global marketplace's increasing complexity. For example, current research attempts to examine how consumers respond to products exported from another country; designed in one country yet manufactured in another; manufactured in more than one location; and manufactured in one country but branded in another.

By relating country images to product category characteristics, decision makers can better understand preference formations for their products. This information provides insight into what underlies consumers' attitudes toward automobile manufactured in particular countries.

Thus, managers can benefit by having a better understanding of when promoting a product's COO is beneficial and when it is not, as well as identifying the dimensions along which country image should be improved. Country image plays a significant role in consumers' perceptions of automobile. Thus, understanding the dimensions of country image and how it can be operationalized is important for managers whose products and those of their competitors are manufactured around the world. De Han (2009) defined the country image as consumers' general perceptions about the quality of products made in given country. Such perceptions are considered specific to product categories, since consumers do not perceive all products from the country as being of equal quality.

Peterson (2008) determined that the effect of a product's country of origin on buyer perceptions and evaluations has been one of the most widely studied phenomena in the international business, marketing, and consumer behavior literatures. Indeed, Brady and Cronin (2001) concluded that the potential impact of the country of origin of a product is the "most researched international aspect of consumer behavior".

2.3 Purchasing Criteria

Most current owners of cars tend to have purchased a car accurately; the customer has potentially developed an attitude toward car. Here, an attitude becomes an evaluating judgment (desire or not desire) based on prior or present experience such as previous satisfaction from dealers or products and services (after sales and warranty), driving experience, and socio-economic status of customers. It is also possible that an attitude can be developed based on prior information without experience, as when consumers develop preferences or biases for or against brands based on the brands' images in the marketplace. This also depends largely on purchasing power of individual customers.

Models of car choice predominantly rely on random utility maximization and a rather low level of detail with regard to the choice alternatives; car types are specified on a vehicle segment level (de Haan et al., 2009; de Jong et al., 2004).

Due to the huge number of individual decision makers involved and alternatives offered, (Peterson et al. 2008).

Customers may have a favorable attitude towards some manufacturers' cars, but may lack the ability due to insufficient purchasing power or willingness to take buying action. On the other hand, customers who have high purchasing power (or over-purchasing power in this sense) may neglect domestic and imported cars. For example, most buyers (with high, medium, or low income) tend to have a preferable attitude towards some manufacturers' cars such as Aston Martin, Bentley, Ferrari, Porsche, and Rolls-Royce, though the majority of them might not even have had a test drive before. The difference is that customers with low to medium income may still also anticipate the quality of smaller sized cars of manufacturers from the lower segments such as Fiat, Ford, Peugeot, and Vauxhall, as these cars are affordable to them. In other words, cars from lower segments have the meaning of 'reality' to them.

The different attitudes to mark of automobile are directly related to different types of customers because cognition, feelings, and 'response dispositions' of customers are organized into a set of 'patterned emotional reactions' (Brown and Swartz,1989). This may be due to differences described as demographic, geographic, psychographic, or lifestyle. Therefore, behavior moves from personal buyer to different buyers in a given society. Like other products, automobile marketers (manufacturers, companies, dealers), also need to focus on 'who buys' or 'type of customers' or customer preferences to segment their car markets. In this article, we identified,

ranked, and compared purchasing criteria for domestic and foreign cars from the viewpoint of Iranian auto buyers by AHP technique.

3. Describe the Variables

In this study, we identified 8 main criteria and 35 sub criteria, from view point of Iranian buyers. Exterior, involves components and factors seen from the outside such as color, length and width, wheels, doors and headlamp styles. In this research, It includes the following sub-criteria: style, quality of interior decoration, tire and number of available color types. Convenience is related to the design of the equipments for easy operation. It includes inside width, forward visibility, heating and cooling system and quality of the audio system. Performance is related to the functioning of the car. It includes maximum speed, braking ability, engine power, equilibrium in screw, and engine sound. Safety, is enhanced a body designed to protect the drivers and passengers against collisions. The most important safety features are those that reduce the risk of death or serious injury. It includes airbags, antilock braking system ABS, impact protection systems, and number of alarm facilities. Economic aspect refers to the price and cost of a new car, or maintaining the car within budgets. It includes purchasing prices, fuel consumption per month, insurance costs and installment conditions, resale prices of used cars and maintenance costs. Attitude to mark, refers to attitudes that lead the customer to make the purchasing decision. This criterion includes: prestige name, others recommend, mod and commercial advertisement. Sale services, criterions include sale agency, online sale, and ease of buying and behavior of salesperson. After sale services, include repair time, spare parts, frequency of repair center, and satisfaction from repair.

4. Methodology

In this article, we used an AHP model for identifying Iranian preference in buying a new car with regard 8 main criteria and 35 sub criteria to compare domestic and imported car's buyers preferences. We consider six kinds of Iranian cars and six kinds of imported cars (from Japan and South Korea). These cars are same class and in same level of price (40000- 50000 $). Therefore, with using the results of empirical studies in Iran and other countries, and related library studying of automobile industries, we indicated the most criteria for buying a car from view point of Iranian. The following variables were identified: (1) exterior, (2) convenience, (3) performance, (4) safety,(5) economic aspect,(6) attitude to mark, (7) sale service and (8) after sale services as well as 35 sub-criteria. Then we make a questionnaire to compare duad variables. We selected Isfahan city for sample. Because people of this city have intensive tend to foreign automobile and there is a closely competition between Iranian and foreign auto sellers in this city. Moreover, most people of this city are from various races and reflect preference of whole people of country. So we can generalize the result to Iranian society. After distribute the questionnaire among buyers at car exhibitions, we gathered the data and started to analyze the data with using expert choice soft ware. This soft ware able to compare duad and calculates the weights of criteria. In this study, 170 questionnaires distributed and 143 from them gathered.

5. Data Analysis

As a multi-criteria decision-making method, AHP is widely used as one of the major methods in solving a wide variety of problems that involve complex criteria across different levels where the interaction of criteria is common (Saaty, 1980). A plethora of studies have shown that AHP provides fair to excellent solutions for selecting the optimal alternative, allocating   resources, measuring performance, and designing systems (Saaty, 1980), including business policy and strategic processes (Emshoff and Saaty, 1982), marketing (Bult and Foekens, 1993), human resource management (Lootsma, 1980), and public affairs. (Duke and Aull-Hyde, 2002).

AHP is coarse in finalizing the rankings of competing candidates when used to identify major contributors to the particular problems in question. The main difficulty associated with AHP application is centered on the decision regarding the priorities of all alternatives involved in the decision-making process.

5.1 Using AHP to Ranking Criteria

Based on the AHP approach and group decision-making algorithm, we can Ranke and compare the most important criteria for purchasing various cars.

Alternatives step by the following steps:

1). To build the decision hierarchy

2). To compare duad

3). To calculate inconsistency rate and criteria weight

4). To rating the options

In order to combine so many buyer' judgments into one synthesis result, we use the geometric mean method in group decision-making.

5.2 Build the Decision Hierarchy

We can decompose the problem into a graphical hierarchical form to represent goal, criteria, Sub-criteria, which build up the criteria for purchasing car. In this study, these criteria derived from past researches and some aspect of car that buyers focus on them. Figure 1 shows the AHP model for purchasing a car.

5.3 Compare Duad

Measurement methodology is used to establish priorities among the elements within each stratum of the hierarchy. This is accomplished by asking the participating decision makers (Iranian buyer of domestic and imported car) to evaluate each set of elements in a pairwise fashion with respect to each of the elements in a higher stratum. This measurement methodology provides the framework for data collection and analysis and constitutes heart of the AHP. Structurally, the hierarchy is broken down into a series of pair comparison matrices, and the participants are asked to evaluate the off—diagonal relationship in one-half of each matrix. The 9-point scale used in typical analytic hierarchy studies is ranging from 1 (indifference or equal importance) to 9 (extreme preference or absolute importance) (Table 1). This pairwise comparison enabled the decision maker to evaluate the contribution of each factor to the objective independently, thereby simplifying the decision making process.

5.4 Consistency Index Calculate Criteria Weight

After gathering questionnaires, we separated questionnaires in two part, domestic car buyers and imported car buyers. The result of compare duad of each question obtains by using geometric mean to synthesize the response of each question. So calculate the response average (geometric means) to each question. With using EXPERT CHOICE (a software to calculate criterion weights), we ranked all sub-criteria with respect to up-criteria.

A consistency ratio (C.R.) provides a measure of the probability that the pairwise comparison matrix was filled in purely at random. The number 0.1, which is the upper limit for C.R., says that there is a 10% chance that the decision-maker will answer the questions in random manner. A value of the C: R< 0.1 is typically considered tolerable. (Saaty, 1980). In this study, expert choice gives CR of each stage.

5.5 Calculate Criteria Weight

In this study, after gathering questionnaires, we separated them to 2 groups.79 questionnaires from domestic car buyers, and 64 questionnaires, from imported car buyers. Therefore, by using geometric mean, we calculated average number of each question. These numbers enters to expert choice software as result of compare duad.

We obtained the synthesized priorities of the main criteria and sub-criteria. Table 2 shows the important of main criteria.

By synthesizing the values with the priorities, we obtain the priorities of the criteria and ranks with respect to the goal and synthesized priorities for each main criterion when the C.R is bounded by the limit. As a result, performance is the highest priority in the main criteria in both domestic and imported cars. C.R in domestic groups was 0.08 and in imported group was 0.06 that is an appropriate rate. Table 3 shows the importance and ranks of the sub criteria, according to the model.

6. Conclusions

Analysis of the hierarchical model was determined the importance of buying criteria for domestic and imported cars. First, technical performance for all vehicles is the first priority. In other words, all customers are looking for high quality car. So low quality products could not sold to customers by promotions. While about domestic cars, after technical performance, mostly economic aspect is important, but in imported cars, factors such appearance and safety are important. Overall strengths of domestic cars include payment condition and after sale service, while mainly strengths of the foreign cars include high technical quality and beauty. Another point is that in domestic cars, after the performance of technical and economic aspects were on top, other criteria with a large difference are in the next category. While in imported cars, although factors such as technical performance, safety, and appearance are in the top, but there is no high gap between the importance of these criteria and categories that are in lower. In other words, imported cars customers have a more comprehensive approach to the aspects of the purchase.

Another point is that although in this research mental factor such prestige name and mode of cars are not in the first priority, but it seems, many customers do not want express that these factors clearly affect purchasing decisions. However, they were express that *some friends, bought this car and it have been satisfied*. Thus, it is deduce that subjective factors play a main role in car buying behavior.

In addition, an appropriate method for specifying affecting Factors on Purchasing cars would be helpful to manufactures and dealers. While the size of decision-making groups is larger, customers can receive help from expert groups. A systematic approach could contribute to reduce much advertising costs and shorten time-consuming purchasing procedures. There are obvious limitations of the method. It depends on qualitative data in the evaluation of a car model by its owners. It would be better if convenience, comfort, visibility and performance of brake systems could evaluated more objectively by means of the data obtained by results of testing.

Finally, with joining Iran to WTO, the industrial and automotive part makers activities, should be based on principles of economic and trade market activities, and government to be the guidance and control activities and to pay headquarters instead of interfere and support of unnecessary industries. In this situation, a new arena will be open to private sector activities and private sectors can blossoming their potential capabilities and help the country to prosperity. Knowing relative competitive advantage and awareness of competition laws in the fields of international market are part of prerequisite for the success of this section. Constructive cooperation in the domestic market and lucid competition in world market are requirements of the other active presence in international markets. At last, with annexation Iran to WTO Iranian automobile industries have to improve their product line and create new automobile safe and high quality according to preferences of customers.

References

Brady, M. K., & Cronin, J. J. Jr. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing,* 65(3), 34–49.

Brown, S. W., & Swartz, T. A. (1989). A gap analysis of professional service quality. *Journal of Marketing,* 53, 92–98.

Bult, J. R., & Foekens, E. W. (1993). An analytic approach to marketing decisions. *International Journal of Research in Marketing,* 10, 407–409.

De Haan, P., Mueller, M. G., & Scholz, R. W. (2009). How much do incentives affect car purchase? Forecasting effects of fee bates based on energy-efficiency. *Energy Policy*, in press.

De Jong, G., Fox, J., Daly, A., Pieters, M., & Smit, R. (2004). Comparison of car ownership models. *Transport Reviews,* 24, 379–408.

Duke, J. M., & Aull-Hyde, R. (2002). Identifying public preferences for land preservation using the analytic hierarchy process. *Ecological Economics,* 42, 131–145.

Emshoff, J. R., & Saaty, T. L. (1982). Applications of the analytic hierarchy process to long range planning process. *European Journal of Operational Research,* 10, 131–143.

Hoffman, D. (1984). Using an electronic spreadsheet to support the analytic hierarchy process, In: *Proceedings of the 16th Annual Meeting of the American Institute for Decision Sciences*, 12, 653-655.

Lootsma, (1980). Saaty's priority theory and the nomination of a senior professor in operations research, *European Journal of Operational Research,* 4, 380–388.

Peterse, A., Mueller, M. G., De Haan, P., & Scholz, R. W. (2008). Fee bates promoting energy-efficient cars: design options to address more consumers and possible counteracting effects. *Energy Policy,* 36, 1355–1365.

Rosenbloom, E. S. (1997). A probabilistic interpretation of the final rankings in AHP, *European Journal of Operational Research,* 96, 371–378.

Saaty, T. L., & Kearns, K. (1985). *Analytical Planning the Organization of Systems*. Oxford: Pergamon Press.

Saaty, T. L. (1980). *The Analytic Hierarchy Process*. New York: McGraw-Hill.

Saaty, T. L., Golden, B. L., Wasil, E. A., & Harker, P. T. (1989). Group decision-making and the AHP, The Analytic Hierarchy Process: Applications and Studies. *Springer*, 59-67.

World Bank. (2003). *International organization of motor vehicle manufacturers*. World Bank Statistics, 135-142.

Table 1. The Comparison Scale in AHP

Intensity of important	definition
1	Equal important
3	Weak important
5	strong importance
7	Demonstrated importance
9	Absolute importance
2,4,6,8	Intermediate values between two adjacent judgments

Table 2. Importance of Main Criteria in Car Purchasing

CRITERIA	Domestic cars	Rank	Foreign cars	Rank
Exterior	0. 128	5	0.207	2
Convenience	0.098	6	0.114	5
Performance	0.204	1	0.213	1
Safety	0.131	4	0.149	3
Economic aspect	0.196	2	0.141	4
Attitude to mark	0.057	7	0.066	6
Sale service	0.052	8	0.050	8
After sale service	0.134	3	0.060	7
SUM	**1**		**1**	

Table 3. Importance of Sub Criteria in Car Purchasing

Imported cars		Domestic cars			
Rank	Weight	Rank	Weight	Sub criteria	Main criteria
1	0.084	5	0.050	Style	Exterior
9	0.042	21	0.018	Decoration	
13	0.029	14	0.028	Car tire	
6	0.052	13	0.033	Color type	
18	0.020	6	0.045	Inside width	Convenience
12	0.031	17	0.026	Forward visibility	
7	0.051	25	0.015	Heating and cooling	
29	0.011	30	0.011	Audio system	
2	0.077	4	0.062	Maximum speed	Performance
10	0.037	12	0.026	Braking ability	
4	0.058	2	0.065	Engine power	
14	0.028	15	0.028	balancing	
26	0.012	27	0.014	Engine sound	
21	0.017	26	0.015	Air bags	Safety
3	0.071	3	0.063	ABS brake	
8	0.047	8	0.043	impact	
24	0.014	29	0.013	Alarm systems	
5	0.054	1	0.078	price	Economic aspect
27	0.012	20	0.024	Maintaining cost	
20	0.018	23	0.017	Fuel consumption	
11	0.032	9	0.040	Resale	
15	0.026	10	0.038	insurance	
16	0.026	18	0.025	Prestige name	Attitude to mark
22	0.017	24	0.017	Others recommend	
28	0.012	33	0.008	Mod	
34	0.007	34	0.007	Ads	
32	0.008	32	0.009	Sale agency	Sale service
35	0.004	35	0.005	Online sale	
17	0.024	16	0.027	Ease of buying	
25	0.014	31	0.010	Behavior of salesman	
23	0.015	22	0.018	Repair time	After sale service
31	0.010	11	0.037	Spare parts	
30	0.021	19	0.025	Number of service station	
19	0.019	7	0.041	Repair quality	
23	0.008	28	0.014	Warranty period	
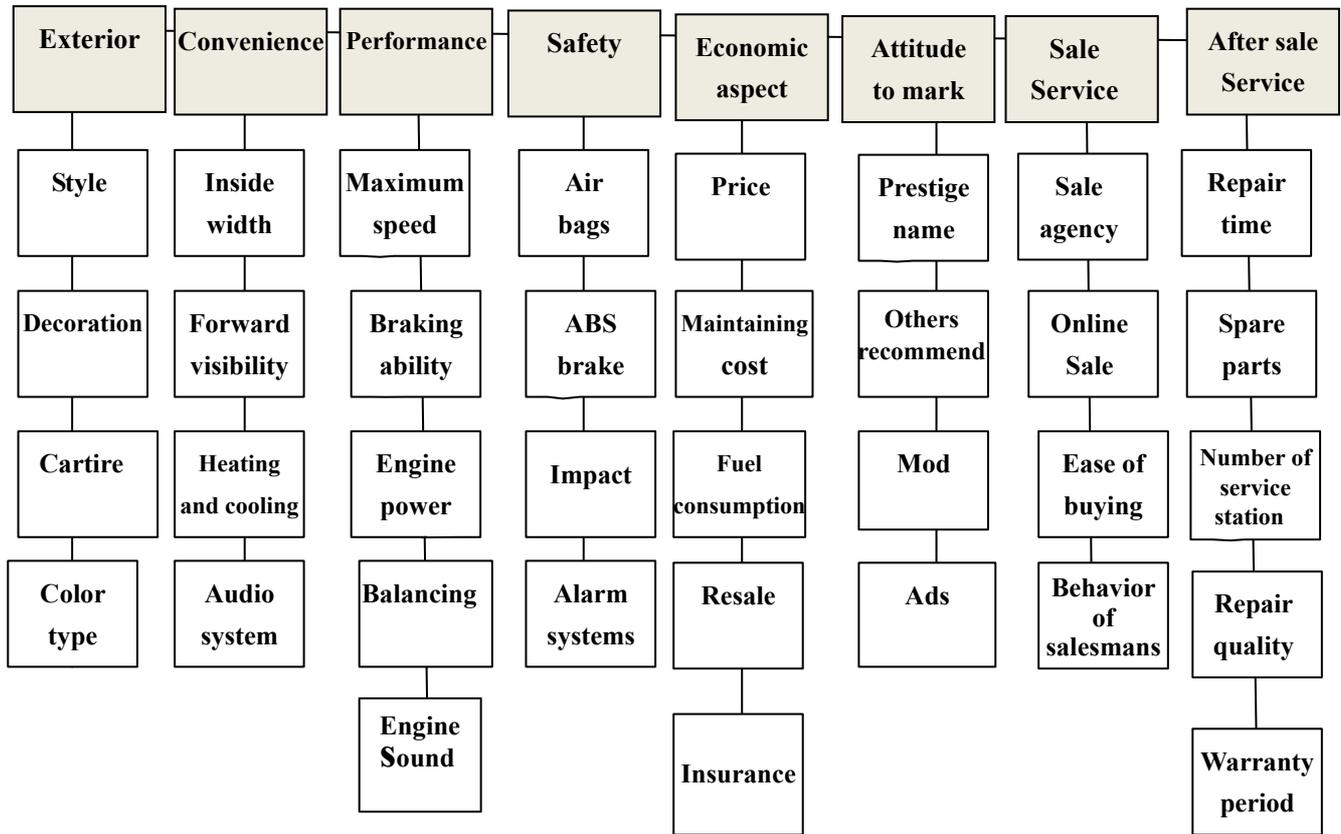
Figure 1. The AHP Model for Purchasing Car