CYCLING POPULARITY – DOES IT HAVE A REAL IMPACTT ON THE ENVIRONMENT?
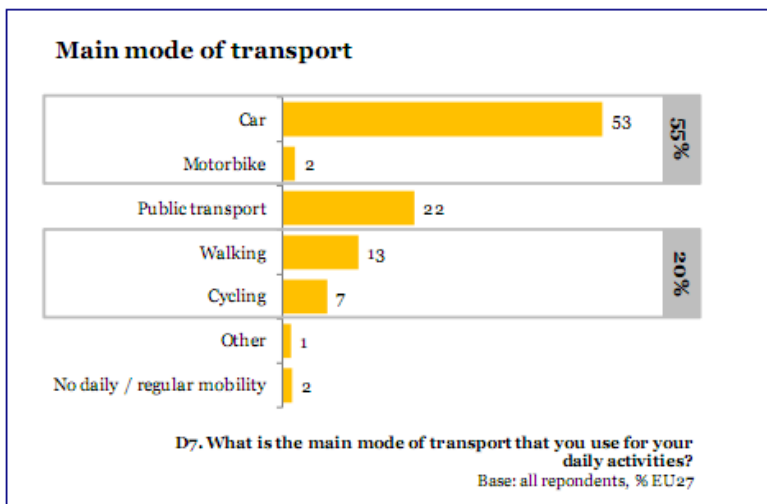
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Transport as a one of the most important branches of the economy, every year, consumes a loads of energy. It refers to the passenger transport and the transport of goods. There is a strong role of local governments across the Europe to decrease the impact of the passenger transport on the environment. This goal has been achieving by bottom up model of governance. Shortly, the bottom up model is defined as a strong influence of local society on the decision making. Usually the local policy on sustainable transport aims to promote the cycling as an environmental friendly mode of transport, instead of the car traffic. Across the Europe we can identify "Cycling Cities" – cities where cycling policy has been implemented successfully, and where the society rather use bikes than car modes to move within the city. But does it have a real impact on the environment?

"The Future of Transport Analitical Report" from 2011, shows the situation on the roads per country. The document is based on the survey with people. Authors collected some important data about the rate of people who use the bikes, cars, public transport as a mode of everyday movement. Basic data from the report are attached below:

Main mode of transport

Car — 53 · 55%
Motorbike — 2
Public transport — 22
Walking — 13 · 20%
Cycling — 7
Other — 1
No daily / regular mobility — 2

D7. What is the main mode of transport that you use for your daily activities?
Base: all repondents, % EU27

Source: European Commision, Future of Transport Analytical Report, Flash Eurobarometer, March 2011

This thesis pays more attention to cycling and to using car. There are two hypothesis to validate:

1.Higher rate of cycling results in lower environment pollution;

2. Lower rate of car modes results in lower environment pollution.

Using the classical statistic methods we can see how the European Union is divided by the rate of cycling in the country. The most popular indicator to analyse the dispersion is a standard deviation. It will show how different is the cycling approach within the European Union. The average percentage rate of cyclist was 7,89%, the standard deviation was at the level 7,09%. V indicator (relation the Standard deviation to the average achieved 90% - very high level. It shows how The European Union is different internally in this field. Using the some modern methods of spatial analysis, we are able to join the rate of cycling and a rate of car modes and classify them from the best (less driving and more cycling) to the worst (less cycling, more driving). Using the synthetic indicator we can classify the countries by final energy consumption in transport per inhabitants and the total greenhouse gas emissions per inhabitant, as well.

	Ranking 1	Ranking 2
Cyprus	27	23
Malta	26	6
Ireland	25	24
Luxembourg	24	27
France	23	12
United Kingdom	22	13
Portugal	21	5
Slovenia	20	14
Spain	19	9
Greece	18	16
Bulgaria	17	7
Italy	16	11
Austria	15	17
Lithuania	14	3
Estonia	13	26
Romania	12	1
Finland	11	25
Czech Republic	10	22
Germany	8	19
Belgium	9	20
Poland	7	15
Latvia	6	2
Slovakia	5	8
Denmark	4	18
Sweden	3	10
Hungary	2	4
Netherlands	1	21

The synthetic indicator is based on the Euclidean distance, defined by the

equation: $d_i = \sqrt{\dfrac{1}{m}\sum_{j=1}^{m}(z_{ij} - z_{0j})^2}$ It allows to build 2 rankings: First ranking:

level of sustainability – by the rate of sustainable modes and rate of car modes, while the high rate of cycling is a stimulant and high rate of car modes is a destimulant. Second ranking: the level of the pollution.

Then, using the Spearman indicator –

$$r = \frac{6\sum\limits_{i=1}^{n} d_i^2}{n(n^2 - 1)},$$

the correlation between ranks has been defined. S=0,14. The correlation is positive. Therefore the mode of the transport have an impact on the environment. Scenario Less Cars and More cycling has a positive influence on the air quality. However this impact is very low and we cannot say that the cycling policy strongly influence the quality of the environment. However, the strong dispersions within Europe, could be a reason of such an ineffective impact of the cycling popularity on the environment, because the air is not staying in the one place.

Reference:
Andrzej Balicki, *Statystyczna analiza wielowymiarowa i jej zastosowanie społeczno-ekonomiczne,* Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2009
European Commision, *Future of Transport Analytical Report*, Flash Eurobarometer, March 2011