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## **The Bicycle – Future’s Solution for an Eco-friendly Urban Transport**

**Cristina Ciovică<sup>1</sup>, Cristian Florea<sup>2</sup>, Alexandra Gălbează<sup>3</sup>**

**Abstract:** Even though more and more cities across the globe impose restrictive measures regarding the use of cars and offer instead incentives in order to choose alternative means of transport, they do not slow down their economic growth, but on the contrary they prove their skills towards providing citizens a better life. Under these circumstances, the bicycle appears as a viable solution for most of us, and the public programs that support its use have started to develop globally, at European level, and in Romania as well. The current paper wishes to point out the stimulating perspectives brought by the slight increase in the number of bicycles sold in our country in recent years towards the future of urban transport.

**Keywords:** means of transport; ecology; public programs

### **1. Introduction**

In cities or areas with mixed traffic, where we can find from motor cars, trucks, busses, to bicycles, motorbikes, scooters and, of course, pedestrians, bicycles begin to have a more and more important role among all the other types of vehicles, whether they are motor-powered or not. Under these circumstances, it is widely accepted that cycling brings a lot of benefits to the human organism, reducing first of all the appearance of cancer, heart diseases or obesity.

In what concerns the transport sector and the part in which cycling contributes to the reduction in the number of cars used, various authors provide favourable arguments such as improving the quality of air, reducing greenhouse gases, reducing pollution, improving life in general and also maintaining a certain social connection between citizens, these aspect being universally valid for all countries and not only for those ones within which the studies were conducted (Bauman, Merom and Rissel, 2012).

### **2. Implementing Public Programs and the Usage of Bicycles Worldwide**

Such as Brent Ritchie underlines in his article (1998), studies show that bicycles have lately began to develop into a favourite option of spending free time and recreation. In some countries such as the United States of America, Great Britain, France, Holland, Switzerland or New Zealand it seems that the usage of this means of transport has become a real tourism branch. And those who deal with this field have gone so far that they managed to transform disabled railways into genuine cycling runways. The reason for which more and more people take part in cycling is based on a worldwide growth in bicycle sales, especially those which are “mountain bikes”. Ritchie divides the motivations of people who choose the bicycle into seven main categories within which we can find arguments ranging from social escapes and physical challenges to the desire to explore, to prove certain skills and to search for a certain stimulus. In addition, as a consequence of the potential that this type of tourism has from a

<sup>1</sup> PhD, Bucharest Academy of Economic Studies, Romania, Address: Piața Romană 6 Bucharest, Romania, tel: +4021 319 1900, e-mail: chi\_che2002@yahoo.com.

<sup>2</sup> PhD, Bucharest Academy of Economic Studies, Romania, Address: Piața Romană 6 Bucharest, Romania, tel: +4021 319 1900 Corresponding author: cristy.florea@gmail.com.

<sup>3</sup> PhD, Bucharest Academy of Economic Studies, Romania, Address: Piața Romană 6 Bucharest, Romania, tel: +4021 319 1900 e-mail: alexandra.galbeaza@gmail.com

social, economic and ecologic point of view, the infrastructure designed for cycling is in a continuous development in most countries with the purpose of stimulating demand.

At global level, public programs that encourage the use of bicycles have grown in magnitude lately, people being able to overcome misconceptions such as “the bicycle, poor’s car” and to discover their true utility. A series of Canadian authors (Fuller et al., 2011) have pointed out the advantages brought by the implementation of BIXI program (name which comes from the juxtaposition of the first two letters of the word “bicycle” and the last two of the word “taxi”) in Canada. The public program, which belongs to the bike-sharing type, focused in its first year of implementation on attracting a number of people at least equal to those that already use a bicycle as a means of transport in Montreal, the objective being successfully met by the 8.2% of the adult population that has chosen to use BIXI. Moreover, it seems that approximately 14% of those that live near bicycle renting stations have used the program at least once. Nevertheless, taking into consideration only those that have answered positively to the question “Have you used the BIXIs at least once?”, the study reveals the fact that two thirds of them were living in less BIXI renting populated areas.

At the same time, we need to evaluate the factors that determine people to cycle or on the contrary those that hold them back. Wishing to examine people’s behaviour regarding cycling to work, Heinen et al. (2011) have noticed that both on small (under 5 km) and medium distances (between 5 and 10 km), as well as on long distances (over 10 km) people tend to be effected by the “direct benefit” agent, within which we can find characteristics such as saving time and comfort, flexibility and pleasure. Still, on the other hand, factors such as “safety” (social or from the point of view of the traffic) and “awareness” (ecological, health and mental relaxation benefits) are representative for those persons that are used to resort to the bicycle for small and long distances. Anyway, we need to underline the fact that this research has been conducted in Holland, country in which infrastructure and policies related to this field are very developed, so there might be some differences in what concerns that last two factors between other European countries and that one in which the study was conducted (for example, in Holland, cycling is generally considered safe or is seen as a means of transport and not one used for recreation).

Other specialists have focused on the substantial difference between the number of bicycles sold and that one of cyclists, the two claiming that the simple custody of a bicycle does not mean that the latter is also used (Foster & Cavill, 2012). The reasons for which we encounter these situations are various: either we do not know how to fix our own broken bicycle and the specialized places are very few and that is why we prefer to buy a new one, either we wish to have the most fashionable bike. Nonetheless, The British Cycling Economy Report brings into the foreground the remarkable contribution that bicycles have for the British economy, accounting revenues for approximately 2.9 billion pounds a year and showing strong signs of growth on the long term as well. Still, the conclusion that Foster and Cavill have drawn is that those who are involved in the cycling industry should be more preoccupied with encouraging the population to effectively use bikes and not to design new types, one more sophisticated than other, or to sell as much bicycles as possible. In order to convert the quite large bicycle demand into a change in people’s behaviour it is necessary to invest in mixed programmes that combine, on one hand, infrastructure improvements and, on the other hand, population education towards changing attitudes.

### **3. Romania and Its Bicycle Industry**

If in the western countries cycling is a well-known practice and most of these nations are worldwide known for their implemented programs, in Romania it is hard to speak about experience in this field or about fulminating successes of this type of projects, but it seems things are stating to get shaped and more and more people to become aware of the benefits the bicycle brings as an alternative means of transport compared to the car.

As its promoters (Raiffeisen Bank and the Green Revolution Association) claim, the I'Velo project is probably the most important bike-sharing program in Romania, making its debut in May 2010 and providing to all cycling lovers, regardless of their age or social status, 1,100 bicycles, at first in Bucharest and then, as a result of its success in the first trimester, in Târgu-Mureş, Cluj-Napoca, Iaşi and Constanţa (Green Revolution Association, 2012a). Last year, the hiring centre from Târgu-Mureş has been moved to Braşov. We should also mention the fact that the present program is being realized under the sponsorship of the Ministry of Environment and Forests, and with the help of the city halls of Bucharest, Braşov, Cluj-Napoca, Iaşi and Constanţa, as well as with the support of Bucharest Lakes, Parks and Leisure Administration (ALPAB).

Fortunately, the management of the Green Revolution Association wasn't happy only with that achievement and succeeded to initiate other related projects. In the same time with the above mentioned program another one has been put forward, known as the "Bicycles with ties" Program, the first free bike-sharing program from Romania dedicated to business centres, namely those companies that wish to provide personal bikes for their personnel. The 156 bicycles were used by more than 500 employees coming from the partner companies, sources from the Green Revolution claiming that in 2011 the number of people who used the bicycle as a means of transport has tripled compared to the previous year (Green Revolution Association, 2012b). Actually, these programs were based on a much smaller one called "On pedals", which has been enjoying exceptional results for the last three years, but just in the perimeter of the Kiseleff Park from Bucharest (Jeles, 2011). Moreover, as a consequence to the success I'Velo had, Green Revolution decided to organize the project "StudentOBike" dedicated exclusively to students from five national academic centres, more exactly from Bucharest, Braşov, Cluj-Napoca and Iaşi (Green Revolution Association, 2012b). Those 500 bicycles that were made available for students and that have as purpose to make them responsible towards the environment were purchased with the help of the Ministry of Environment and Forests, the Bucharest City Hall, and the city halls from Braşov, Cluj-Napoca and Iaşi, as well as with the support of the partner universities.

Bicycle producers from Romania also benefit from an increase in the number of persons that use bicycles and from the development of public programs, the DHS Group, the one that provided the equipment for the I'Velo project, being one of the top companies and achieving in 2009 a turnover of 21 million Euros. In addition, Rom-Eurotrade general manager, a valuable bicycle importer, declared that the Romanian market has an "amazing" development trend, in a shorter period than normal. Furthermore, he added that our country cannot be compared to the western countries, but it is capable of catching up with most of the western markets (Muresan, 2010).

Although the crisis brought only turbulences in most sectors, the automobile market registering even 70% drops, in what concerns the bicycles, the trend is an optimistic one, which attracted new companies to the Romanian market (Moş Ion Roată, Velorbis) and which makes approximately 300,000 Romanians to save at least one hundred Euros for a bike (Rosca, 2010). And if some believe that the new arrived companies is the best thing that could happen to our country than they are wrong because the electronic revolution of bikes is knocking at the door. Even though magnesium and carbon or the folding technologies have already pushed their way among the new bicycle types, it seems that we are witnessing some unseen inventions (Popan, 2011). Thus, microcomputers that show your speed and heartbeat in each moment while you're cycling, global positioning systems incorporated in a Smartphone which is installed on the handlebars or bicycles than cannot be set in motion without a security code will be part of our everyday life. Actually, we are talking about e-bikes or pedelecs, types which are well-known in Western Europe, especially in Germany and Holland, but which are rarely seen in our country, specialized companies reporting the sell of just couple of dozens of them.

**Table 1 The number of bicycles sold (2004 – 2010)\*.**

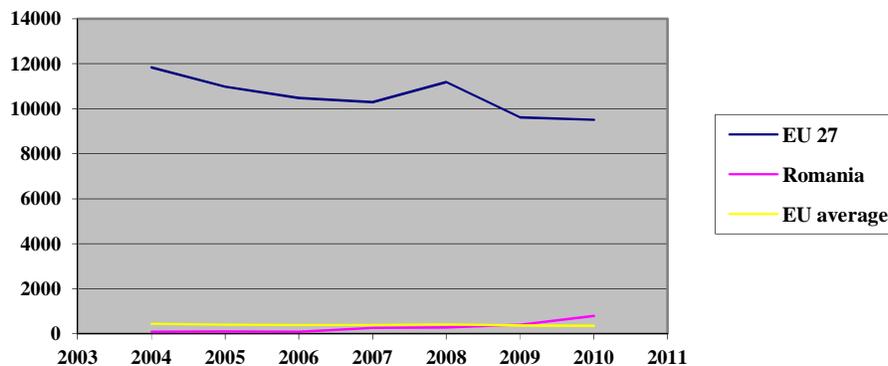
Year	Ball bearing bicycles (EU 27)	Ball bearing bicycles (Romania)	Bicycles without ball bearings (EU 27)	Bicycles without ball bearings (Romania)	Total bicycles in the EU (with or without ball bearings)
2004	11830	75	3391	0	15221
2005	10981	96	1873	0	12854
2006	10470	85	2785	0	13255
2007	10289	251	3583	0	13872
2008	11176	283	2850	0	14026
2009	9611	397	3713	0	13324
2010	9501	789	3006	0	12507

\* Data is in thousands of units

Source: Eurostat

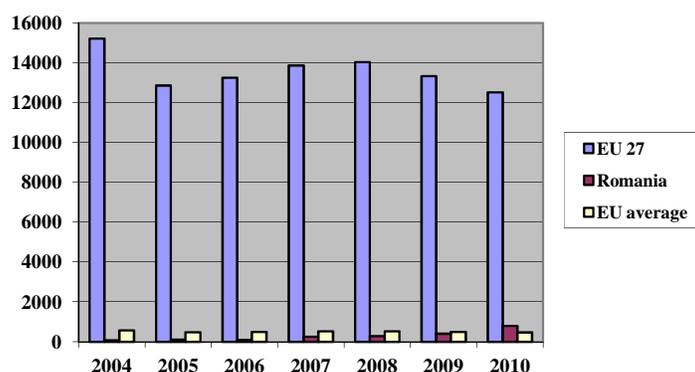
At Romania’s level it is hard to state how many persons use bikes because there is no statistical data for this aspect, but with the help of the Eurostat (2009/2012) data we have managed to analyze the number of bicycles sold between 2004 and 2010. According to the information found, there are two types of bicycles, the ones that have ball bearings and the ones without ball bearings. The table above wishes to show the situation of these non-motorized vehicles in Romania in comparison with the number registered in the European Union.

In what concerns the ball bearing bicycle domain a backwards relation between our country and the level of the European Union can be seen (figure 1). Consequently, although we have shown so far that in the western countries people mainly tend to use the bicycle as a means of transport within the city regardless of their destination, it seems that from 2004 till 2010 the trend of the European Union has been a decreasing one, with a slight upswing during 2008, while in Romania the evolution has been positive, with a shy but firm starting point (only 75,000 bicycles were sold in 2004 compared to 12 million in the European Union). Moreover, we must point out the fact that in the last two years (namely 2009 and 2010) the level in our country was a bit higher than the average of the European Union, which is encouraging for our market.



**Figure 1 Ball bearing bicycles sold in the European Union and in Romania**

Taking into consideration both categories of bicycles introduced by the European statistical organism, figure 2 presents the same backwards relation between the number of bicycles sold in the European Union and in Romania, although the variations from year to year are relatively small at the Union’s level, the first expressions of the financial-economic crisis sticking out at the beginning of 2009.



**Figure 2 Bicycles sold (with or without ball bearings) in the EU and in Romania**

As a result of the fact that in Romania bicycles without ball bearings are not produced, we have chosen to analyze in detail only part of the data provided by Eurostat (column 2 of table 1). We have thus resorted to the Microsoft Office Programme Excel and more precisely to the descriptive statistics function.

**Table 2 The statistical output (The European Union)\***

Mean	10551.14286
Median	10470
Standard Deviation	843.8671753
Minimum	9501
Maximum	11830
Sum	73858
Count	7

\* Data is in thousands of units

Source: author's own computation using Eurostat data

Table 2 shows the results obtained in the case of the European Union, results that incorporate both bicycle categories. Consequently, it seems that during the seven years that were analyzed the average number of bicycles sold was approximately 10,551.142 per year. Likewise, applying the formula

**Equation 1** Formula for Relative Amplitude

$$A\% = [(Maximum - Minimum) / Mean] * 100,$$

we get a percentage of the relative amplitude of 22.07% which means that the average calculated is representative for the community (as the amplitude does not exceed the value of 100%). The standard deviation is approximately 843,867 units; this means that the average distance between the number of bicycles sold each year is represented by 843,867 units. Nevertheless, with the help of the standard deviation we can calculate the variation coefficient whose formula is the following:

**Equation 2** Formula for Variation Coefficient

$$v = (Standard\ deviation / Mean) * 100.$$

Thus, the percentage of almost 8% in the case of the variation coefficient shows that the average is representative for the whole community, the later being a homogenous one.

#### 4. Conclusion

Cycling used as a means of transport has a lot of benefits, from those ecological or social to those which are related to the community where we live or to our health. That is why it is very important to pay a great attention to this remarkable invention of the XIXth century and to follow the example of the other European states in order to implement public programs aimed at encouraging people to use the bicycle. Although our country is just starting out, the potential that it has will certainly help in order to line up with the other prosperous nations. And until this will happen, there are some aspects that need to be taken into consideration by the officials of big cities:

- Promoting alternative means of transport with a focus on the motorbike sector;
- Developing and expanding the cycling infrastructure;
- Broadening bicycle renting networks and creating bicycle repairing units close to the bicycle runways;
- Setting informing panels dedicated to cyclists regarding the traffic on the routes designed for them;
- Educating citizens in what concerns the benefits brought by using a bicycle;
- Offering free classes to children aged under 18 with the purpose of leaning how to ride a bike.

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