

**ENVIRONMENTAL CONCERN IN CAR PURCHASING
BEHAVIOUR**

by

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ABSTRACT

This study aims to provide a general overview about the environmental concern and attitudes of the car owners in Istanbul city , and the impact of this concern on car buying behaviour. Examined are such subjects as: the importance that car holders give to the environmental problems , the role of transportation vehicles in air pollution , willingness to contribute to the solutions of air pollution , and the level of actual participation , general image of car brands in the subject of environmentalism, utilisation of unleaded gasoline , importance of the environment impact of a car in the purchasing decision , the level of knowledge regarding the unleaded gasoline and catalytic converter ; willingness to pay extra or to compromise convenience in return for cars with higher environmental quality.

In the course of the study, after a general overview of concepts coming with environmental action in marketing area and especially its effects on automotive industry , an empirical study has been conducted in Istanbul. The data analysed by the study has been collected through a structured questionnaire from a sample of 458 respondents by non probabilistic convenience sampling method .

The general conclusion of the study is that ; drivers in Istanbul are highly concerned with environmental problems ; especially with those which they are suffering in their everyday lifetime. They are willing to participate in the solution process but actually they can not do so because of financial or other convenience factors.

Air pollution constitutes the most important environmental problem according to them. In this context , they define environmentally friendly car as not polluting air.They are aware of the effects of catalyser and unleaded fuel consumption. There exists a big potential demand for a car with catalyser but they prefer that car over the others , if the price difference is minimal or none. And they do not want to give up any convenience that similar cars with lower environmental quality offer them. In other words , they appreciate environmental quality of a car but they prefer that production mark-up will be financed by producer or the government.

ÖZET

Bu çalışmanın amacı , İstanbul'daki otomobil sahiplerinin çevreye duyarlılıklarını ölçmek ve çevresel bilincin otomobil satın alma kararlarında yaptığı etkileri genel olarak incelemektir . Bu amaç doğrultusunda ele alınan başlıca konular şunlardır : otomobil sahiplerinin çevre sorunlarına verdiklerine önem derecesi ; motorlu taşıtların hava kirliliğindeki payı , otomobil sahiplerinin hava kirliliğinin çözümüne kişisel katkıda bulunma istekleri , markaların çevre imajı , hava kirliliğini önlemek amacıyla kullanılan emisyon tedbirleri hakkındaki bilgileri , bu tedbirleri uygulama oranları , kurşunsuz benzin kullanımı , çevreci otomobil imajının ekonomik değeri ve otomobil satın alma kararlarında çevre bilincinin etkileri .

Çalışma kapsamında , çevre bilincinin pazarlama alanına getirdiği yenilikler ve özellikle otomotiv sektörüne etkileri üzerine bilgi verilmiş , daha sonra İstanbul'da bir saha çalışması yürütülmüştür . Kullanılan veriler , tesadüfi olamayan örnekleme metodu kullanılarak belirlenen 458 denekten , önceden hazırlanmış soruları içeren bir anketin denekler tarafından , anketörler aracılığıyla yanıtlanması yolu ile toplanmıştır . Bu çalışma sonucunda varılan genel sonuca göre, İstanbul'daki otomobil sahipleri özellikle günlük yaşantılarında yüzyüze geldikleri çevre sorunlarına büyük önem vermektedir . Çevresel sorunların çözümüne katkıda bulunmak istemelerine rağmen , bunu çeşitli ekonomik ve diğer sebepler nedeniyle gerçekleştirememektedir .

İstanbul'daki otomobil sahipleri , hava kirliliğini en önemli sorun olarak belirlemektedir . Bu çerçevede , çevreci otomobili , havayı kirliletmeyen otomobil olarak tanımlamaktadır . Katalitik konvertör ve kurşunsuz benzin kullanımı hakkında yeterli bilgiye sahiptir . Katalitik konvertörlü otomobilin fiyat farkının , diğerlerine göre az olması durumunda , bu tür otomobillere talebin yüksek olduğu görülmektedir . Ayrıca çevreci otomobil için , çevreci olmayan otomobillerde bulunan özelliklerden vazgeçmek istemedikleri belirlenmiştir . Diğer bir ifadeyle ; otomobil sahipleri , fiyat farkının az olması ve diğer otomobillerle aynı özellikleri sağlaması halinde , çevreci özelliklerin , otomobil satışlarında , büyük bir rekabet şansı yaratacağını belirtmektedir .

INTRODUCTION

Environmental pollution , is an important issue that has been discussed during last years. Air pollution in Türkiye , especially in big cities during winter periods , became a great danger. This danger caused by industrial, heating sources and motor vehicles emission gases threatens public health . Press also puts great importance in this subject in last years. Increasing public pressure pushes governments and political parties to form an " Environmental Policy " and implement this policy without any delay.

In this context, " The Ministry of Environment " prepares a regulation in order to limit emission gases in motor vehicles . These regulations will affect the future of the Turkish automotive sector to a great extent .

The first regulation about the control of exhaust emissions in the world took place in California , in 1968. First examples in Europe was put on act in 1972 with European Community Environmental Regulation 15.00 (E.C.E R.15.00) . The motorisation rate of these countries are greater than Türkiye. Generally in Europe there are 218 cars per 1000 person . In countries like U.S.A. , Germany , France there are 480 cars per 1000 person . In Türkiye, there are only 36 cars per 1000 person. Unfortunately this low rate does not constitute an advantage for our country . The distribution of car park is dense in big cities. Thus motor vehicles emissions play an important role in air pollution .

Since 1972 European Community acted regulations which limits the exhaust emission in increasing extent progressively. Finally, in 1991 they put on act Euro 93 . The limits of this regulation can only be reached by the utilisation of catalytic converter in fuel motors. European Community reached this point in the control of emission gases in motor vehicles according to a master program which has been implemented progressively during years . The implementation date of regulations changes according to each countrys conditions. Governments take into consideration the period for adjustment of their automotive industry . For example, in Germany regulations E.C.E. R. 15.05 of 1989 was put on act in the beginning of 1993 .

Turkiye, being a developing country and a potential member of the European Community , has to study carefully these improvements in the industrialised countries and has to pay much more attention to environmental issues .

This thesis originates from the idea that , companies should take environmental issues into consideration in their long and short-term business policies in order to satisfy consumer demands and to be compatible in changing market conditions. The Ministry of Environment and The Ministry of Industry have already put a regulation which necessitates unleaded fuel consumption in all models of cars produced after the date of July 1993 . Thus the government has been making efforts to increase the demand and to spread all over the country the consumption of unleaded fuel.They have also declared a master plan for the production of cars with catalytic converter. According to that plan, all cars will be produced with catalytic converter after the year 2000.

Table 1.1 - Plan for the production of cars with catalytic converter

<u>YEAR</u>		<u>MOTOR CYLINDER</u>
After 1995		1800 cc. and superiors.
1996		1600 cc.
1997	% 30 of	1400 cc.
1998	% 60 of	1400 cc.
1999	% 100 of	1400 cc.
2000		All models

Source :Declaration of emission control in motor vehicles,1992, T.C. Ministry of Environment , General Directory of Environmental Protection and Control (T.C.Çevre Bakanlığı Çevre Kirliliğini Önleme ve Kontrol Genel Müdürlüğü)

As seen in the Table 1.1,from 1995 on,all the cars produced in Turkiye which have an engine with 1800 cc.and superior should have catalytic converter.In 1996 all the cars with 1600 cc.and superior engine capacity should be produced with catalytic converter.From 1997 on, 30% of the produced cars with an engine 1400 cc.should be with catalytic converter. From 1998 on , this percentage will increase to 60%. In 1999 all the cars with 1400 cc. engine capacity should be produced with catalytic converter.And from 2000 on , all the cars produced in Turkiye should be with catalytic converter.

These figures clearly indicate that automotive industry will have to make new technology investments in order to reach these limits.

The main purposes of this thesis is to investigate the level of environmental concern among car owners in Istanbul, the attitudes towards air pollution, and the demand for " environmentally friendlier car", and the economic value of such a car.

The studies within the framework of this thesis will be presented in the following order:

In the following chapter new concepts in societal marketing , the arising public concern in environmental protection , the role of motor vehicles in air pollution and the examples of automotive industry in developed countries which tries to cope with new standards will be reviewed.

In the third chapter the methodology of the field study will be explained and the major findings of the survey will be presented .

In the last chapter , the conclusions and the implications of the research will be discussed .

CHAPTER ONE

I.LITERATURE BACKGROUND

In this chapter previous studies and articles related to the subject which will form the theoretical basis of this thesis will be presented under the topics listed below :

- 1-Megamarketing and Societal Marketing
- 2-Environmental Concern and Public Reaction
- 3-The Role of Transportation Vehicles in Air Pollution
- 4-The Impact of Environmental Protection on Economy
- 5-The Automotive Industry and The Environment

1.1. MEGAMARKETING AND SOCIETAL MARKETING

Kotler (1986), in his article in Harvard Business Review , states new marketing strategies; namely power and public relations in addition to the four P's of marketing strategy (product , price , place and promotion). Kotler calls this new strategic thinking as megamarketing. He defines megamarketing as " the strategically coordinated application of economic, psychological , political, and public relations skills to gain the cooperation of a number of parties in order to enter and/or operate in a given market " (Kotler ,1986,p.118). Megamarketing involves additional parties compared to marketing concept such as legislators , government agencies, labor unions ,reform groups and general public. Since environmental issues are related to general public benefit , we can define the demand of environmentally friendlier car as a megamarketing subject.

By 1980's business world discovered that environmentally concerned consumers were creating a demand as commercially forceful as any other buying trends .The green dimension gives businesses a new way to compete ; competition in terms of environmental features .A growing number of companies ,especially in developed countries ,are changing their product mix , their marketing practices and their production

technologies in order to conform with the demands of environmentalist consumers and pressure groups .

In this context , new concepts arised in marketing area . The issues of what is acceptable in marketing practices and what obligations marketers have to society are issues of marketing ethics and social responsibility. No matter how intense the competition is for market share, marketing decisions must be acceptable and beneficial to society. Otherwise the public will react and the consequences will be more negative than simply being number two in market share.

Ferrel and Pride (1993), in their book titled Marketing Concepts and Strategies , give clear definitions to these new concepts. They declare that "Marketing ethics are moral principles that define right and wrong behavior in marketing."(p. 72) The most basic ethical issues have been formalized through laws and regulations to provide conformity to the standards of society. Marketing ethics go beyond legal issues; ethical marketing decisions foster mutual trust among individuals and in marketing relationships.

Fairness, justice and trust are key moral principles for marketers who will inevitably have difficulties if they look after their own interests at the expense of others. However marketers may unethically behave due to conflicts between personal moral values and organisational objectives. On the other hand, improving ethical behaviour in an organisation is possible by eliminating unethical persons and implementing more efficient ethical standards. (Ferrel and Pride , 1993)

Ferrel and Pride (1993) also indicate that the concepts of ethics and social responsibility are often used interchangeably, although each has a distinct meaning. They say that "Social responsibility in marketing refers to an organisation's obligation to maximize its positive impact and minimize its negative impact on society. Whereas ethics relate to individual decisions, social responsibility concerns the impact of an organisation on society. Social responsibility can be viewed as a contract with society whereas ,ethics relate to carefully thought-out rules of moral values that guide individual and group decision making." (p.87)

Bremmer(1989),in his article titled "A New Sales Pitch: The Environment" states that " Recognition is growing that for a firm's survival and competitive advantage,the long-term value of conducting business in a socially responsible manner far outweighs short-term costs.To preserve socially responsible behavior while achieving organizational goals,organizations must monitor changes and trends in society's values.Furthermore, marketers must develop control procedures to ensure that daily decisions do not damage their company's relations with the public."(Business Week ,July 24,p.51)

Marketers must determine what society wants and than predict the long-run effects of their decisions,often by turning to specialists such as lawyers,doctors,and scientists. Because society is made up of many diverse groups,finding out what society as a whole wants is difficult,if not impossible. In trying to satisfy the desires of one group,marketers may dissatisfy others.

Ferrel and Pride (1993) write also that there are costs associated with many of society's demands.For example,society wants a cleaner environment and the preservation of wildlife and habitats,but it also wants low-priced products.Thus companies must carefully balance the costs of providing low priced products against the costs of manufacturing and packaging their products in an environmentally responsible manner.Marketers must also evaluate the extent to which members of society are willing to pay for what they want.Although social responsibility may seem to be an abstract ideal,managers make decisions related to social responsibility on a daily basis.To be successful,a business must determine what customers, government regulators, and competitors,as well as society in general, want or expect in terms of social responsibility.Social responsibility issues can be summarized in three major categories: the consumer movement,community relations,and green marketing.

Ralph Nader,one of the best known consumer activists, continues to crusade for consumer rights.Consumer activism on the part of Nader and others has resulted in legislation requiring various safety features in cars:seat belts,padded dashboards,stronger door latches,headrestraints , shatter-proof windshields,and collapsible steering columns. (Ferrel and Pride , 1993)

"Bill of rights" is drafted by President John F. Kennedy. These rights include the right to safety, the right to be informed, the right to choose, and the right to be heard. Those rights benefit marketers too, because when consumers complain to manufacturers about a product, this information can help them modify the product to make it more satisfying.

As Arabacıoğlu (1992) states in her MBA thesis, all these efforts, of course, have a positive impact on local communities, but they also indirectly help the organizations in the form of good will, publicity, and exposure to potential future customers. Thus, although social responsibility is certainly a positive concept, most organizations do not embrace it without the expectation of some indirect long-term benefit.

"Green Marketing" is the new name of the game. It refers to the specific development, pricing, promotion, and distribution of products that do not harm the environment. Since the environmental advantages are being perceived as a very effective competitive advantage, suppliers and marketers will be pushed by consumers to compete in terms of more environmental features (Stewart, 1992). For example, Exxon starts selling Phase IV gasoline, which is designed to reduce air pollution. (Ferrel and Pride, 1993) Companies receiving the green seal will be able to use it in advertising and public information campaigns and on packaging.

As consumers have become more concerned about the effects of their buying actions on the natural environment, businesses have been attempting to exploit those concerns in their marketing strategies. However, Arabacıoğlu (1992) reports also that a recent study by AGB Market Information Company showed that U.S. consumers don't always buy the products that they claim to prefer. People who have positive attitudes toward green marketing and prefer environmentally conscious products are more likely to consume in line with those attitudes but, in the end, are still more likely to use the most convenient product when there is no efficient alternative.

As we have seen in this section; marketing science creates new concepts on social responsibility subject according to changing consumer demands. As these concepts become more important, organizations will pay much more attention on social responsibility. Thus companies will compete also in this new area. Environmental protection is one of the main subjects which grows rapidly, within this new competition. In the following section we will review how much importance people give to environmental protection.

1.2. ENVIRONMENTAL CONCERN AND PUBLIC REACTION

In this section , the environmental actions and their results in Türkiye will be reviewed and evaluated.

Human-beings cared about their environment since early times. However we used natural resources like they are unlimited and we destroyed to some extent the nature. In the last quarter of 20th century environmental pollution and its thrilling effects, petrol crisis, the destruction of natural balance in some areas, improvements in communication and holes in the ozone layer makes the foundation of environmental concern in all over the world.

Now we know that natural resources are limited and we have to pay more attention to protect the nature. Human-beings try to protect their environment locally and they also contribute in some campaigns aiming environmental protection in global context.

Ünlü (1992), a member of the board of directors of Turkey Environment Protection and Forestation Association (Türkiye Çevre Koruma ve Yeşillendirme Kurumu ,T.C.K.Y.K), mentions that their most important slogan is " THINK GLOBALLY, ACT LOCALLY ". Ünlü explains their slogan as follows: We live in a unique planet and our problems are related to each others. We have to solve them in global extent. Meanwhile it is very important to act locally where the problem is arising. And the most important thing is to understand the role of public contribution in the environmental protection movement. This shows us that environmental concern becomes more and more important.

Environmental concern is a prerequisite for environmental protection. But it is not sufficient solely. Generally public contribution is taking part in the time interval of decision making process in political activities, in planning and management of public affairs, in having knowledge about the situation, and in advising.

People as a group , foundations, or voluntary organisations affect the time interval of decision making process by their criticisms or supports. This happens oftener in local areas and you can get the results easier.

In most situations public contribution gives boldness to the manager who has to take decision in difficult matters.It also provides the implementation of regulations. Without public intervention we can not develop an effective local environmental management.

Another important aspect of public contribution is personal contribution in the improvement of our living environment. Being responsible for our environment and paying attention to choose most harmless way to conserve natural resources while producing or consuming in daily life is the most important part of this context.

Ünlü (1992) advises also a booklet, published by EARTHWORKS organisation and financed by BORUSAN in TÜRKİYE, individuals who want to contribute in the environmental protection named; " We can save the nature with 50 simple precautions ".In this booklet there are examples of precautions that we can apply easily during our daily life .

Nowadays governments also try to settle international agreements in environmental protection. A conference organised by United Nations Conference of Environment and Development (UNCED) during 3-14 JUNE 1992 in Rio about environment and development with the participation of more than 150 presidents and prime ministers.Türkiye is represented by The Minister of Environment in Rio, and Prof.Dr.Barış Mater represented all Turkish voluntary organisations in The Global Forum 92.

Mater (1992) reported that one of the most important items observed in Rio Conference had been the protection of atmosphere, energy consumption and change of the global climate ,the thinning of ozone layer and air pollution beyond frontiers.

As we have seen in this section environmental protection is a new subject for Türkiye. Although it is new, Turkish people are becoming environmentally concerned very rapidly. As a developing country, Türkiye is adapting environmental trends of the developed world much faster than expected. According to these developments in environmental subject, we may say that public demand for environmentally friendly products/cars is growing in Türkiye. In the next section, we will review studies related to the impact of motor vehicles on air pollution.

1.3. THE ROLE OF TRANSPORTATION VEHICLE IN AIR POLLUTION

In this section we will review the results of some recent studies which try to define the causes of air pollution. It will be useful to see the role of transportation vehicle in air pollution before making a market research for environmentally friendly car demand.

Air pollution, caused by the destruction of natural composition of the atmosphere by various gases, steams, liquid and solid particles, constitutes one of the most important environmental problems. Increase in population, rapid urbanism and developing industry give an increasing acceleration to air pollution since the beginning of the 20th century.

Kartal and Doğan (1992) discussed the causes of air pollution as urbanism and industrialisation, in a TUBITAK study. The sudden and direct toxic effects, the length of its life cycle in the atmosphere, being measurable with only very special equipments, and being the fundamental factor of acid rain and SMOG makes the vehicle emission more serious and more dangerous among other emission sources. In order to protect the atmosphere and to prevent air pollution we have to know the contribution of different polluting factors.

Erkan (1992) reported in his writing that air pollution caused by the transportation vehicles is already beyond the healthy standards in big cities. He indicates also the percentage contribution of emissions in air pollution is greater than 70 %.

Various techniques have been applied for air pollution modelling. In a TUBITAK study realised by Topcu, Keskinler and Bayramoglu (1992) a model was developed by applying continuity equation to the air control volume over Erzurum city .

Model parameters were calculated by regression analyses using sulphur dioxide (SO₂) and particles' polluting concentrations and meteorological data concerning 1989-90 and 1990-91 winter seasons. Multiple correlation coefficient R² for all analyses were of the same order of 97 % .

According to this model, daily polluting concentrations are not only influenced by daily meteorological parameters but also by previous day's values. The proposed model estimates daily polluting concentrations by the means of meteorological data fairly well.

Kartal and Dogan (1992) indicate population growth, meteorological conditions, low quality fuels, false burning techniques, lack of green area, increase in the vehicles' park, industrialization and poor management of solid wastes as the causes of air pollution in Kayseri.

In their study, Kartal and Dogan also defined the percentage contributions of burning fuels, which is found as the most important factor in air pollution, according to their sources.

According to a research conducted ,in St. Louis,U.S.A, the contribution of vehicles is about 0.6 % in SO₂ (Committee on the Challenges of Modern Society,1973) . Grinskei and Schneider (1975) report similar results in their studies in Norway and in Netherlands.

Similar studies report that the contribution of vehicles in carbon monoxide (CO) is about 60.5 % , whereas in nitrogen oxide (NO_x) is 27 % .

(Committee on the Challenges of Modern Society, 1973)

Demirekler(1979) in a research realised in Ankara, found that a vehicle produces 0.12-13.5 g. CO emission per Km..

Müezzinoğlu (1983) reports the emission factors for fuel and diesel vehicles as follows ;

Table 2.1 - Emission factors for motor vehicles

<u>Emission Gases</u>	Vehicles' Emission (g/kg)	
	<u>Fuels</u>	<u>Diesel</u>
Carbon monoxide (CO)	471	9.7
Nitrogen oxide (NOx)	18.3	36
Sulphur dioxide (SO ₂)	1.4	6.5

Source :Müezzinoğlu (1983) ,Hava Kirliliği Kontrol Semineri Notları (Air, pollution Control Conference Reports , Segem, Ankara

Kartal and Dogan (1992) report that a study by National Academy of Sciences in 1972 states that emission control to the vehicles provides 85 % decline in CO .

Boccola and Cirillo (1989) explain that in 1984 vehicles' emissions constitute 5.1 % of total sulphur dioxide (SOx) pollution , 61.4 % of total nitrogen oxide (NOx) pollution and 90.7 % of total carbon monoxide (CO) pollution in air in Italy.

Kartal and Dogan (1992) report that fuel vehicles' CO emission varies between 65-380 g/Kg . Kartal and Dogan (1992) indicate also that diesel vehicles produce between 5-25 g/Kg CO emission , and 8-22 g/Kg NOx emission.

In another research conducted in Wien , Horwarth et al (1989) report that particles originating from diesel vehicles add 1-2.6 additional patients in lung cancer cases per 100,000 person/year.

Lubbert and De Tilly (1989) state that vehicles' emission constitutes 1.1-10.5 % of total SO₂ pollution . They indicate also vehicles emission forms 36.5-84.5 % of NOx pollution .

All of these studies examine emission gases like SO₂ , CO and NOx because of their thrilling poisoning effects on living and nonliving materials . SOx , NOx and inorganic gases like CO₂ and HCl form an important cause of acid rain.

Kartal and Dogan (1992) utilized portable gas analyser to study vehicles' emission. They used arithmetic average values of different kinds of vehicles in different time intervals: start of engine, optimum operating time, and during transportation for some of them. The standard deviation of the analyser is smaller than 0.05 % for CO and SO₂.

Kartal and Dogan (1992) conclude that vehicles originate the greatest percentage of CO emission. This high value proves that motor vehicles are the most important cause of CO pollution. However, researchers also indicate that these rates depend on the combustion techniques and efficiency of combustion.

Table 2.2 - Motor Vehicles' Contribution in Air pollution

POLLUTING GASES AND FACTORS CONTRIBUTION		
(%)		
<u>Emission Gases</u>	<u>VEHICLES</u>	<u>HEATING & INDUSTRY</u>
Carbon monoxide (CO)	90.6	9.4
Nitrogen oxide (NO _x)	76.7	23.3
Sulphur dioxide (SO ₂)	3.9	96.1

Source:Kartal, Doğan (1992),The contribution of gas emissions originated from the heating systems and vehicles, TÜBİTAK DOĞA DERGİSİ,VOL.16,NO 4,1992 ,P:307

1.4.THE IMPACT OF ENVIRONMENTAL PROTECTION ON ECONOMY

The environment is positively or negatively affected by different economic activities in varying degrees and environmental damage have also significant impact on the economy.

Ar (1975) reports that environmental problems used typically to be on the fringe of economic policy making, and received only passing reference in economic analysis. But increasingly today,environmental protection and environmental pollution analysis are entering more directly into economic cost and benefit calculations.

Ghosh (1987) states that " If environmental protection is taken up, it increases the costs directly in many industries and these are passed on to their final consumers in varying degrees. In a developed country, where industries are most often mature and have fairly strong foundation, this increase in costs has less impact than on industries in developing economies, where some weak industries may be priced out of the market due to the high price impact of environmental protection on them. This results, in practical terms, either in the destruction of some industries causing higher environmental damage or in a retardation of growth, as traditionally measured, and employment. But at the same time it is increasingly being felt in developing countries that environmental effects have to be duly incorporated into the economic development process." (p.115)

Trade-off between economic growth and environmental improvement has been searched in the U.K. Department of Environment Survey in 1986. Fifty percent of the respondents said that " the environment should be protected , even at the risk of holding back economic growth ". (p.130)

On the other hand , some contradictory arguments regarding environmentalism versus economics are also present . Pearce reports , for example , in his article in New Scientist (June 16, 1990) that " the green decade appeared to be over almost before it had begun " (p.42) . He backs up his argument with the results of the market research of AGB Market Information Company , which reported that the supermarket shelves were stacked with unsold green products .

As a conclusion , it can be said that , public seems to be willing to compromise economically in turn for a better environment but this compromise holds true to a certain extent.

1.5. THE AUTOMOTIVE INDUSTRY AND THE ENVIRONMENT

In this section ,we will review the studies of international automotive industry which tries to cope with the new demands of environmentalist consumers and legal authorities.

The first CLEAN AIR ACT in U.S.A.(1970) required dramatic reductions in motor vehicle emissions. Technology solved this problem by catalytic converter.In response to a mandate from General Motors,the petroleum industry began producing the unleaded fuel necessary for operation with the converter. However, the cost to the car buyer of new emissions control and safety technology was becoming substantial.(Report on Environment and Automotive Industry, 1993)

Despite early successes,the new technology did not yield permanent environmental solutions. It only prevents air quality levels from getting any worse. Average vehicle miles travelled in U.S.A. were up by about 20 per cent.In some areas of particular environmental concern, such as California, the vehicle population was also growing at a rate as high as 4 per cent per year. By 1995, emissions control technology will be fully reflected in the US vehicle population.Clean Air Act amendments were recently passed into law in the U.S.A.(Mateyka ,Allen and Hamilton,1991)

Le François (1993) in his article in L'Auto-Journal states that people began to give more importance on environmental and energy problems in the early 1980s. As a result of this pressure , R&D studies for electric and alternative fuelled vehicles started .Especially CO production originated from fuel engines and its "global warming" effect accelerated those studies in Western Europe and in Japan.

By 1988, the programme results indicated that on a fully accounted life cycle, basic electric vehicles still needed substantial improvements to be competitive on an economic basis alone, as the following cost figures demonstrate:

-two passenger car : 29,5 cents per mile versus 21,5 for gasoline fuelled vehicles;

-3-4 ton van:38.2 cents per mile versus 25.8 for gasoline fuelled vehicles.At a gasoline price of \$1,00 gallon,electric vehicles were not substitute transportation.((Mateyka ,Allen and Hamilton,1991)

R&D has focused on urban fleet vehicles such as buses and delivery trucks. The presumption appears to be that the development of the infrastructure for fuelling and servicing such fleets of alternative fuelled vehicles will later support the introduction of corresponding passenger vehicles, particularly in urban areas.

While the amendments to the Clean Air Act in the U.S.A. put particular pressure on diesel engine manufacturers to develop alternative fuelled vehicles the choice of which alternative fuel is now a point of much mandate. The options are as follows: (Report on Environment and Automotive Industry, 1993)

Methanol: Already, recent high prices for methanol have dampened some initial enthusiasm.

Compressed Natural Gas (CNG): Even at high pressures, vehicle range may still be limited, and the fuel tank weight and volume compromise vehicle utility

Liquefied Natural Gas (LNG): It appears that it can be created relatively inexpensively at various points in the pipeline system and distributed to existing vehicle fuelling locations by truck, just as current fuels are distributed.

Mateyka, Allen and Hamilton, (1991) report that "The vehicle manufacturers have taken a passive stance on alternative fuels and run the risk of a regulatory nightmare. The vehicle and engine builders have various strategies for coping with the demands of such a chaotic marketplace. Faced with such uncertainty, young business strategists vote for being a fast follower. The technologists hold fast to "build the multi-fuel engine", while manufacturing and financial people lobby for gasoline/petrol and diesel". (p.110)

West European countries set fuel prices (taxes) high and let the market drive the auto industry. The result is vehicles which are lighter and more fuel efficient than those produced in North America.

Nowadays, we are facing environmental problems in all our consumption goods. We might say that the most recent one is in automotive industry. Developed countries realized this fact due to increasing public pressure in their own countries. Governments tried to solve this problem

and they came to the conclusion such that a policy which covers all the automotive sector should be implemented. The partial attempts which have been tried before did not end up with a permanent solution. A sufficient solution can only come with a long-term plan created by government and automotive industry together. The experience showed that governments by themselves are not capable of solving this problem. Automotive industry should take an active role in solving environmental problem. But this participation will be limited by some constraints which are the realities of this sector. They can be summarized as follows : (Mateyka ,Allen and Hamilton,1991)

The first constraint is related to the size and weight of the car. Because as the size of the car increases , full consumption and emission will increase inevitably. Since these are the main items causing the environmental problem , industry , somehow , should fix them at a certain level.

The consumers primarily want to have economic and convenient cars. In other words , if the environmentally friendlier cars do not consist of these criteria there will be no chance in the market.

Public transportation is not attractive enough to the individuals. People prefer to use their own car. For example, in the USA , the percentage of people using buses are not high.

Only few engineers and car enthusiasts are interested in the type of motor and fuel. The rest of consumers concentrate on economic conditions.

As in other goods , consumer needs in car sector are endless and people are looking for a car which will satisfy their varying desires. On the other hand , the same consumers are also gradually becoming aware of environmental problems. Recently , they are very sensitive to air pollution, traffic congestion and the expenses related to their own cars. They want to have the best with their limited budget.

Mateyka, Allen and Hamilton (1991) in their article state also that " The fundamental technology of the motor vehicle needs to be re-examined at the systems level. Considering that the current mission of personal vehicles is to carry an average of 1-2 passengers and a small amount of material, making most trips on high speed motorways, it is clear that passenger cars as currently designed are too large and heavy, and generally poorly suited to this purpose. Similarly, if commuters used

smaller, narrower vehicles more appropriately designed for the mission, the size and cost of bridges and ramps could be dramatically reduced, and the land area given over to motor vehicle roads, parking lots and driveways could be held constant."(p.115)

Calvet (1993) , reports that in Western Europe,the process of rethinking the highway,vehicle,and driver system is in many ways more advanced than in the USA,in the form of Project Prometheus and parallel programmes in industry.

The challenge to the automotive industry is clear.It is time to find the new model for the automotive,highway,and driver system of the 21st century.The challenge is clear to governments:define the absolute needs and do not build regulatory barriers to new technology.

Emptas (1993) indicated that the automotive industry is going to be a very exciting place to be for the next ten or 15 years,because the challenges are so great.The business implications of fuel switching are potentially enormous.The challenges are to increase private mobility and to reduce congestion,without building a new high cost highway system,and simultaneously to reduce energy use and air pollution.The final challenge is to do all this with vehicles made of recyclable materials.The companies who can see the system end game,who work in partnership with governments to redefine and separate the roles and missions of highways,vehicles, drivers and to find the new paradigm,will be the winners of the 21st century.

In the next chapter , the purpose is to investigate the degree of the sensitivity of car owners to the environmental problems in Türkiye.The main question adressed is to what extent they are ready for buying environmentally friendly car. In the next chapter , we will present the design of the study and discuss the results obtained .

CHAPTER TWO

II.A FIELD STUDY ON THE DEMAND FOR A CAR WITH CATALYTIC CONVERTER

This chapter is designed in two sections . In the first section , research design and methodology of the field study will be described and in the following section related findings will be presented .

2.1 Research Design and Methodology

In this section , first the research objectives and research questions will be presented , then the data collection procedure including sampling plan and questionnaire will be reviewed .

Research Objectives and Research Questions

One of the two main objectives of this research is to determine the level of environmental concern among drivers . Parallel to this objective , answers to the following questions have been sought by the reseacher :

- What is the importance of environmental problems ?
- Where does the air pollution stand when compared with other environmental problems ?
- What is the role of motor vehicles in air pollution ?
- The level of willingness to participate in the solution of air pollution .
- The level of personal contribution to the solutions of air pollution .

The second main objective of the research is to assess the impact of environmental concern on car purchasing decision ;that is ,to assess the potential demand for car with catalytic converter . In order to reach that objective answers to the following questions have been sought by the questionnaire :

- The environmental image of five important brands in Turkish automotive sector .
- The definition of an environmentally friendly car .
- The perceived level of knowledge of the consumer about the catalytic converter and the unleaded gasoline.
- The utilisation of unleaded gasoline .
- The level of willingness of the consumer to buy a car with catalytic converter.
- How much extra the consumer is willing to pay for a car with catalytic converter .

Type of Reseach Design

The type of this research can be considered as a cross cut of descriptive and explanatory because it is among the first attempts to seek insights into some general questions regarding the environmental concern level of the Turkish car buyers.

The study is a cross-sectional field study by which the data has been collected by means of a structured questionnaire over a period of two months. (January-February 1994)

The population and sample

In this sutdy car owners in Istanbul is taken as the target population. Since we want to define the environmental concern of potential car buyers and the demand for a car with catalytic converter , we assume that car owners represent the major part of potential demand. The final form of the questionnaire has been distributed to 458 persons by non-probabilistic convenience sampling method. The quotas were assigned for car brands for the sample to represent the Istanbul car park . The sample size of 458 *, represents a standard error of 4 % within 95 % confidence interval.

*The formula used to derive the sample size is as follows:

$$n = \frac{(1.96)^2 * 0.3 * 0.7}{(0.04)^2} = 458$$

According to Government Statistics Institute (DIE) reports, Istanbul represents nearly 30 % of car park in Türkiye, in 1992. (Istanbul 620.000, Türkiye 2.150.000 cars.)

Data collection Method and Questionnaire Design

A structured and undisguised questionnaire has been used as the primary data collection instrument. The questionnaire has been developed after a thorough review of the literature related to the subject and also in light of the information from the industry and with some other authorities related to the subject. The prototype of the questionnaire was tested on a convenience sample of 12 persons, and necessary changes and adaptations were made accordingly. And face-to-face interview technique is applied.

According to the nature of question and type of information sought, the questionnaire utilizes different attitude measurement scales such as nominal, ordinal, and interval and various attitude rating scales such as rank-order and likert. Open-ended questions are also used for the purpose of getting unaided responses for some questions. A copy of the questionnaire is presented in Appendix I (in Turkish) and Appendix II (in English).

Limitation of the Study

The limitation of the study was the target population, being only the car owners in Istanbul. The main reason for choosing the car ownership as a criterion is the assumption that they are the potential customers for new cars. So the sample represents only customers who will renew their car. Infact, since the motorisation rate is still low in Türkiye, there is a part of the new car demand which comes from the people who have never owned a car before. However it is very difficult to define the real potential demand. So it can be said that, in this study, only renewing part of the potential demand for new car is represented.

2.2 RESEARCH FINDINGS

In this section the results of the field study conducted on environmental concern in car purchasing behaviour will be presented.

2.2.1 Demographic characteristics of the Sample

Findings on the characteristics of the sample are summarized in Table 3.1 :

TABLE 3.1 - Demographic Characteristics of the Sample

<u>GENDER</u>	<u>no of respondents</u>	<u>percentage of respondents</u>
Female	90	19.7
Male	<u>368</u>	80.3
Total	458	
 <u>AGE GROUP</u>		
20-24	136	29.7
25-29	90	19.7
30-34	78	17.0
35-39	49	10.0
40-44	36	7.9
45-49	40	8.7
50-54	18	3.9
<u>55+</u>	<u>11</u>	2.4
Total	458	
 <u>EDUCATION LEVEL</u>		
Primary school	33	7.2
Secondary school	43	9.4
High school	188	41
University	172	37.6
<u>Graduate Studies</u>	<u>22</u>	4.8
Total	458	
 <u>MARITAL STATUS</u>		
Bachelor	204	44.5
Married	244	53.3
<u>Divorced-Widow</u>	<u>10</u>	2.2
Total	458	
 <u>NUMBER OF CHILDREN</u>		
No children	51	20.1
1 child	73	28.7
2 children	89	35.0
3 children	29	11.4
4 children	7	2.8
5 children	3	1.2
<u>6 and above</u>	<u>2</u>	0.8
Total	254	

<u>WORKING STATUS</u>	<u>no of respondents</u>	<u>percentage of respondents</u>
Owner	178	39.3
Manager	33	7.3
Clerk	110	24.3
Worker	19	4.2
Retired	7	1.5
Not working	111	23.3
<u>TOTAL AVERAGE HOSEHOLD INCOME</u>		
below 10 billion TL	104	22.7
10-15	83	18.1
15-20	78	17.0
20-25	51	11.1
25+	142	31

In terms of gender , 80.3 percent of the respondents are male and the remaining 19.7 % is female . The sample is observed to be quite young , since 66,4 % of the respondents are below age 35 . 83.4 % of the respondents are high school graduates and higher education level. In terms of marital status half of the respondents are married. The distribution of the married respondents (including divorces and widows) by the number of children is as follows : 20.1 % with no children , 63.5 % has 1 or 2 children , 16.2 % has more than 2 children . Nearly 40 % of the respondents are the owners of their job , 7.3 % of them are managers , 23 % are not working .

If we assume that below 10 million TL. monthly average total household income earners belong to low income group , 10-20 million TL. to middle income and above 20 million TL. to high income group , the distribution of the sample by income groups comes out to be as follows : 22.7 % low income , 35.1 % middle income , 48.1 % high income . This high income level of the respondents can be explained by the fact that the sample is formed by car owners.

2.2.2 FREQUENCY DISTRIBUTIONS

In this section , the results of the field study will be presented by the frequency distributions . The presentation will be made under two separate headings , namely , the level of environmental concern of car owners , and the impact of this on their car buying decision .

2.2.2.1 FINDINGS ON ENVIRONMENTAL CONCERN OF CAR OWNERS

Environmental problems have been perceived by 19.2 % of the respondents as the most important problem that the world will face in the future after the economic crisis . It is followed by the rapid increase of population (Table 3.2)In the meanwhile , we have to keep in mind that , this was the first question and the social desirability bias have no impact on this high concern for environment .

Table 3.2 The most important problem of the world in the future (%)

	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>Average</u>
Economic crisis	32.5	15.5	12.7	20.2
Third world war	11.4	7.2	6.8	8.5
Population increase	17.0	20.1	13.1	17
Energy crisis	3.5	10.3	10.7	8.2
Environmental problems	19.2	24.7	17.0	20.3
Health problems	4.6	10.9	16.8	10.8
Terrorism	10.7	11.4	22.3	14.8

When it comes to identifying the environmental problems , the air pollution is mentioned as the first answer with highest frequency.(Table 3.3) 45.9 % of the respondents are concerned about air pollution when they think about environmental problems . Destruction of green and contamination of drinking water are the following items with lower frequencies.

It is interesting that people are more concerned about local problems than global environmental problems such as desertification , depletion of ozone layer , sea pollution ,and loss of species.

Table 3.3 "Environmental problem" reminds of ...

<u>PROBLEM</u>	<u>%</u>
AIR POLLUTION	45.9
Destruction of the green	13.8
Contamination of drinking water	12.0
Depletion of ozone layer	8.3
Sea pollution	6.8
Hazardous waste	4.8
Other	3.7
Loss of species	1.7
Household waste	1.3
Desertification	0.9
Noise pollution	0.9

According to the results, the ozone layer depletion is the item with the highest frequency among global environmental problems . This might be result of the mass media which has put remarkable importance on this subject previously ; thus, represents also the importance of media in forming public opinion .

In their living environment , car owners complain mostly about air pollution (Table 3.4) and the contamination of drinking water . This is the same result as for the identification of environmental problems . Drivers in Istanbul considers air pollution as the most important environmental problem and also at the personal level they complain mostly about air pollution . After air pollution they complain secondly about the contamination of drinking water . It is interesting to note that people at the personal level complain most about the same three items that they think as environmental problems .

Table 3.4 Level of personal complaint

	<u>Mean</u>	<u>A</u>	<u>B</u>
AIR POLLUTION	1.08	98.9	1.1
Contamination of drinking water	1.15	97.2	2.6
Destruction of the green	1.20	97.6	2.4
Hazardous Waste	1.27	95	3.7
Pollution of sea,river	1.30	95.4	4.4
Noise pollution	1.36	92.1	6.7
Loss of species	1.54	88.4	10.5
Household Waste	1.61	84.9	13.6
Depletion of ozone layer	1.78	74.9	20
Desertification	1.84	75.8	21.1
Acid rain	1.88	69.2	23.2

1-very much complained 4-not complained at all 5-no idea
A total affected percentage
B total not affected percentage

When it comes to the cause of the air pollution ; 41 % of car owners define it as industry , % 31 of them as heating sources and % 17.5 as motor vehicles. (Table 3.5)The importance of motor vehicles in air pollution gets higher frequency as the second main important cause . 28.6 % of the car owners perceive motor vehicles as the second main important cause of air pollution .

Table 3.5 Main important cause of air pollution

	<u>Percentage</u>		
	<u>1st</u>	<u>2nd</u>	<u>Total</u>
Industry	41.0	28.8	69.8
MOTOR VEHICLES	17.5	28.6	46.1
Heating sources	31.0	13.5	44.5
Urbanism	8.5	18.3	26.8
Other	0.9	1.7	2.6
Other waste	1.1	9.0	2.0

The respondents were then asked about the evaluation of some ideas on environmental protection .(Table 3.6)

Table 3.6 Opinions on Environmentally Friendly Products / Cars

Improved technologies will lead to more environmental friendly products

Mean : 1.76 A : 80.3 B : 19.7

Environmentally friendly standards should be implemented in our country also.

Mean : 1.18 A : 96.5 B : 3.5

I prefer buying an environmentally friendly car .

Mean : 1.62 A : 87.6 B : 12.4

I will pay extra money in order to buy an environmental friendly car .

Mean : 2.04 A : 71 B : 29

I can give up some conveniences of my car in order to buy an environmentally friendly car .

Mean : 2.13 A : 66.2 B : 33.8

I prefer environmentalist brands when choosing a car .

Mean : 1.69 A : 83.8 B : 16.2

Environmentally friendly car should be compulsory in production and importation .

Mean : 1.48 A : 89.7 B : 10.3

The extra cost of environmentally friendly car should be financed by government or producer .

Mean : 1.55 A : 84.3 B : 15.7

1=Totally agree 2=agree 3-disagree 4-Totally disagree

A: Total agree percentage B: Total disagree percentage

People believe that environmental standards shall be implemented in our country also. They state that improved technologies will lead to more environmentally friendly products and they prefer buying this kind of car. One interesting point here is that paying extra money for an environmentally friendly car is more acceptable than giving up some conveniences of their car . The respondents believe that the least acceptable thing is giving up some conveniences of their car (66.2 %) . One reason for that might be driving is perceived as a hobby in our population . And car owners accept even paying extra money but they do not want to sacrifice any benefits of their toy .

With a further question , the respondents were asked about their application of some precautionary measures to prevent air pollution . Table 3.7 presents the results.

Table 3.7 Participation in following precautions

I pay extra money to buy the products of environmentally conscious brands
 Mean : 2.3 A : 55 B : 45
 I prefer energy sources that have lower negative environmental impact.
 Mean : 2.2 A : 62.5 B : 37.5
 I drive less frequently my car during heavy air pollution periods .
 Mean : 2.8 A : 37.3 B : 62.7
 I check my car's exhaust system frequently .
 Mean : 1.8 A : 76.6 B : 23.4

A :certainly do percentage B :not doing at all percentage

The activity with the highest participation rate was "having a check of the car's exhaust system" with 77 % of the respondents saying that they certainly do this control frequently . 63 % of the car owners said that " they prefer energy sources that have lower negative environmental impact" . 55 % of the respondents said that they prefer buying products of environmentally conscious brands . An important result here is that people can not give up to drive their own car even during heavy air pollution periods . This may be considered as an anticipated result keeping in mind that Istanbul still has not a convenient public transportation system.

Table 3.8 Agreement vs. Actual participation

AGREEMENT	MEAN	A	ACT. PARTICIPATION	MEAN	A
I will pay extra money to buy environmentally friendly car.	2.04	71	I pay extra money to buy the products of environmentally conscious brands	2.3	55
Environmental standards should be implemented in our country also.	1.18	96.5	I check my car's exhaust system frequently .	1.8	76.6
I can give up some conveniences of my car in order to buy environmentally friendly car .	2.13	66.2	I drive less frequently my car during heavy air pollution periods .	2.8	37.3

1=fully agree 4=fully disagree
 A=Total agree percentage

1=always do 4=certainly do not
 A=Total do percentage

Table 3.8 compares the agreement level with some ideas ,by the actual participation of respondent . There exists a very obvious difference between the " agreement level with environmental protection ideas " and " the rate of those who are actually practicing these activities " . For all the activities the agreement attributed , by far exceeds the actual participation rate . Such differences between the ideas and actually performing these ideas seems normal when for these activities the person is required to put in some extra effort or money or also when he is required to give up some conveniences . Such activities can be listed as : " to pay extra money for environmentally fiendly products " , " not to drive personal car during heavy air pollution periods " .

So it can be concluded that , although the car owners in Istanbul are highly concerned about the environmental protection, this does not mean that they actually perform some basic precautions in their daily life .

2.2.2.2 FINDINGS ON THE IMPACT OF ENVIRONMENTAL CONCERN ON CAR PURCHASING BEHAVIOUR

In this part of the survey , the attention is focused on the the impact of environmental concern on the car purchasing decision . The purpose of the first question in this part was to rank environmental image of five important brands in Turkish automotive market . As seen in Table 3.9 Toyota received the highest degree of environmentalism with a mean value of 1.91 . Opel and Ford are the following brands with means 2.21 and 3.35, respectively . Renault has been the fourth brand in this ranking before Tofas .

Table 3.9 Environmentalist image of automotive brands

	mean
Toyota	1.91
Opel	2.21
Ford	3.35
Renault	3.37
Tofas	4.15

1-environmentally very concious

5-environmentally not concious at all

In the following question respondents were asked to give the definition of an " environmentally friendly car "

A little over 40 % of the respondents define such a car as not polluting air. 25.1 % of them agreed that environmentally friendly car has high technology and 20.5 % said that this kind of car is produced by recyclable materials. This result indicates that the respondents believe that technology can overcome environmental problems . And they give importance on air pollution aspect in defining a car as environmentally friendly .

Table 3.10 Definition of an environmentally friendly car

	<u>%</u>
Does not pollute air	42.4
Has high technology	25.1
Is produced by recyclable materials	20.5
Is not harmful for health	11.6
Other	0.4

The respondents were than asked how much mark-up they are ready to pay for an environmentally friendly car (Table 3.11). If the initial price of the car is 200 million TL. , 16.2 % of the respondents said that they are not willing to pay any price difference . 23.8 % said that they can pay up to 10 million TL. difference for environmentally friendly car . 16.6 % of the respondents agreed to pay 20 million TL. and 43.4 % agreed to pay even more.

Table 3.11 Price difference that can be paid for an " environmentally friendly car "

<u>Price difference in million TL.</u>	<u>%</u>
0	16.2
10	23.8
20	16.6
20+	43.4

Nearly half of the respondents are ready to pay % 10 mark-up for an environmentally friendly car . Here we see that the car buyer is willing to pay more for environmentally friendly car .

The respondents were then asked with an aided question , by which they were given a list of possible outcomes which they believe are the results of catalytic converter . As seen in Table 3.12 , 68.3 % of the respondents said that the catalyser is used for decreasing exhaust gas . 15.3 % said that they do not know the utilisation purpose . 7.2 % of them answered that it is used for decreasing fuel consumption and 4.1 % said that it is for increasing the life-cycle of the engine .

One interesting result here is that more than half of the respondents know about catalyser which is a new concept even in Europe . This shows that people pay attention on technologic improvements and their environmental impacts.

Table 3.12 The purpose of catalyser utilisation

	<u>%</u>
To decrease the exhaust gas	68.3
Do not know	15.3
To decrease the fuel consumption	7.2
To increase the life-cycle of the engine	4.1
To increase the power of the engine	3.5
Other	0.9
To decrease the vibration	0.7

The same aided question is then asked for the purpose of unleaded fuel consumption . 81.7 % of the respondents answered that it is for decreasing the exhaust gas. 4.8 % of them said it is for increasing the life-cycle of the engine and 4.4 % said that it is for increasing the power of the engine . This result again shows that high percentage of the car owners are aware of the purpose of unleaded fuel consumption . This means that most of the car owners are very concerned about air pollution and they follow the problem-solving activities with great interest. We have to keep in mind that companies like GM, Castrol and BP have conducted mass campaigns about unleaded fuel and these campaigns had contributed to a great extent to reach at this level of perception on the matter of unleaded petrol .

Then respondents were asked if their car can consume unleaded fuel, 14.2 % said that they do not know . 36 % said that their car can consume unleaded fuel and 49.8 % said that their car can not consume unleaded fuel .

When respondents were asked if they purchase unleaded fuel, 22.5 % said that they do so generally in order to protect the environment. The most important reason for not buying unleaded fuel was its expensive price .

Next , respondents were asked if they think about buying a car with catalyser, nearly 80 % said that they do. The ones who do not think of buying a car with catalyser indicated that it is more expensive and it is also difficult to find unleaded fuel everywhere .

Finally the respondents were asked how much they can pay extra for a catalyser .Nearly 4 % of the car owners said that they will not pay any extra money . 33 % of them answered that they can accept up to 10 million TL. extra amount . 26 % said that they can afford it till 20 million TL. and 12 % said that they will pay even more than 20 million TL. to buy a car with catalytic converter.

2.2.3 INTERRELATIONS AMONG VARIABLES

In this section , the interrelations between some demographic variables , car brands and behavioral variables related to environmental concern and car purchasing behaviour will be analyzed by cross tabulations. The variables are chosen especially to analyse the brand ownership effect on environmental concern and car purchasing behaviour.

2.2.3.1 Concern about the future and brand ownership

When we analyze the future concern of car owners according to their car brands , Tofas holders are the group with highest frequency who think that economic problems are the most important ones for the future of the world.(Table 3.13)

Among the other brand owners like Toyota, Opel ,Lada , Honda and Mazda the concern about economic problems drops and population increase and environmental problems gets higher importance . Most of the Renault holders (34 %) also think that economic problems is the most important problem in the future of the world. If we analyse the results according to counry groups of car brands, we will find that owners of local brands were more concerned about economic problems than environmental problems. On the other hand the concern about environmental problems is higher among imported car owners group. We can say that imported car owners are more concerned about environmental problems because they have higher standards of living.

Table 3.13 Concern about the future (%)

	Econ. Crisis	Third World War	Pop. Increase	Energy Crisis	Envir. Prob.	Health Prob.	Terrorism	Total
Renault	34	9	17	7	19	7	6	100
Lada	20	12	17	0	29	0	20	100
Skoda	22	5	22	6	17	5	22	100
Tofaş	39	11	12	4	18	4	11	100
Ford	20	20	20	20	20	0	0	100
Opel	38	20	18	3	8	3	10	100
Peugeot	0	20	20	0	40	0	20	100
Suzuki	16	0	33	0	50	0	0	100
Toyota	27	12	27	0	22	1	10	100
Mazda	10	21	16	10	26	5	10	100
Honda	36	18	0	0	18	9	18	100
Mercds	38	11	11	0	22	17	0	100
BMW	21	21	22	0	13	4	17	100
Total	32	12	17	4	19	5	11	100
Local	37	11	15	5	16	5	9	100
Import	20	13	20	2	23	4	17	100

2.2.3.2 The most important environmental problems and brand ownership

When we analyze environmental problems according to car brands ; Honda and Mazda (63 %) ,Mercedes and BMW (50 %) , and Tofas (54 %) owners think that air pollution is the most important environmental problem. Additionally, imported car owners pays more attention to deforestation than local car owners. And owners of Japanese cars are the most concerned in air pollution .(Table 3.14)

In the analysis of environmental problems according to income levels , we see that as income increases the concern in the environmental problems increases also . (Table 3.15) At all the income levels air pollution and deforestation is seen as the most important environmental problem .

Among the highest income group the ozone layer , pollution of seas and lakes become also important . 79 % of respondents , who think that air pollution is the most important environmental problem , say that they can buy a car with catalyser .

Table 3.14 Environmental problems by car brands (%)

	1	2	3	4	5	6	7	8	9	10	Total
Renault	13	9	51	9	8	1	2	5	1	1	100
Lada	17	8	39	17	8	4	0	0	0	4	100
Skoda	6	25	25	25	0	0	0	6	6	6	100
Tofaş	7	15	54	14	3	0	1	3	0	0	100
Ford	0	20	20	20	0	0	0	20	0	20	100
Opel	5	7	39	18	13	3	5	5	2	0	100
Peugeot	0	20	80	0	0	0	0	0	0	0	100
Suzuki	16	0	33	33	16	0	0	0	0	0	100
Toyota	7	19	41	14	9	0	0	9	0	0	100
Mazda	0	5	63	10	10	0	10	0	0	0	100
Honda	0	0	63	9	0	0	9	9	9	0	100
Mercds	11	10	50	5	11	0	0	6	5	0	100
BMW	4	4	54	18	4	4	0	9	0	0	100
Total	8	12	47	14	7	1	2	5	1	1	100
Local	9	12	49	13	6	1	2	4	1	1	100
Import	7	13	44	15	8	1	2	6	2	1	100

- 1-Depletion of ozone layer
- 2-Contamination of drinking water
- 3-Air pollution
- 4-Deforestation
- 5-Pollution of seas / lakes / rivers
- 6-Desertification
- 7-Loss of species
- 8-Hazardous waste
- 9-Household waste
- 10-Noise pollution

Table 3.15 Environmental problems by Income level (million TL)
(%)

Problem type* Income level	1	2	3	4	5	6	7	8	9	10	Total
10 million TL.	2	3	12	3				1	1	1	23
15million TL.	1	2	9	3	1			2			18
20 million TL.	0	2	8	3	2	1		1		0	17
25 million TL.	2	1	5	1	2	0			0		11
30 million TL.	0	1	2	1	1	0			0	0	5
35 million TL.	1	1	4	1		0	0		0	0	7
Above 35 m.TL.	2	2	9	2	1	0	2	1		0	19
Total	8	12	49	14	7	1	2	5	1	1	100

*See Table 3.14 for problem type .

2.2.3.3 The cause of air pollution and brand ownership

The respondents who think air pollution as the most important environmental problem count industry , heating resources and motor vehicles as the primary causes.

The analysis of responses according to car brands shows that Renault owners are the primary group who see heating sources as the main cause of air pollution .(35.1 %)

The imported car owners put more responsibility on motor vehicles in polluting air than local car owners. And a high percentage of car owners who think that motor vehicles emission is an important cause of air pollution state that they can buy a car with catalytic converter . (81.3 %)

2.2.3.4 Concern about environmental problems

Fifty-five percent of car owners say that they are willing to pay extra amount for buying environmental goods in daily life . If we analyze the responses according to gender ; we see that women pay more attention to this issue.(60 %) The percentage of men is 54 % . (Table 3.16)
If we analyse the responses according to age groups we see that respondents between 25-45 years old are more willing to pay extra money for buying environmental goods.

Table 3.16 Paying extra amount to buy the products of environmentally conscious brand. (%)

Gender	Always do	Generally do	Generally do not	Certainly do not	Total
Female	4	8	7	1	20
Male	14	29	29	8	80
Total	18	37	36	9	100

Nearly 80 % of car owners think that improved technologies are more environmental friendly. And 96.5 % of them think that environmental standards should be implemented in our country also. And 89.7 % of them say that the extra cost of environmentally friendly car should be compensated by government or producers.

2.2.3.5 Environmentally Friendly Car

According to drivers, the most environmentally friendly car brand is Toyota . Opel is the second brand . Then comes Ford , Renault , and Tofaş, respectively. Respondents who make this ranking define an environmentally friendly car as a car which ; is made by recyclable materials (20.5 %) , has an improved technology (25.1 %) , does not pollute air (42.4 %) .

2.2.3.6 Demand for catalytic converter and brand ownership

When the respondents were asked if they will buy a car with catalytic converter ; (78.6 %) of them answered that they will . Further when we analyse the responses according to car brands we see that imported car owners like BMW (100 %) , Toyota (85 %) are more willing to buy a car with catalytic converter . We see also that 79 % of the Renault owners are willing to purchase such a car . If we analyse the results according car brands we see that drivers who are willing to buy a car with catalytic converter are 78 % of local brand owners , 82 % are Japanese car owners and 76 % are European car owners .

Table 3.17 Environmentally friendly car demand (%)

	I may buy	I will not buy	Total
Renault	79	21	100
Lada	67	33	100
Skoda	72	28	100
Tofaş	76	24	100
Ford	80	20	100
Opel	79	21	100
Peugeot	60	40	100
Suzuki	83	17	100
Toyota	85	15	100
Mazda	79	21	100
Honda	73	27	100
Mercedes	72	28	100
BMW	100	0	100
Total	79	21	100
Local	78	22	100
Import	80	20	100

When we analyse the reasons for not buying a car with catalytic converter, the respondents answered that it is more expensive (40.8 %), they do not know this device (16.3) and , unleaded fuel distribution is not sufficient yet (15.3 %) .

In the following chapter the conclusions and the implications of the field study will be reported .

CHAPTER THREE

III.CONCLUSIONS AND IMPLICATIONS

3.1 Conclusions of the study

The main objectives of the study were first to have a general idea about the level of environmental knowledge and concern of the car owners in Istanbul and second to see whether the environmental concern has an impact on the car buying behavior of the consumers . With these objectives , after a thorough review of previous studies , a structured questionnaire has been designed and the data has been collected from a sample of 458 respondents by non probabilistic sampling method .

The first result was that more than 20 % of the respondents have identified the " environmental problems " as the most important three problems that the world will face in the future , even when compared with such other major problems as wars, energy crisis and anarchy . After economic problems , environmental problems are defined as the second most important problem . This clearly shows that public today is highly concerned about the improvement of the environmental quality for a better world in the future .

When the respondents were asked to identify the environmental problems, the first group of problems that triggered their minds were air pollution , destruction of green and contamination of drinking water . All of these problems are the ones which the inhabitants of Istanbul suffer from in their everyday life. So it can be concluded that people are more concerned with local environmental problems which they are faced with in absolute reality than global environmental problems such as desertification , depletion of ozone layer, sea pollution , loss of species , etc . People identify specific problems that they suffer personally as the most important ones .

One interesting result here is that air pollution received the highest frequency as an environmental problem which is far important from all the others . This may be the result of the fact that the survey is conducted during winter period when the air pollution gets at highest levels during a year .

Among global environmental problems the one with the highest frequency is the depletion of ozone layer . This represents the importance of media in forming public opinion . Because the media has put remarkable importance on this subject previously .

People believe that motor vehicles are the third important cause of the air pollution after industry and heating sources . 80 % of respondents believe that improvement in technology will solve also environmental problems . They believe that environmental standards in developed countries should also be implemented in our country . 71 % of the car owners say that they will pay some extra money but they are not willing to give up some conveniences of their car in order to buy environmentally friendly car . However they state that they prefer environmentally friendly brands when they buy car .

This encouraging scene of the consumer with high willingness to compromise money for environmental car is shaded , however when the actual participation in environmental protection is observed . Although people think that quality consists of an important aspect of the product , they are still reluctant in performing some basic precautions in order to protect environment . Only 37.3 % of them said that they drive less frequently their personal car during heavy air pollution periods . Thus we can conclude that agreement in ideas on environmental protection does not necessarily mean actual participation in protection . It may seem normal when for these activities the person is required to put in some extra effort , money or also when he is required to give up some conveniences .

When it comes to the environmentalist image of car brands, Toyota is the brand with best image . It is interesting that Opel which uses environmental protection most frequently in their ads has been the second brand . This may be due to the image of Japanese cars with improved technology . As we have seen before car drivers think that products with improved technology are more environmentally friendly. Renault has been the fourth brand after Ford and before Tofas .

The most important characteristic expected from an environmentally friendly car is that it should not pollute air . The second important factor came out to be the technology and the third important factor is the issue related to production with recyclable materials . So it can be concluded that for a car , its emission level and technology are sufficient to evaluate it as an environmentally friendly vehicle .

Car owners stated that they are willing to pay 12 million TL. extra for catalytic converter for a car which costs 200 million TL. on the average. However, it will be useful to remind that 16.2 % of them are not willing to pay any extra amount for catalytic converter . Most of the car owners know the results of catalytic converter utilisation (68.3 %). This percentage even gets higher when it comes to unleaded fuel consumption (81.7 %) .These percentages show that consumers are aware of new technological improvements and they give importance to environmental protection . However ,only 22.5 % of them said that they consume unleaded fuel . The most important reason for not purchasing unleaded fuel is its high price .

The general conclusions of the study is that people are concerned with environmental problems , especially with those which they suffer in their everyday lives. They are willing to participate in the solution process but actually they can not do so because of financial or other convenience factors . Air pollution constitutes the most important environmental problem . In this context they define environmentally friendly car as not polluting air. They know the effects of catalytic converter and unleaded fuel consumption . There exists a big potential for a car with catalytic converter but they prefer that car over the others only if the price difference is minimal or none and also they do not want to give up any convenience that the similar cars with lower environmental quality offer them . In other words , they appreciate environmental quality of a car but they prefer that production mark-up should be financed by producer or government .

3.2 Implications of the study

Since environment is a common concern for all mankind , without any exception , a study on the demand for environmentally friendlier car does have some implications for different parties in a population .

According to the survey results , car owners seem to be highly concerned with environmental problems . But unfortunately this high concern has not turn yet into positive and contributing action . The actual participation of the car owners in the solution process came out to be still very low. The consumers should be more active in the solution process and they should start to use their force as individuals of the society by demanding cars with higher environmental quality .

This discouraging scene , to some extent , can be interpreted as related to financial conditions of the consumer. But on the other hand the consumer should be ready to compromise some of the conveniences of their cars for the sake of environmental quality .

Producing or marketing companies should be more flexible in order to face up consumer demands. As Emptas (1993) states, companies should have superior product development capabilities and rapid product cycle times from concept to market. They need to have flexible manufacturing systems to bring new concept vehicles to market rapidly.

Companies should refocus on market research to define fundamental new vehicle concept. This may be realized only by searching future consumer needs for transportation.

After defining the social needs, companies should work together with governments in order to form a master plan for the automotive industry. In realising these concept cars, they will require huge amounts of investments, team work and risk sharing. Companies may overcome the difficulties by forming R&D consortia with each others.

The automotive industry should have long term vision and should lead in the close partnership with governments to find better solutions.

As we have seen at the beginning of the first chapter, new concepts such as megamarketing and societal marketing are arising in marketing science. We have reviewed also the developing environmental concern which begins to result in public reaction. As people get much informed in environmental subjects they will show their intention in their buying habits. They will also form public pressure in legislative authorities in order to have much environmentally friendlier products and production technology.

In the field study we see that environmental concern is quite high among car owners in Istanbul. And they state air pollution as the most important environmental problem in Istanbul. Their willingness to compromise money for environmental car does not turn yet to affect their buying decision. However we may state that the awareness of the people is enough to implement competition in the environmental factors of the product / car. The future competition in car market, as well as other products, will be in "Green Marketing". The developing environmental concern among consumers will create very effective competitive advantage in the long term for the companies, which put the environmental features in their marketing strategies.

Thus automotive producers and marketing companies should modify their strategic product planning according to this new criteria. For example in Türkiye, many brands will launch their new models with injection engines in order to utilize catalytic converter. (Renault 19)

Findings on the impact of environmental concern on car purchasing behaviour indicated that nearly half of the respondents are ready to pay 10 % mark-up for an environmentally friendly car. This means that companies supplying these kinds of cars, must be careful in their pricing decisions. If the costs of manufacturing is over 10 % mark-up, they should find better solution in production process in order to decrease their costs. Especially in big cities, as the transportation concept changes due to car parking problem, the solution might be smaller cars with better environmental quality and similar price compared to current car models. Another alternative for supplying cars with better environmental quality within the limits of acceptable 10% price mark-up might be the reduction in taxes by government especially for cars with catalytic converter. This solution is already used by different European countries. European countries reduced also the price of unleaded fuel to spread its utilisation percentage.

Our government can use these experiences that developed countries have in the near past, to guarantee a cleaner environment and to find better solutions for the companies which manufacture in an environmentally responsible manner.

As we have seen in the field study the environmental image of local car brands are quite low compared with imported ones. If the future competition will be in green marketing, our automotive industry will have problems. Especially Renault and Tofas, the leaders of local car producers should arrange their future product strategy according to new demands of consumers. And they should upgrade their environmental image. If not, with the opening of European Customs Union in 1995, in the context of European Community amendments, local automotive industry will have no chance to compete with imported car brands.

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APPENDIX I - QUESTIONNAIRE IN TURKISH

Cevaplamakta olduğunuz anket , İstanbul'da otomobil sahiplerinin , birtakım sorunlar hakkındaki düşünce ve tutumları konusunda ,Boğaziçi Üniversitesi ,Yüksek Lisans düzeyinde hazırlanmakta olan bir çalışmanın araştırma bölümüdür.

Doğru veya yanlış cevap söz konusu olmadığından ,samimiyetle ilk aklınıza gelen cevapları vermeniz ve tüm soruları cevaplamanız araştırmanın güvenilirliğini arttıracaktır.Yardımlarınız için şimdiden teşekkür ederiz.

A- Lütfen kendinize ait otomobilinizin markasını yazınız.

1-Geleceğimiz açısından en büyük üç tehlike aşağıdakilerden hangisidir?(Lütfen önem derecesine göre işaretleyiniz)

	1.önemli	2.önemli	3.önemli
a) Ekonomik kriz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) 3.Dünya savaşı	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Nüfus artışı	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Enerji krizi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Çevre sorunları	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Sağlık sorunları	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Terör	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Diğer (belirtiniz)	_____	_____	_____

2- Çevre sorunu deyince ilk aklınıza gelen nedir ?

- Ozon katmanının delinmesi
- İçme sularının kirlenmesi
- Hava kirliliği
- Yeşil alanların azalması
- Deniz, göl ve nehirlerin kirlenmesi
- Çölleşme
- Canlı türlerinin yok olması
- Tehlikeli atıklar
- Evsel katı atıklar
- Gürültü kirliliği

3-Yaşamakta olduğunuz çevrede, aşağıdaki sorunlardan ne derece şikayetçisiniz ?

	çok	biraz	pek değil	hiç değil	fikrim yok
Ozon katmanının delinmesi	1	2	3	4	5
İçme sularının kirlenmesi	1	2	3	4	5
Yeşil alanların azalması	1	2	3	4	5
Deniz, göl ve nehirlerin kirlenmesi	1	2	3	4	5
Çölleşme	1	2	3	4	5
Canlı türlerinin yok olması	1	2	3	4	5
Tehlikeli atıklar	1	2	3	4	5
Evsel katı atıklar	1	2	3	4	5
Asit yağmuru	1	2	3	4	5
Hava kirliliği	1	2	3	4	5
Gürültü kirliliği	1	2	3	4	5

4) Hava kirliliğinin en önemli 2 nedeni sizce nedir ? (Lütfen işaretleyiniz)

	1.önemli	2.önemli
a) Isıtma kaynakları	<input type="checkbox"/>	<input type="checkbox"/>
b) Sanayii	<input type="checkbox"/>	<input type="checkbox"/>
c) Motorlu vasıtalar	<input type="checkbox"/>	<input type="checkbox"/>
d) Diğer atıklar	<input type="checkbox"/>	<input type="checkbox"/>
e) Kentleşme	<input type="checkbox"/>	<input type="checkbox"/>

5) Aşağıdaki fikirlere ne derece katılıyorsunuz ? Lütfen cevabınızı aşağıdaki değerlendirmeye göre işaretleyiniz .

tamamıyla katılıyorum	biraz katılıyorum	pek katılmıyorum	hic katılmıyorum
1	2	3	4

a) Gelişmiş teknolojiler çevreye daha fazla saygılıdır.

1	2	3	4
---	---	---	---

b) Çevreci standartlar ülkemizde de uygulanmalıdır.

1	2	3	4
---	---	---	---

c) Çevreci oto almaya özen gösteririm.

1	2	3	4
---	---	---	---

d) Çevreci oto almak için daha fazla para öderim.

1	2	3	4
---	---	---	---

e) Çevreci oto almak için otomun sağladığı bazı avantajlardan vazgeçebilirim.

1	2	3	4
---	---	---	---

f) T.S.B. tarafından çevreci olarak onaylanan bir otoyu almaya özen gösteririm.

1	2	3	4
---	---	---	---

g) Oto üretim ve ithalatında çevreci oto zorunlu olmalıdır.

1	2	3	4
---	---	---	---

h) Çevreci otomun maliyet farkını satıcı veya devlet karşılamalıdır.

1	2	3	4
---	---	---	---

6) Aşağıdakileri ne derece uyguluyorsunuz ? Lütfen cevabınızı aşağıdaki değerlendirmeye göre işaretleyiniz .

Kesinlikle Yaparım	Yaparım	Genellikle yapmam	Kesinlikle yapmam
1	2	3	4

a) Hava kirliliği dönemlerinde otomobilimi daha az kullanıyorum.

1	2	3	4
---	---	---	---

b) Çevreci markanın ürünlerini almak için fiyat farkı ödüyorum.

1	2	3	4
---	---	---	---

c) Otomobil kullanırken gerekmedikçe klakson çalmamaya özen gösteririm.

1	2	3	4
---	---	---	---

d) Otomobilimin egzost düzenini sık sık kontrol ettiriyorum.

1	2	3	4
---	---	---	---

7) Aşağıdaki markaları çevreye en saygılı olanı 1. sırada, en az saygılı 5.sırada olacak şekilde sıralayınız.

	En saygılı	2.saygılı	3.saygılı	4.saygılı	en az saygılı
a)Ford	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b)Opel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c)Renault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d)Tofaş	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e)Toyota	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8) Çevreci otomobili aşağıdaki yargılardan hangileri daha iyi tanımlar ? Lütfen iki cevap işaretleyiniz.

- a) Tekrar kullanılabilen maddelerden üretilmiş olan
- b) Teknolojisi gelişmiş olan
- c) Havayı kirletmeyen
- d) Sağlığa zarar vermeyen
- e) Diğer (belirtiniz) _____

9) Çevreci olmayan bir oto 200 milyon olsa aynı otonun çevreci olarak onaylanını ne kadara alırsınız ?
YAZINIZ _____

10) Sizce katalizör aşağıdakilerden hangisini gerçekleştirmek için kullanılmaktadır ?

- a) Motorun ömrünü uzatmak için
- b) Yakıt tüketimini azaltmak için
- c) Motorun gücünü artırmak için
- d) Zararlı gazları azaltmak için
- e) Titreşimi azaltmak için
- f) Bilmiyorum
- g) Diğer (belirtiniz) _____

11) Sizce kurşunsuz benzin ne amaçla kullanılmaktadır?

- a) Motorun ömrünü uzatmak için
- b) Yakıt tüketimini azaltmak için
- c) Motorun gücünü artırmak için
- d) Zararlı gazları azaltmak için
- e) Titreşimi azaltmak için
- f) Bilmiyorum
- g) Diğer (belirtiniz) _____

12) Otomobiliniz kurşunsuz benzin yakıyor mu?

- a) evet b) hayır c) bilmiyorum

13) Kurşunsuz benzin kullanıyormusunuz ?

- a) evet b) hayır (Lütfen 15. soruya geçiniz)

14) Neden kurşunsuz benzin kullanıyorsunuz ?

- a) Çevreye zarar vermemek için
 b) Otomobilim gerektirdiği için
 c) Daha ucuz olduğu için
 d) Diğer(belirtiniz)_____

(Lütfen 16.soruya geçiniz)

15) Neden kurşunsuz benzini kullanmıyorsunuz ?

- a) Motora zarar verdiği için
 b) Performansı azalttığı için
 c) Daha pahalı için
 d) Az bulunduğu için
 e) Diğer(belirtiniz)_____

16) Katalizörlü otomobil almayı düşünürmüsünüz ?

- a) evet (lutfen 18. soruya geciniz)
 b) hayır

17) Neden katalizörlü otomobil almak istemezsiniz ?

- a) daha pahalı olduğu için
 b) kurşunsuz benzin her yerde bulunmadığı için
 c) otomobilin ömrünü kısalttığı için
 d) motor gücünü azalttığı için
 e) motorun tamirini güçleştirdiği için

(Lütfen 19. soruya geçiniz)

18) Katalizörlü otomobil almak için ne kadar ek maliyet ödemeyi kabul edersiniz.

- a) hiç etmem
- b) 5 milyon
- c) 10 milyon
- d) 15 milyon
- e) 20 milyon

19) Cinsiyetiniz

- a) kadın
- b) erkek

20) Yaş grubunuz

- a) 17-24
- b) 25-34
- c) 35-44
- d) 45-54
- e) 55 ve üzeri

21) Eğitiminiz

- a) ilkokul
- b) ortaokul
- c) lise
- d) üniversite
- e) yüksek lisans ve üzeri

22) Medeni durumunuz

- a) bekar
- b) evli
- c) dul/boşanmış

23) Çocuğunuz var mı ?Varsa lütfen kaç tane olduğunu belirtiniz?

- a) Çocuğum yok
- b) 1 çocuk
- c) 2 çocuk
- d) 3 çocuk
- d) 4 çocuk
- e) 5 çocuk
- f) 6 ve üzeri

24) İş durumunuz

- a) kendi işimde çalışıyorum
- b) Yönetici
- c) Memur
- d) İşçi
- e) Emekli
- f) Çalışmıyorum

25) Ailenizin aylık ortalama net gelirini belirtiniz?

- a) 10 milyon TL. ve altı
- b) 10.000.001-15.000.000 TL
- c) 15.000.001-20.000.000 TL
- d) 20.000.001-25.000.000 TL
- e) 25.000.001-30.000.000 TL
- e) 30.000.001-35.000.000 TL
- f) 35 milyon TL üzeri

APPENDIX II - QUESTIONNAIRE IN ENGLISH

The questionnaire you are about to fill in ,is part of a study conducted at Boğaziçi University , regarding beliefs and attitudes of car owners in Istanbul city .

Since there are no right or wrong answers for the questions , your sincerity in answering the questions will increase the reliability of the study .

Thank you very much for your cooperation.

A-Please write the brand of your own car .

1-What are the most important problems the world will face in the future?
(Please brand)

	most important	2nd	3rd
a) Economic crisis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) 3.World War	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Rapid increase of population	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Energy crisis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Environmental problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Health peoblems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Terror	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Other (please specify) _____	_____	_____	_____

2- What does the phrase " environmental problem " remind you of?

- Depletion of ozone layer
- Contamination of drinking water
- Air pollution
- Deforestation
- Pollution of seas / lakes / rivers
- Desertification
- Loss of species
- Hazardous waste
- Household waste
- Noise pollution

3-In your own surrounding , how much are you personally affected by the problems listed below ?

	very much	a little	not much	not at all	no idea
Depletion of ozone layer	1	2	3	4	5
Contamination of drinking water	1	2	3	4	5
Deforestation	1	2	3	4	5
Pollution of seas / lakes / rivers	1	2	3	4	5
Desertification	1	2	3	4	5
Loss of species	1	2	3	4	5
Hazardous waste	1	2	3	4	5
Household waste	1	2	3	4	5
Acid rain	1	2	3	4	5
Air pollution	1	2	3	4	5
Noise pollution	1	2	3	4	5

4) What do you think are the most important two cause of the air pollution? (Please brand)

	1.important	2.important
a) Heating sources	<input type="checkbox"/>	<input type="checkbox"/>
b) Industry	<input type="checkbox"/>	<input type="checkbox"/>
c) Motor vehicles	<input type="checkbox"/>	<input type="checkbox"/>
d) Other waste	<input type="checkbox"/>	<input type="checkbox"/>
e) Urbanisme	<input type="checkbox"/>	<input type="checkbox"/>

5) To what extent do you agree with the following ideas ? (Please brand the degree that is suitable for you .)

fully agree	agree	disagree	fully disagree
1	2	3	4

a) The improvement in the technology will automatically decrease the negative environmental impact of the products.

1	2	3	4
---	---	---	---

b) Environmental standards should be applied in our country also .

1	2	3	4
---	---	---	---

c) I prefer to buy an environmentally friendly car .

1	2	3	4
---	---	---	---

d) I pay more to buy an environmentally friendly car .

1	2	3	4
---	---	---	---

e) I am willing to compromise some of the convenience that my car offer me today, in return for a car that has lower negative environmental impact

1	2	3	4
---	---	---	---

f) I prefer to buy a car produced by environmentally concious company.

1	2	3	4
---	---	---	---

g) Enviromentally friendly car must be compulsary in production and importation.

1	2	3	4
---	---	---	---

h) Extra cost which will arise when car is made environmentally friendly should be shared among government and producing company.

1	2	3	4
---	---	---	---

6) To what extend do you apply following activities.

Always	Generally	Generally	Certainly
Do	Do	Do not	Do not
1	2	3	4

a) I pay extra amount to buy the products of environmentally concious company.

1	2	3	4
---	---	---	---

b) I use environmentally friendly heating sources .

1	2	3	4
---	---	---	---

c) I drive less frequently my car during the periods of heavy air pollution .

1	2	3	4
---	---	---	---

d) I make checked frequently the exhaust system of my car .

1	2	3	4
---	---	---	---

7) Could you please rank the following car brands in the order of environmentally consciousness.

	Most conscious	2nd	3rd	4th	least
a)Ford	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b)Opel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c)Renault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d)Tofas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e)Toyota	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8) What are the most two important characteristics of an environmentally friendly car.

- a) produced by recyclable materials
- b) having high technology
- c) not polluting air
- d) not harmful to health
- e) Other (pls.specify)_____

9) If the price of a car was 200 billion TL., how much will you accept to pay to a similar car with lower negative environmental effect.

Please write _____

10) According to you , what is the objective of catalytic converter?

- a) To make longer the life cycle of the engine
- b) To minimize the gasoline consumption
- c) To maximize the performance of the engine
- d) To minimize the exhaust gas
- e) To minimize the vibration of the engine
- f) No idea
- g) Other(pls specify)_____

11) According to you , what is the objective of unleaded gasoline ?

- a) To make longer the life cycle of the engine
- b) To minimize the gasoline consumption
- c) To maximize the performance of the engine
- d) To minimize the exhaust gas
- e) To minimize the vibration of the engine
- f) No idea
- g) Other(pls specify)_____

12) Can your car consume unleaded gasoline ?

- a) Yes b) No c) No idea

13) Do you use unleaded gasoline ?

- a) Yes b) No (Please move on to 15.question)

14) Why do you use unleaded gasoline ?

- a) To protect the environment
 b) For my car it is compulsory
 c) It is cheaper
 d) Other(pls.specify)_____

(Please move on to 16. question)

15) Why do you not use unleaded gasoline ?

- a) harmful for the engine
 b) decreases the performance of the engine
 c) it is more expensive
 d) It is difficult to find it
 e) Other(pls.specify)_____

16) Do you think of buying a car with catalytic converter?

- a) yes (Please move on to 18. question)
 b) no

17) Why do you not think of buying a car with catalytic converter ?

- a) more expensive
 b) it is difficult to find unleaded gasoline
 c) It makes shorter the life cycle of the engine
 d) decreases the performance of the engine
 e) It makes more difficult the reparation of the engine

(Please move on to 19.question)

18) How much extra you accept to pay for a car with catalytic converter ?

- a) Nothing
- b) 5 billion TL
- c) 10 billion TL
- d) 15 billion TL
- e) 20 billion TL

19) Gender

- a) Female b) Male

20) Age group

- a) 17-24
- b) 25-34
- c) 35-44
- d) 45-54
- e) 55 and above

21) Education

- a) Graduate of primary school
- b) Graduate of secondary school
- c) Graduate of High school or Equiv.
- d) Graduate of university
- e) Graduate of Masters and above

22) Marital status

- a) Bachelor b) Married c) Divorced / Widow

23) How many children do you have ?

- a) No
- b) 1 child
- c) 2 children
- d) 3 children
- d) 4 children
- e) 5 children
- f) 6 and above

24) Working status

- a) Working in my own job / enterprise
- b) Manager
- c) Clerk
- d) Worker
- e) Retired
- f) Not working

25) Could you please specify monthly net total household income ?

- a) 10 billion TL. and less
- b) 10.000.001-15.000.000 TL
- c) 15.000.001-20.000.000 TL
- d) 20.000.001-25.000.000 TL
- e) 25.000.001-30.000.000 TL
- e) 30.000.001-35.000.000 TL
- f) Above 35 billion TL

APPENDIX III - FREQUENCY DISTRIBUTIONS

A- Please write brand of your own car ?

<u>CAR BRAND</u>	<u>no of respondents</u>	<u>percentage of respondents (%)</u>
RENAULT	97	21
TOFAS	134	29
OPEL	39	8
TOYOTA	59	12
FORD	5	1
MERCEDES	18	4
BMW	23	5
LADA	24	5
SKODA	18	4
PEUGEOT	5	1
SUZUKI	6	1
MAZDA	19	4
HONDA	11	2

TNR = 458
BASE = 458

1-What are the three most important problems the world will face in the future?

(Please mark)

	<u>most important</u>	<u>2nd</u>	<u>3rd</u>	<u>Average</u>
a) Economic crisis	32.5	15.5	12.7	20.2
b) 3.World War	12.4	7.2	6.8	8.5
c) Rapid increase of population	17.0	20.1	13.1	17
d) Energy crisis	3.5	10.3	10.7	8.2
e) Environmental problems	19.2	24.7	17.0	20.3
f) Health peoblems	4.6	10.9	16.8	10.8
g) Terror	10.7	11.4	22.3	14.8
h) Other (please specify)	.4		.7	.3

TNR = 458

BASE = 458

2- What does the phrase " environmental problem " remind you of?

	<u>%</u>
Depletion of ozone layer	8.3
Contamination of drinking water	12.0
Air pollution	45.9
Deforestation	13.8
Pollution of seas / lakes / rivers	6.8
Desertification	.9
Loss of species	1.7
Hazardous waste	4.8
Household waste	1.3
Noise pollution	.9

TNR = 458

BASE = 458

3-In your own surrounding , how much are you personally affected by the problems listed below ?

	MEAN	PERCENTAGE					A	B
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>		
Depletion of ozone layer	1.78	45	29	15	5	4	74	20
Contamination of drinking water	1.15	88	9	3			97	3
Deforestation	1.2	84	13	2	1		97	3
Pollution of seas / lakes / rivers	1.3	76	20	4			96	4
Desertification	1.84	40	36	18	4	2	76	22
Loss of species	1.6	58	30	8	2	2	88	10
Hazardous waste	1.27	77	18	3	1	1	95	4
Household waste	1.61	54	31	11	2	2	85	13
Acid rain	1.88	40	29	17	6	8	69	23
Air pollution	1.08	94	5	1			99	1
Noise pollution	1.36	74	18	6	1	1	92	7

TNR = 458

BASE = 458

1- very much 2- a little 3-not much 4-not affected at all
5-have no idea

A- TOTAL AFFECTED

B-TOTAL NOT AFFECTED

4) What do you think are the most important two causes of the air pollution? (Please mark)

	PERCENTAGE	
	<u>1.important</u>	<u>2.important</u>
a) Heating sources	31	13.5
b) Industry	41	28.8
c) Motor vehicles	17.5	28.6
d) Other waste	1.1	9.0
e) Urbanisme	9.4	20

TNR = 458
BASE = 458

5) To what extent do you agree with the following ideas ? (Please mark the degree that is suitable for you .)

a) The improvement in the technology will automatically decrease the negative environmental impact of the products.

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
1.762	50	30	13	7
A = 80	B = 20			

b) Environmental standards should be applied in our country also .

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
1.183	85	11	3	1
A = 96	B = 4			

c) I prefer to buy an environmentally friendly car .

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
1.616	52	35	11	2
A = 87	B = 13			

d) I pay more to buy an environmentally friendly car .

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
2.039	34	37	20	9
A = 71	B = 29			

e) I am willing to compromise some of the convenience that my car offer me today, in return for a car that has lower negative environmental impact

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
2.129	32	34	22	12
A = 66	B = 34			

f) I prefer to buy a car produced by environmentally concious company.

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
1.688	52	32	12	4
A = 84	B = 16			

g) Enviromentally friendly car must be compulsory in production and importation.

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
1.476	66	24	7	3
A = 90	B = 10			

h) Extra cost which will arise when car is made environmentally friendly should be shared among government and producing company.

	<u>PERCENTAGE</u>			
MEAN	1	2	3	4
1.548	67	18	10	5
A = 85	B = 15			

TNR = 458

BASE = 458

1- Totally agree 2- agree 3- disagree 4-Totally disagree

A = TOTAL AGREE B = TOTAL DISAGREE

6) How frequently do you do the following :

a) I pay extra amount to buy the products of environmentally conscious company.

		<u>PERCENTAGE</u>				<u>A</u>	<u>B</u>
MEAN	1	2	3	4			
2.3	18	37	36	9	55	45	

b) I use environmentally friendly heating sources .

		<u>PERCENTAGE</u>				<u>A</u>	<u>B</u>
MEAN	1	2	3	4			
2.2	27	36	30	7	63	37	

c) I drive less frequently my car during the periods of heavy air pollution .

		<u>PERCENTAGE</u>				<u>A</u>	<u>B</u>
MEAN	1	2	3	4			
2.8	11	26	38	25	37	63	

d) I make checked frequently the exhaust system of my car .

		<u>PERCENTAGE</u>				<u>A</u>	<u>B</u>
MEAN	1	2	3	4			
1.8	51	25	17	7	76	24	

TNR = 458

BASE = 458

1-Always do

2-Generally do

3-Generally do not

4-Certainly do not

A = TOTAL DO

B = TOTAL DO NOT

7) Could you please rank the following car brands in the order of environmentally consciousness.

	<u>MEAN</u>	<u>PERCENTAGE</u>				
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
a)Ford	3.35	8	15	33	23	21
b)Opel	2.21	30	35	21	10	4
c)Renault	3.37	6	15	28	40	11
d)Tofas	4.15	6	9	8	21	56
e)Toyota	1.91	51	26	11	6	6

TNR = 458

BASE = 458

1-most conscious

2-second conscious

3-third conscious

4-fourth conscious

5- least conscious

8) What are the two most important characteristic of an environmentally friendly car.

	<u>%</u>
a) produced by recyclable materials	20.5
b) having high technology	25.1
c) not polluting air	42.4
d) not harmful to health	11.6
e) Other (pls.specify)	0.4

9) If the price of a car was 200 million TL., how much extra will you accept to pay to a similar car with lower negative environmental effect.

<u>Million T.L.</u>	<u>no of respondents</u>	<u>%</u>
a)200	74	16.2
b)210	109	23.8
c)220	76	16.6
d)230	55	12.0
e)240	17	3.7
f)250	86	18.8
g)260	6	1.3
h)270	1	.2
i)280		
j)290	2	.4
k)300	17	3.7
l)+300	15	3.3

10) According to you , what is the objective of catalytic converter?

	<u>%</u>
a) To make longer the life cycle of the engine	4.1
b) To minimize the gasoline consumption	7.2
c) To maximize the performance of the engine	3.5
d) To minimize the exhaust gas	68.3
e) To minimize the vibration of the engine	.7
f) No idea	15.3
g) Other	.9

11) According to you , what is the objective of unleaded gasoline ?

	<u>%</u>
a) To make longer the life cycle of the engine	4.8
b) To minimize the gasoline consumption	3.1
c) To maximize the performance of the engine	4.4
d) To minimize the exhaust gas	81.7
e) To minimize the vibration of the engine	.2
f) No idea	3.7
g) Other	2.1

12) Can your car consume unleaded gasoline ?

	<u>%</u>
a) Yes	36
b) No	49.8
c) No idea	14.2

13) Do you use unleaded gasoline ?

	<u>%</u>
a) Yes	13.5
b) No	22.5

14) Why do you use unleaded gasoline ?

	<u>%</u>
a) To protect the environment	17
b) For my car it is compulsory	3.5
c) It is cheaper	.7
d) Other	2.4

15) Why do you not use unleaded gasoline ?

	<u>%</u>
a) harmful for the engine	2.8
b) decreases the performance of the engine	1.7
c) it is more expensive	6.6
d) It is difficult to find it	4.6
e) Other	4.7

16) Do you think of buying a car with catalytic converter?

	<u>%</u>
a) yes	78.6
b) no	21.4

17) Why do you not think of buying a car with catalytic converter ?

	<u>%</u>
a) more expensive	40.8
b) it is difficult to find unleaded gasoline	15.3
c) It makes shorter the life cycle of the engine	8.2
d) decreases the performance of the engine	6.1
e) It makes more difficult the reparation of the engine	1.0

18) How much extra would you accept to pay for a car with catalytic converter ?

	<u>no of respondents</u>	<u>%</u>
a) Nothing	13	3.8
b) 5 billion TL	63	13.8
c) 10 billion TL	89	19.4
d) 15 billion TL	41	9.0
e) 20 billion TL	79	17.2
f) + 20 billion TL	57	12.4

TNR = 342

BASE = 458

Demographic Distribution

<u>GENDER</u>	<u>no of respondents</u>	<u>percentage of respondents</u>
Female	90	19.7
Male	368	80.3
 <u>AGE GROUP</u>		
20-24	136	29.7
25-29	90	19.7
30-34	78	17
35-39	49	10
40-44	36	7.9
45-49	40	8.7
50-54	18	3.9
55+	11	2.4
 <u>EDUCATION LEVEL</u>		
Primary school	33	7.2
Secondary school	43	9.4
High school	188	41
University	172	37.6
Graduate Studies	22	4.8
 <u>MARITAL STATUS</u>		
Bachelor	204	44.5
Married	244	53.3
Divorced-Widow	10	2.2
 <u>NUMBER OF CHILDREN</u>		
No children	51	20.1
1 child	73	28.7
2 children	89	35
3 children	29	11.4
4 children	7	2.8
5 children	3	1.2
6 and above	2	0.8

<u>WORKING STATUS</u>	<u>no of respondents</u>	<u>percentage of respondents</u>
Owner	178	39.3
Manager	33	7.3
Clerk	110	24.3
Worker	19	4.2
Retired	7	1.5
Not working	105	23.2
<u>TOTAL AVERAGE HOSEHOLD INCOME</u>		
below 10 billion TL	104	22.7
10-15	83	18.1
15-20	78	17.0
20-25	51	11.1
25+	142	31