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TRANSPORTS AND CONSUMERS' ECOLOGICAL BEHAVIOUR

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Abstract

Transports certainly have positive economic and social effects. However, transports in general, and motor transports in particular play a significant role in environmental pollution, with a negative impact on the quality of life. In this article, we make a diagnosis on the contribution of transports to environmental pollution, especially through CO₂ and green house gases emissions, on international and national levels, highlighting trends in transports evolution. Based on an ample research the article presents policies (command-and-control and incentive-based policies, physical, soft or knowledge policies etc.) meant to diminish the negative impact of auto transports on the quality of life. The last part of the article investigates, based on the direct market research, the current and future behaviours of transport services consumers in Bucharest, the way transport services are perceived, as well as the way different modalities of protection against the pollution caused by transport are assessed. Market research has generally revealed a pro-environmental behaviour, most of the subjects investigated agreeing with the measures focused on reducing pollution caused by transports. However, the survey results have shown that factors related to the environment and its protection are not very important when deciding to purchase a car.

Keywords: transport services, environmental pollution, consumer behaviour, survey

JEL Classification: D11, D18, M31

Introduction

As transports, generally, and transport by car, particularly, have a significant contribution to air pollution and other forms of pollution with a negative impact on the quality of life, the goal of the present article is to investigate transport services consumers' current behaviour, attempting an estimation of their future behaviours.

In the first part, a diagnosis on the contribution of transports to environmental pollution, especially through CO₂ emissions and greenhouse gases, on international and national levels is made. The diagnosis was based on the literature research as well as information from bodies and organizations such as: International Transport Forum (ITF), International Environmental Agency (IEA), European Environmental Agency (EEA) a.s.o. The trends in transport evolution on national and international levels are highlighted as well.

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Also, the policies meant to diminish the negative impact of car transports on the quality of life (command-and-control and incentive-based policies, physical, soft or knowledge policies etc.) are reviewed in the first part. This was aimed at verifying the extent to which citizens know and agree with this kind of policies, in the second part of the article.

The second part of the paper is dedicated to a direct research undertaken on a sample of transport services consumers in Bucharest so as to emphasize the extent to which they are concerned with environmental problems, whether they have an environmentally friendly behaviour, agreeing or not with the policies meant to diminish the negative impact of auto transports. Moreover, the aim was to verify the hypothesis that environmentally friendly consumers will also have a future behaviour which will take into consideration the negative effects of auto transports.

1. Transports and environmental pollution

Besides the positive economic and social effects (development of domestic and international trade, satisfying people's need for movement and communication etc.) transports have less favourable aspects, like the negative impact on the environment. What is important is that the state and companies act so as to harmonize economic interests with social and environmental concerns (Dinu, 2011, State and Popescu, 2008, Olaru, Dinu, Stoleriu, Sandru and Dincă, 2010). Organizations should be more concerned about society and the environment (Anghel, Grigore and Roșca, 2011).

Transport-sector CO₂ emissions represent 23% (globally) and 30% (OECD) of overall CO₂ emissions from fossil fuel combustion. The sector accounts for approximately 15% of overall Greenhouse Gas Emissions (OECD/ITF, 2010).

Global energy-related CO₂ emissions increased from 20.9 Gt in 1990 to 28.8 Gt in 2007 and transport emissions increased from 4.6 Gt in 1990 to 6.6 Gt in 2007. Unfortunately, despite many planned efficiency improvements, global CO₂ emissions from transport are expected to grow. According to the World Energy Outlook 2009, global energy-related CO₂ emissions could be over 40 Gt by 2030 and transport emissions would make up over 9 Gt (OECD/ITF, 2010). Thus, the share of transports in world energy-related CO₂ emissions increased from 21.8% in 1990 to 23% in 2007 and will continue to rise slightly to 23.2% in 2030. Road transport is responsible for over 70% of all CO₂ emissions from transport. Between 1900 and 1930, it is likely that shipping was still the largest source of CO₂ emissions from the transport sector (Fuglestad et al., quoted by Uherek et al., 2010). Nevertheless, after 1910 road traffic gained growing importance, overtaking all other transport means as shown in table no. 1.

Table no. 1: Emissions of CO₂ from transport, %

| | 2000 | Cumulative 1900-2000 | 2005 |
|-------------------|-------------|-----------------------------|-------------|
| Total transport | 100 | 100 | 100 |
| Road | 72.3 | 55.1 | 73.1 |
| Rail | 2.1 | 10.1 | 2.1 |
| Maritime shipping | 10.6 | 15.4 | 8.5 |
| Aviation | 11.6 | 8.1 | 11.5 |
| Other transport | 0.4 | 11.3 | 4.8 |

Source: Uherek et al., 2010 and International Energy Agency, 2010

During the last decades, following road transport, aviation ranked the second regarding CO₂ emissions. In addition, aircrafts contribute to climate change by emitting nitrogen oxides, sulphur dioxide, soot and water vapour. Less well understood warming effects attributed to aircraft emissions include the formation of contrails and cirrus clouds (Anger, 2010). Also, local negative external effects of aviation, particularly in the airport proximity and under flight paths refer to noise pollution.

On the other hand, aviation is one of the fastest growing industries of the global economy. Over the past 20 years, the industry grew by an average annual rate of approximately 5%. Aviation is an important contributor to the world's GDP, generating substantial employment across all nations. Despite the current recession and the crises in air transportation, the industry's growth is estimated to remain a global phenomenon with an average projected annual growth rate of about 4.2-5.1 % (Vespermann and Wald, 2010).

Obviously some countries and regions emit more CO₂ than others as a result of as the following: population size and demographic growth, level of economic activity, travel distance etc.

Per capita emissions of CO₂ from transport (excluding international aviation and navigation) among International Transport Forum (ITF) countries varied from 6.5 tonnes in the USA to 0.1 tonnes in India. The average per capita emissions of transport CO₂ is 1.5 tonnes for ITF countries (OECD/ITF, 2010).

Levels of transport CO₂ emissions per dollar of GDP (PPP, 2000 USD) are more balanced among most ITF countries. The average GDP intensity of transport CO₂ emissions for ITF countries is 0.1 Kg. of CO₂ per dollar of GDP.

Generally, wealth creation and economic growth has been accompanied by per capita CO₂ emissions rising from transport activity.

In 2007, Romania ranked under the average regarding both per capita emissions of CO₂ from transport with 0.63 tonnes and CO₂ emissions from transport per dollar of GDP with 0.07 Kg. / USD 2000 PPP (OECD/ITF, 2010).

Only apparently positive, this situation is the result of negative evolutions of economic activities, particularly transport, and not necessarily, or entirely, of policies favourable to environment protection and pollution reduction.

Thus, during 1990-2007, GDP PPP has known a slow increase in Romania, with an annual average of 1.42%, compared to 10.14% in China (including Hong Kong), 3.88 % in Poland, 2.9% in United States (OECD/ITF, 2010).

Regarding goods and travellers transport, during 1990-2009, the data in table no. 2 and table no. 3 show important changes in the dynamics and structure by means of transport.

Table no. 2: Goods transport, by means of transport, in Romania

| | Transported goods (mil. tonnes) | | | Goods Transport performance (mil. tonnes -km) | | |
|-------------------------|------------------------------------|-------|-------|--|-------|-------|
| | 1990 | 2007 | 2009 | 1990 | 2007 | 2009 |
| Total | 2216 | 453 | 413 | 204221 | 83116 | 58361 |
| In % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Railway | 9.9 | 15.2 | 12.2 | 28.0 | 19.3 | 19.0 |
| Road | 87.3 | 78.7 | 71.0 | 54.3 | 72.2 | 58.7 |
| Inland waterways | 0.5 | 3.3 | 6.0 | 1.0 | 6.0 | 20.2 |
| Maritime | 1.2 | 0.1 | 8.7 | 14.2 | 0.1 | xxx |
| Air | ... | ... | ... | ... | ... | ... |
| Via petroleum pipelines | 1.1 | 2.7 | 2.1 | 2.5 | 2.4 | 2.1 |

Note: ... = under 0.1%; xxx = data unknown.

Source: Computed on data from NIS, 1996 and NIS, 2010

A drastic decrease in volume of merchandise transported and their route, due to the significant decline in agricultural and industrial production, is noticeable.

Road transport is on the first place in Romania as well, among means of transportation, due to its obvious advantages: increased mobility, accessibility, high effectiveness on short distances (Ionciă et al., 2004). At the same time, they have in our country as well the greatest share (approximately 88%) in CO₂ emissions from transport. The latter accounted in 2007 for 14.8% of total CO₂ from fuel combustion at the level of the Romanian economy.

Table no. 3: Passengers transport, by means of transport, in Romania

| | Passenger transport (mil. passengers) | | | Passenger transport performance (mil. passengers - km) | | |
|------------------------|--|-------|-------|---|-------|-------|
| | 1993 | 2007 | 2009 | 1993 | 2007 | 2009 |
| Total | 757 | 327 | 342 | 42.7 | 19.7 | 23.3 |
| In % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Railway | 29.7 | 27.0 | 20.6 | 45.5 | 38.0 | 26.2 |
| Road | 69.9 | 70.6 | 76.7 | 48.0 | 61.8 | 73.4 |
| Inland waterways | 0.1 | 0.1 | 0.05 | 0.1 | 0.1 | 0.1 |
| Maritime ¹⁾ | xxx | 0.003 | 0.004 | xxx | xxx | xxx |
| Air | 0.3 | 2.4 | 2.7 | 6.4 | xxx | xxx |

Note: ¹⁾ cruise passengers, xxx = data unknown.

Source: Computed on data from NIS, 1999 and NIS, 2010

The number and routes of passengers were also reduced by more than a half in 2009 compared to 1993 due to the influence of factors such as: the increase in the overall population, and especially of employed population, the increase in transportation fees, the decrease in real income, etc.

Road transport represents, in the case of passenger transport as well, the preferred means of transportation, as it comprises almost 77% of the number of passengers and approximately 73% of the routes in 2009. At the same time, railway transport, which is a less polluting means of transportation (at the level of the year 2007 it had an approximately 4% share in

total CO₂ emissions from transport, according to OECD/ITF, 2010) has known a decrease in share for both number of passengers and routes.

Moreover, aviation, the second 'culprit' as share in total CO₂ emissions (4.5% in 2007) has had an increasing trend.

The economic crisis has led, in Romania, as well as globally, to a prolonged downturn in economic activity and has had a significant impact on CO₂ emissions. The IEA (International Environmental Agency) has estimated that growth rates of CO₂ emissions dropped sharply in 2008 and absolute emissions of GHGs dropped more in 2009 than at any other time in the past 40 years. This decrease in emissions should have a lasting impact on the rate of growth of CO₂ concentrations given the long atmospheric life of CO₂.

The ultimate long-term impact of the recession on GHG emissions will depend on the form of the recovery. A convergence back to previous growth paths and a continuation of past economic patterns will quickly lead back to steeply rising GHG emissions in the absence of robust GHG mitigation policies (OECD/ITF, 2010).

Given the arguments presented above, the policies aimed at forming an environmentally friendly behaviour of consumers in regard to transport are crucial.

2. Policies aimed at forming an environmentally friendly behaviour of consumers in regard to transport

Among the policies promoted by any State, the consumer policy must be considered a self-standing element, with its own objectives, priorities and instruments – well-incorporated among the other policies of State. (Petrescu, Dinu, Ștefănescu and Dobrescu, 2011).

Economics offers several types of instruments for addressing the problem of transport negative externalities: *command and control and incentive-based policies; physical, soft and knowledge policies etc.* (Santos et al., 2010).

Command and control policies are government regulations which force consumers and producers to change their behaviour.

Within the current economic background, marked by the global phenomenon of increasing awareness of the interdependence between development and the environment, we have become part of the increase of the society's exigencies regarding the environment protection, exigencies made known by more and more severe regulations. (Pamfilie, Procopie and Bobe, 2011).

Government regulations are the most widely used policy instruments. Examples include the tax on polluting emissions coming from auto vehicles. According to the new bill adopted by the Romanian Government, this duty has as a basis the principle *the polluter pays*. It will be paid once, for new and second-hand vehicles registered for the first time in Romania, regardless of whether the vehicle is produced in the country or abroad. For vehicles registered before 2007, the tax on pollution will be paid at the moment when they are first sold. Another example would be the tax on pollution and noise for vehicles of at least 12 tons. Thus, a project to modify the directive regarding the eurovignette, the Directive 1999/62/CE, proposes the inclusion, in the mechanism of calculation of tariffs for using certain infrastructures, of costs pertaining to air pollution, as well as to phonic pollution.

Moreover, at the level of the EU, we should mention the voluntary agreement signed by The European Automobile Manufacturers Association and European Commission in 1999 on reducing the average CO₂ emissions from new cars. A target emission for the average vehicle of 140 g CO₂/km in 2008 was agreed, with an intermediate target of 165-170 g CO₂/km for 2003 (Fontaras and Samaras, 2007). As the observed progress slowed down from over 1% reduction annually (from 1995 to 2003) to 0.6% annually (since 2004), this target would not be reached before 2020 (De Haan et al., 2009).

Fiscal instruments are, like command and control, widely used in road transport because they are relatively cheap and simple to implement. Usage taxes and parking and congestion charges have been implemented in many countries around the world. Other interesting possibilities include pay-as-you drive insurance and other usage charges (Santos et al., 2010).

Incentive-based policies include various actions, such as subsidies which can be given to those scrapping old cars and buying fuel-efficient vehicles (for instance, the *Rabla* – 'Jalopy' – Program).

Other policies aimed at the reduction of pollution determined by road transport consisted of promoting the buying and usage of environmentally friendly cars (cars using alternative energy sources, like bio-fuels, electricity and other renewable fuels for transport), eco-driving and other *soft policies*.

Eco-driving refers, mainly, to the technique drivers can use to optimize their fuel consumption. Fuel can be wasted due to motor malfunction, the unaerodynamic shape of the car, loss of kinetic energy during braking. Drivers' behaviour can positively influence the situation by proper maintenance of the car, maintaining an efficient speed and a continuous course without sudden braking and stops, choosing an efficient fuel. Eco-driving campaigns aim to inform and educate drivers in order to induce them to drive in a fuel-efficient and thus environmentally friendly way. There seems to be some consensus in the literature that eco-driving could lead to reduction in CO₂ emissions of around 10 percent.

Other such soft policies, aiming to bring about behavioural change by informing actors about the consequences of their transport choices, and potentially persuading them to change their behaviour include *car sharing and car pooling, teleworking and teleshopping, as well as general information and advertising campaigns* (Santos et al., 2010). Consumers can also be informed about the cars made of materials which have a maximum capacity for recycling, do not have toxic substances and do not harm the user and the environment.

Physical policies include a physical infrastructure element such as public transport, land use, walking and cycling, road construction and freight transport.

Thus, actions aimed at the increase in the public transport, combined with the decrease in the use of private cars can reduce traffic congestion and, more importantly, CO₂ emissions, as public transport generally causes lower CO₂ emissions per passenger kilometre than private cars (Santos et al., 2010).

Other authors justly think that the reduction of pollution determined by urban transport cannot be obtained through technical measures alone. As people want maximum comfort,

this can only be achieved by building cities where not having a car is an advantage, not an impediment (Bart, 2010).

Urban planning is no longer just a local or national issue, its impact on climate change makes it a matter for the EU to regulate. It is also clear that in most places, local governments are unable to prevent an ever greater sprawling of cities. The objective of regulation should be to make sure that new urban development is not exclusively car oriented. These kinds of solutions are related to policies promoting public transport as well as walking and cycling.

Walking and cycling, which improve general health and produce no tailpipe emissions, constitute an excellent alternative to motorised transport on short distance trips within towns and cities. The policies which can incentivise walking and cycling include crime reduction to make streets safer, well maintained and clean pavements, attractive street furniture, safe crossings with shorter waiting times, dedicated cycle path, showers in offices, and lower speed limits to name but a few (Santos et al., 2010).

There are simpler ways to make walking and cycling a real alternative for local trips. For example, *walking buses* are proving a popular alternative to the traditional motorised *school run* (Chapman, 2007).

The programs for renting bicycles are also very successful; they have been applied in more than 100 European cities, Bucharest included. The program in Bucharest, launched in March 2011 disposes of 1100 bicycles, and renting is free, with an ID card.

Another set of policies which include both physical infrastructure elements as well as soft policies are the ones meant to encourage a shift towards energy efficient and relatively environmentally friendly forms of transport like *shipping or rail*.

The current research aims at determining the extent to which citizens of Bucharest are knowledgeable and concerned with such policies, whether they agree or not with the policies, thus allowing us to estimate the coordinates of their environmentally friendly transport behaviour.

3. Research regarding the current and expected behaviour of transport services consumers

Specialty studies reveal that eight out of ten citizens in the European Union share the opinion that the type of car and the way people use their cars, have important impacts on the environment in the respondent's area (European Commission, 2007 quoted in Van Rijnsoever et al., 2009).

Also, previous studies have found that current attitudes are valid predictors of pro-environment behavioural intentions (Van Birgelen et al., 2011).

On the other hand, it is well-known that not all attitudes are translated into behaviour; there is an attitude-behaviour gap. This is determined by a multitude of factors, both subjective and objective, both at a personal level and at a collective level. At the individual level, important subjective factors are values, norms, identity, status etc. Between objective individual factors, there are resource constraints, the level of education. Collective factors include social dilemmas, group culture and shared norms.

Considering the aspects mentioned, the present research has tried to pinpoint current behaviour and consumers' attitudes to transport and anticipate the extent to which a future pro-environmental behaviour can be expected.

Function of the type of information to be obtained, market research can be divided into qualitative research, aimed at understanding and explaining various phenomena and quantitative research, aimed at quantifying the data and generalizing results at the level of the entire population studied (Pop and Petrescu, 2008). Regarding quantitative research, the market survey is the method of research used the most often and the questionnaire is by far the most common instrument used to collect primary data (Kotler and Keller, 2006).

In order to study the way in which transport services are perceived in Bucharest, as well as how the various methods of protection against pollution of transport are perceived, an exploratory research has been conducted. The point of view of the consumer was studied using a survey conducted on a sample of 230 people, with a probability of 90.11% ($t = 1.65$) and a margin of error of $\pm 5.45\%$. The research was conducted based on a face-to-face interview with the help of a written questionnaire completed by the interview operator. The interviews took place in Bucharest in 2011.

The stages followed when conducting the survey were the classical stages of this type of research. First we established as objectives of the research the following: studying the attitude towards fuel and the behaviour related to the use of Euro fuel among car owners, studying the habits related to transport and the importance of different ways of transport (for the daily transport to work, school etc. and during holidays), perception regarding the degree of pollution of transport services and their effects on the environment, studying the importance of different factors in the acquisition of a new car and the place of the elements related to the protection of environment, knowing the extent to which citizens are aware of and agree with the policies of reduction of the negative impact of auto transport on the environment.

Then we established the hypotheses of research by starting from the results of the documentary research, namely:

Hypothesis 1. The population is concerned by environmental problems, and especially by the negative impact of transport on the quality of life, which can influence future transport behaviour and the efficiency of pollution reduction policies.

Hypothesis 2. Consumers with a current pro-environmental behaviour related to transport are more willing to accept future measures of reduction of the negative impact of transport.

Hypothesis 3. Consumers with a pro-environmental behaviour in areas other than transport are more willing to accept future measures of reduction of the negative impact of transport.

Hypothesis 4. Pro-environmental behaviour does not depend on the consumer's age and gender.

Hypothesis 5. Pro-environmental behaviour depends on the consumer's level of education.

The next steps were identifying the population studied, the unit of observation and the unit of survey, setting the sample, establishing modal, spatial and temporal coordinates, elaborating the questionnaire, the pilot survey, collecting data, processing data, the analysis of results and drawing up the final report.

The sample consisted of 43.5% male subjects and 56.5% female. 23.9% were in the 18-24 age group, 13.0% were in the 25-34 age group, 52.2% were in the 35-65 age group and 10.9% were over 65 years. As level of education 13.1% graduated 1-8 classes, 30.4% graduated college, 50.0% graduated university, 6.5% graduated other forms of education.

The car is the vehicle most commonly owned by the family of the respondents (68% of the subjects interviewed responded that their family has at least one car). The types of transport vehicles owned by the family of the subjects interviewed are presented in figure no. 1.

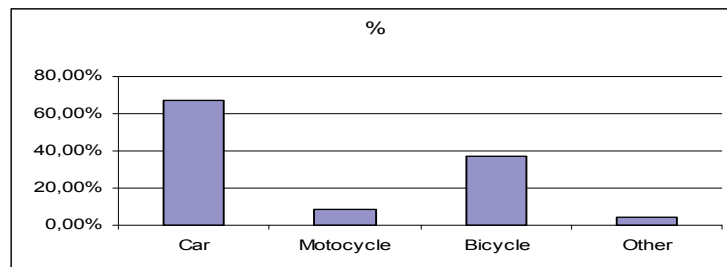


Figure no. 1: The types of transport vehicles owned by families

Among the owners of vehicles 36.11% answered that they did not take into account the Euro type when fuelling their cars and approximately 64% take this into account, which leads us to the conclusion that most citizens of Bucharest have, from this point of view, a pro-environmental behaviour. This seems to be true for future behaviour as well, according to the answers to the question regarding the intentions to purchase a new car (thus confirming hypothesis 2).

Among those who intend to buy a new car 83.3% are interested in vehicles fuelled by EUR, 5.6% by GPL and 11.1% are interested in electric or hybrid cars. However, to the question regarding the importance of different factors in the acquisition of a new car (we used a 5 levels differential semantic scale: 5= very important factor, 1= factor without importance) we observed that the most important factors are, in this order,; comfort (score 4.1), aspect (score 4), brand (score 3.9) and engine power (score 3.9). The factors related to the environment are perceived as having little importance in the purchase of a car: the green house emission (score 2.9), the emission of pollutants (score 2.9), the energetic label of the car (score 2.8) and the use of environmentally friendly materials in the make of the car (score 2.5). The answers confirm the fact that positive attitudes do not always turn into behaviour, a significant degree of inertia being manifested when it comes to changes in behaviour which will affect a person's comfort or image.

The answers to the question regarding the habits related to transport and the importance of different ways of transport for the daily transport to work, school etc. revealed that for getting to the work place / school 54.35% of the subjects interviewed use a means of public transport most often (tram, bus, subway, trolley, minibus), 45.65% replied that they use a car, 10.87% walk to work/ school, and 2.17% go by bicycle (the question could have multiple answers – there were subjects who answered that they use several means of transport, for instance: public transport and walking). Among car owners, 48% answered that they also use public transport. The fact that more than a half of the subjects interviewed use public transport can lead us to the idea that policies for stimulating public transport could be successful among the population of Bucharest. On the other hand, transport

behaviour during holidays confirms the trends mentioned in the first part of the study, and, in order to change this behaviour, the policies mentioned in the paper should be much more active. Thus, the answers to the question regarding the habits related to transport and the importance of different ways of transport during holidays showed that 66.67% of the persons who spent their holidays in the country in recent years have used their own car, 33.33% used the train and 14.29% used the bus, while 55.17% of the persons who spent their holidays abroad used the airplane as means of transport, 27.59% the bus, and 24.14% their own car.

The analysis of the answers referring to the most pollutant means of transport confirms hypothesis 1 that the population is worried about the negative impact of auto transport on the environment. Thus, the "car" is perceived by 73.91% of the respondents as being the most polluting, 10.87% consider that the "airplane" is the most polluting vehicle, 8.70% answered that the "boat" and 6.52% did not know or did not answer the question. The "train" is the only one which is not considered polluting by the subjects interviewed. (Figure no. 2)

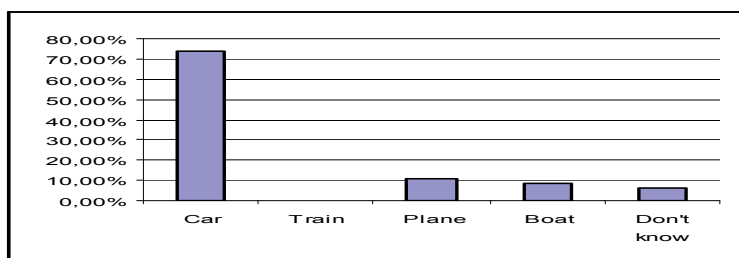


Figure no. 2: Perception regarding the most polluting vehicle

Moreover, by analyzing the answers referring to the aspects which bother them the most, from the point of view of the pollution caused by transport in the area where they live, we can state that most of the subjects consider the noise is the disturbing factor related to transport vehicles (48% of the subjects interviewed), 39.13% are bothered by air pollution and 2.17% consider other factors (like smell) disturbing. 28.3% of the subjects interviewed answered that they are not bothered in any way by the transport vehicles. (Figure no. 3)

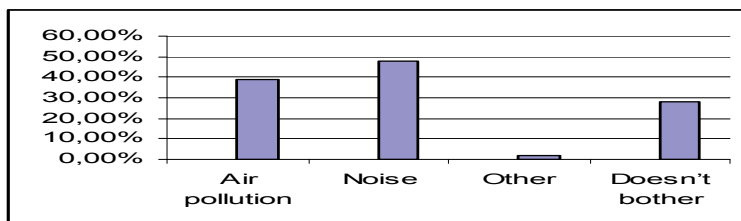


Figure no. 3: Perception of the inconvenience of transport vehicles

The concern of the subjects interviewed regarding environmental pollution caused by transport also results from the fact that Bucharest is perceived as being very polluted by 26.1% of respondents, polluted by 17.4% and 21.7% consider that the neighbourhood where they live is not very polluted and only 4.35% consider that it is not polluted. The

global score was 2.6 (1= very polluted, 5= not polluted) – the general perception being that the Bucharest is polluted.

The answers to the question „When you buy a product do you take into consideration the impact on the environment of the respective product: a) yes, b) no” showed that 76.1% of the interviewed subjects have an ecological behaviour and 23.9% do not consider the impact on the environment when buying a new product. These results confirm hypothesis 3, taking into account the fact that the answers to the question about the bicycle renting program and the one referring to the perception on different measures taken to reduce pollution generally reflect a responsible behaviour towards the environment.

The opinion related to the bicycle renting program was studied using a 5 level scale (5= very favourable, 4= favourable, 3= indifferent, 2= unfavourable, 1= very unfavourable). The 4.2 score shows that the attitude is favourable.

The perception of different measures to reduce pollution was studied using a five levels Likert scale (total agreement = +2, total disagreement = -2). The interviewed subjects agree with the measures: giving out coupons to replace old cars through the *Rabla* program (score 1.46), offering discounts for subscriptions to car owners who choose public transport over the car (score 1.02), setting an insurance premium for cars which takes into account its degree of pollution (score 0.9), and have a neutral opinion regarding the work at home (score 0.2), taxing access to the central of the city (score 0.1), or car pooling (score 0.1).

The answers to the question “What do you think should be done to make transport in the city less polluting?” indicate that 67% consider that the ecological cars are a viable solution, 26% consider that limiting traffic is an appropriate measure and 7% suggest other measures such as: riding bicycles, facilitating access by building three lane avenues, taxing access to certain areas etc.

We have used χ^2 test in order to see which variable (gender, age, and education) influences the ecological behaviour (hypothesis 4 and 5). The χ^2 shows if we can make an association between an independent variable (in this case we calculate it for: gender, age, education) and a dependent nominal variable. The hypotheses are H_0 : „the ecologic behaviour *is not* influenced by the independent variable” and H_1 : „the ecologic behaviour *is* influenced by the independent variable”. For each variable we have calculated χ^2_c (1). We have compared it with the theoretical value $\chi^2_{T, P, (m-1)(n-1)}$.

$$\chi^2_c = \sum_{i=1}^m \sum_{j=1}^n \frac{(O_{ij} - A_{ij})^2}{A_{ij}} \quad (1)$$

m – number of rows of the contingency table

n - number of columns of the contingency table;

O_{ij} – values of the row i and column j resulted from the survey;

A_{ij} - values of the row i and column j expected to result if H_0 is true,

The results of the χ^2 tests are presented in table no. 4.

Table no 4: The influence of different variables on the ecologic behaviour

| Independent variables | | χ^2_c | $\chi^2_{T,0,10,(m-1)(n-1)}$ | If $\chi^2_c < \chi^2_T \rightarrow H_0$, If $\chi^2_c > \chi^2_T \rightarrow H_1$ |
|-----------------------|-----------|------------|------------------------------|--|
| 1 | gender | 0,423 | 2.709 | H_0 |
| 2 | age | 27,007 | 6,251 | H_1 |
| 3 | education | 53,077 | 6,251 | H_1 |

The ecological behaviour is influenced by the education and the age of the interviewed subjects, and it is not influenced by the gender of the subjects.

Conclusions

The economy of Romania is tightly integrated in the international economic system (Ioncica et al., 2010). Transports have beside the positive economic and social effects, negative external effects, affecting the environment through various form of pollution, especially through CO₂ and green house gases emissions. With the view to diminishing these negative effects, worldwide and at country level, numerous policies based on command control or on incentives, relying on physical elements, soft or research and development were designed and implemented. The effect of these measures depends on the attitudes and the current and future behaviour of the population. The market research conducted on a sample of transport services consumers in Bucharest generally revealed a pro-environmental behaviour, citizens being concerned about the pollution caused by transport. At the same time, most of the subjects investigated agree with the measures of reduction of pollution caused by transport. However, regarding expected behaviour, the research showed that citizens are interested when buying a car especially in comfort, design, brand, engine power and less in aspects related to the environment. From this point of view, a change in consumer behaviour requires active policies for informing and stimulating the population.

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