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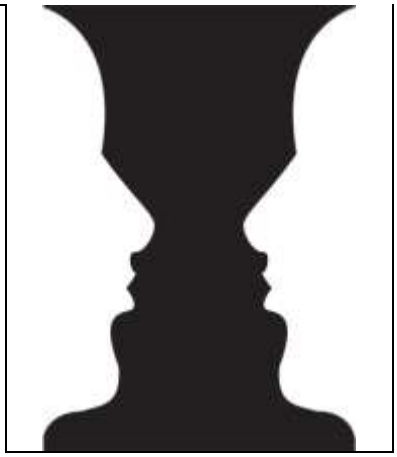

The Role of the Internet in Shaping Environmental Concern. A Focus on Post-Communist Europe[1]

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Abstract
Common sense, as well as scientific evidence, frequently use the generalization that compared to the citizens of the West, citizens of the ex-communist countries are less environmentally concerned as far as during the communist past they were not socialized to behave in an environmentally conscious manner and after the regime change were much more concerned with the economical survival than with environmentally responsible attitudes and behaviours. The paper tries to answer the question if new communication technologies, particularly the Internet, can have a decisive role in socializing people towards environmental concern and environmental practices in the post-communist countries. For this purpose the data set of the Special Eurobarometer 68.2 is used. Analysis shown that in the post-communist member states of the EU Internet use has a significant role in enhancing people's environmental concern both in terms of perceived environmental information, environmental attitudes and especially environmentally friendly consumerism. Energy saving behaviours and environmentally friendly travelling behaviours were not, or were less dependent on the Internet use when socio-demographics were controlled. Results suggested that technological flux, understood in terms of broadband Internet penetration, is also a decisive factor in enhancing environmental concern.

Keywords
Environmental citizenship, Internet use, post-communist countries

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Introduction

In the context of today's environmental problems a new concept of citizenship appeared, that is environmental citizenship (Dobson, 2003; Bell, 2005), assessing the rights and duties of citizens related to the environment. Accordingly, every individual has the right to live in a clean environment, to access environmental information and to participate in environmental decision making, respectively citizens have duties related to the preservation of the environmental quality, both in the private and the public sphere. Environmental citizenship constitutes a form of citizen participation, a way of inclusion and bottom-up environmental reform strongly linked to the core mean of democracy (Melo-Escrihuela, 2008).

Environmental participation has a number of obstacles: in order to act in an environmentally significant manner and even for developing environmental concern and pro-environmental attitudes citizens need certain resources and possibilities. Prior research has shown that environmental concern requires knowledge and information about the causes and consequences of environmental problems, but this information is significantly dependent on citizens' educational level, on their income, age, value orientation and even their residence, no matter we refer to the urban-rural dichotomy or the wealth of the nation citizens live in. There is a broad range of scientific evidence which sustains that more informed citizens (e.g. Schahnand Holzer, 1990), more educated, i.e. more enlightened people (Gelissen, 2007), citizens with higher incomes (e.g., Lee and Norris, 2000; Franzen, 2003; Gelissen, 2007), younger citizens (e.g., Arcury et al., 1987; Dietz et al., 1998; Lee and Norris, 2000; Gelissen, 2007), those with post-materialist value orientations (e.g., Inglehart, 1990, 1995; Lee and Norris, 2000; Gelissen, 2007), respectively those living in urban areas (Buttel, 1992) and in more affluent countries (Franzen, 2003) are better environmental citizens, i.e. they are more environmentally concerned and committed in terms of private sphere behaviour and public sphere activism.

The post-materialist basis of the environmental concern, which assesses that environmental concern is a higher order value and thus becomes manifest only if lower order necessities like economic well-being are satisfied, was successively challenged by other explanations. First of all, Inglehart himself (1995) stated that in the less wealthy societies in the absence of the post-materialistic value orientation objective environmental problems may serve as motivations for environmental concern. Dunlap, Gallup and Gallup (1993) developed the paradigmatic shift explanation according to which there is a clear movement towards pro-environmental attitudes all over the world.

Further empirical evidence (e.g. the Special Eurobarometer series on the environmental attitudes of Europeans; Lee and Norris, 2000) shows that environmental concern is much more similar than different in the West and the East when one refers to the perceptions and attitudes, however is more intensive in the West when one refers to concrete behaviours, for instance participation in environmental NGOs (Dalton, 2005; Nistor, 2009).

The present paper starts from the dichotomy that citizens of the post-communist, now EU member states are still less environmentally concerned compared to the old member states' citizens especially in terms of behaviour. During the communist regime authorities emphasized economic progress, while human and environmental quality were completely neglected. Environmental information were kept secret, environmental policies existed only formally, leaving the impression that the environment is not an issue (Cherp and Vrbensky, 2002). The actual result was a 'toxic nightmare' in several of the region's areas (DiLorenzo, 1992; Pavlinek and Pickles, 2005). Right before the regime change, and strongly associated with the Chernobyl disaster, environmental groups strongly proliferated around the region so that many scholars believed that after the collapse of communism a really new third way development will be established in these countries, however the reality was completely different: due to the economic hardship formerly communist countries had to put emphasis on economic growth and neglected its environmental impacts (Baumgartl, 2000). Public environmental euphoria plummeted and environmental policies began into place in isolation from social pressures (Horak, 2001). Obviously, as the economy reinvigorated and citizens came into contact with the greener lifestyles of the Western public, environmental concern in the Eastern European region began to emerge, but still seems to be difficult to turn the concern into concrete behaviours.

Besides this dichotomy, the paper presupposes that even in the post-communist countries there are significant discrepancies in environmental concern along socio-demographic variables like age, education, etc. (Lee and Norris, 2000). What the paper wishes to add to these already documented facts is the investigation of the role of the information technology, particularly the Internet, in shaping environmental concern and behaviours in the Eastern European context. The presupposition is that the Internet constitutes a medium which brings environmental information very close to citizens and constitutes a socialization factor for Eastern European citizens towards environmental concern.

Theoretical Insights

Environmental concern is clearly dependent on environmental information which then depends on mass media and public sphere communication. Hansen (1991, 1993) notes that mass media act as an agenda setting in relation with environmental issues and bring into public attention issues and problems about which the public would know less in the absence of the media. Dunlap and Jones (2002) put also that today's environmental problems are less localized in terms of their origin and effects, so their recognition and the social concern towards them depend very much on their media coverage. This then leads to the fact that global environmental problems are frequently viewed as more serious compared to local problems (cf. environmental hyperopia – Uzzel, 2000). Mass media thus have the role in increasing social and, particularly, environmental consciousness by helping to create more informed individuals (Keum, Devanathan, Deshpande, Nelson and Shah, 2004).

Contemporary mass media have moved towards new forms of communication technologies and instruments (e.g., Internet and mobile technologies, computers and mobile devices) through which the awareness of public affairs has extremely increased (Norris, 2001). According to Barber, Mattson and Peterson (1997) new communication technologies, particularly the Internet, possess the following advantages compared to the traditional media: inherent activity, potential for lateral and horizontal communication, non-hierarchical modes of communication, low costs to users, rapidity in communication, lack of national and other boundaries, freedom from monitoring of government. These advantages, and especially the lack of boundaries in Internet mediated communication, are very important patterns when one refers to nowadays' environmental problems (e.g. climate change) which are trans-boundary and their coverage requires a similar medium that is the Internet.

The role of the Internet in spreading environmental information and in enhancing environmental activism and governance was documented in several studies. Good (2006) summarized a series of research which studied the role of the Internet as an information depot for specific environment related topics: toxicology, pollution, environmental management, etc. The literature on environmental activism, whether on local or global level, emphasized the role of the Internet in enhancing and transforming environmental protest activity (e.g., Pickerill, 2003). According to Doyle and McEachern (2001) the Internet has become a new means for mobilization on environmental issues and created a more dynamic, less localized politics compared to the static environmental politics existed before the Internet age in which issues and concern haven't gone far away. Stokols and Montero (2002) bring into attention the ways in which the Internet has changed environmental campaigning: while in the past efforts to promote environmental behaviours like energy conservation, recycling, etc. have relied on community-based information campaigns, now efforts to promote environmentally significant behaviours are channelled through comprehensive and visually striking web sites. The Internet thus serves as a medium for social learning (see also Holmes, 2003) and can be conceptualised as a tool for empowerment (Amichai-Hamburger, McKenna and Tal, 2008).

Regarding the relationship between the Internet and environmental information, respectively environmental concern the conclusion may be that 'the Internet contains a wealth of environmentally related information, much of it of considerable significance' (Rittner, 1992, p. 23 – quoted by Good, 2006, p. 195). The growing number of Internet users envisages the growing impact of Internet based environmental information, however as Rittner (1992) notes 'problems in gaining access to the Net and its resources abound and are likely to continue for some time' (p. 23 – quoted by Good, 2006, p. 195), a fact which should be carefully judged in the case of the present analysis as well given the fact that there is a digital divide between the post-communist and old member states of the EU and within singular countries as well, alongside especially age, education, income and residence variables (Orviska and Hudson, 2009).

In spite of the above listed impacts of the Internet on environmental concern and which determined authors that 'in fully understanding the genesis and shape of environmental attitudes, we must attend to what people are reading, hearing and

viewing' (Holmes, 2003, p.36), the linkages between the mass media, particularly the Internet and environmental attitudes and behaviours are taken for granted and there are only a few empirical studies which explicitly aimed to study such linkages (e.g. Good, 2006). It is however equally true that there are many empirical findings which among other variables with significant impact on environmental concern and behaviour emphasized the role of the Internet usage (e.g. Hersch and Viscusi, 2006; Bouve-de Pauw and Van Petegem, 2010).

The study of the impact of mass media use on different attitudes and behaviours should give attention to some critical issues. One such issue refers to the importance of specific media use. Norris (1996) is one of the leading scholars who points to the need to give attention to differentiated mass media uses, e.g. one is general Internet use and other is the use of the Internet for accessing news, for chat, for e-mail, etc. In this sense there are evidence summarized for instance by Keum et al. (2004) which demonstrate that environmental concern and environmentally significant behaviour are mostly impacted by news consumption.

The same considerations should be taken into account when one refers specifically to the impact of the Internet usage on environmental attitudes and behaviours. Albeit exploring the differentiated Internet use on general civic engagement and not specifically on environmental commitment, the considerations of Shah, Kwak and Holbert (2001) should be carefully judged. The authors are against the view to see the Internet as an amorphous whole and their argument is based on the results of an empirical study which investigated differentiated media use on civic engagement, interpersonal trust and life contentment. Results shown that the use of the Internet for information exchange has a positive impact on every three dependent variables and, in consequence, 'seems reasonable to conclude that individuals who use the Internet for information exchange probably encounter more mobilizing information and experience more opportunities for recruitment in civic life' (p. 154). Based on Shah et al.'s (2001) findings, Good (2006) herself tried to investigate the impact of differentiated Internet use on environmental attitudes but couldn't demonstrate such a clear effect of Internet news consumption on environmental concern in the case of a US based general public.

Another critical issue which should be taken into account in relation to the Internet usage is the existence of a digital divide which denotes the gap between Internet users and those who do not have access or skills to use the Net. While Internet use has grown exponentially there are still important gaps in terms of Internet use. In a recent paper dealing explicitly with the case of the European Union, Orviska and Hudson (2009) show that there are substantial differences between countries in terms of Internet usage and access, with Scandinavian and Western European countries ranking the best and post-communist countries falling into the gap. But – as the authors note – even in those countries where Internet use seems to be a business as usual, there are substantial variations across socio-economic characteristics: Internet access is higher for young people, city dwellers and increases with education. This last consideration is very important for the perspective of our analysis. Typical Internet users are those people who are also the common source of environmental concern. From here appears that the

impact of the Internet usage on environmental concern, if any, might reside amongst an 'elite' public and thus might be status implicit, and/or might count only in the case of those countries where Internet penetration is higher.

Data, Research Questions and Methodology

The aim of the present analysis is to contribute to the research investigating the linkages between Internet use and environmental concern understood both in terms of attitude and behaviour. For this reason the data set of the 68.2 Special Eurobarometer is used. The survey was realised between November 2007 – January 2008 in the 27 member states of the EU and the corresponding data set was delivered free of charge for scientific purpose from ZACAT - GESIS - Leibniz Institute for the Social Sciences. As the title of the survey shows (European Union Policy and Decision Making, Corruption, Civil Justice, E-communication, Agriculture and Environmental Protection) it was a multiple subject oriented survey.

In the present paper I treat as variables measuring citizens' environmental concern those items from the surveys which measure, firstly, respondents' perceived information about environmental issues (Q1 – for the original wording of the dependent variables see Appendix 1); secondly, respondents' environmental attitudes, that is variables measuring, in turn, the perceived importance of environmental protection for the individual (Q2); the confidence in one's own ability to play a role in protecting the environment (Q3); behavioural disposition to buy environmentally friendly products even they are more expensive (Q4), respectively a factor score developed on the basis of these three items (see Appendix 3). In the case of each of the four questions original response variants correspond to a 4-point Likert scale which code values for the purpose of the analysis were changed so that higher is the agreement (respectively the perception of information in the case of the first item) higher is the corresponding code. Thirdly, respondents' environmentally significant behaviours in terms of energy saving, consumption and travelling are also considered. These variables were developed on the basis of the factor analysis of eight different environmentally significant behaviours performed by the respondents in the previous month of the survey (Q5).

For the Internet use – which is the independent variable of the analysis – two kinds of items were taken into consideration. One is the general Internet use and refers to the more or less regular use of the Internet during the previous month of the survey (Q6 – see Appendix 2.1 for the original wording), i.e. respondents who no matter of Internet access location, declared the use of the Internet, while the other is a more specific, environmental related Internet use which accounts for those respondents who mentioned the Internet among the three main sources of gaining information about the environment (Q7 – see Appendix 2.2 for original wording).

For the purpose of the analysis participating countries were divided in two groups, weighted correspondingly: old member states, corresponding to EU 15, respectively formerly communist, newer member states from East-Central Europe including the post-Soviet countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland,

Romania, Slovakia, Slovenia), but excluding Malta and Cyprus due to their lack of communist legacy, compared to East-Central Europe.

In the first part of the analysis comparative statistics is presented for both country groups in terms of general and specific Internet use, and for the considered environmental information, attitude and behavioural variables.

In the second step of the analysis the focus is oriented only towards the post-communist member states and through multiple linear regression analysis is investigated the fact if Internet use exercises any significant impact on the environmental consciousness of the citizens of the formerly communist now EU member states. Due to the existing digital divide a specific research question is to investigate if the impact of Internet use on the dependent variable is status-implicit. For this purpose regression analyses which investigate the impact of the two types of Internet use is calculated with controlling for socio-demographics.

Moreover, the variable accounting for inter-country digital divide, that is broadband Internet penetration (the variable was delivered from Eurostat 2008 – see Appendix 4 for variable description and corresponding values), is also included in the final models of the regression analysis, thus intending to reveal if individual Internet usage, or, national level Internet penetration, if any of them, is more significant in shaping environmental information, attitude and behaviour.

Analyses

General and Environmentally Specific Internet Use

The Eurobarometer 68.2 survey asked respondents to indicate if in the last month they used the Internet at home, at work, at school, university or other study centre, at other place, respectively if they did not use the Internet in the last month, or they do not use the Internet at all. I assume that citizens who use the Internet with more or less regularity, no matter at which place can be considered general users.

The comparative analysis of the frequency of the general Internet users reveals that this type of Internet use is significantly more frequent among old member states' citizens compared to new member states' citizens (Chi-square=333.109; df=1; $p<0.001$). From the data regarding the relative frequency of the general Interne use (Table 1) can be made some considerations about the digital divide: while half of the respondents from the old member states used the Internet at home, the corresponding percent is much lower in the post-communist countries. The picture is also telling when one considers the percent of those declaring that they do not use the Internet at all: in the post-communist countries half of the questioned do not use Internet at all, while this percent is lower in the old member states.

Further, country-level analysis revealed that in some post-communist countries the percent of those who do not use the Internet at all is much higher than the regional average: e.g. 61% in Hungary, 58% in Romania, 57% in Bulgaria, while in the old member states' group some countries are far better than the regional average, e.g. in Denmark

only 16%, in Sweden only 13%, in the Netherlands only 12% of the respondents declared no use of the Internet at all.

Table 1. General Internet use in the two country groups of the EU. Relative frequencies (%)

	Old member states (%)	Post-communist states (%)
Internet use at home	52	34
Internet use at work	24	18
Internet use at school	6	7
Internet use at other place	5	5
Didn't use Internet in the last month	3	4
Do not use Internet at all	37	49

The specific Internet use, i.e. for environmental purposes, refers to those respondents who mentioned the Internet among the three main sources of gaining information about environmental issues (see Q6 in Appendix 1). Comparative percents show that neither in old, nor in the post-communist member states Internet tops the list, it constitutes the fourth main source of information on environmental issues. The top source of environmental information in both country groups is still the old media, that is TV, followed by newspapers and films, respectively docs (Table 2).

Table 2. The three main sources of environmental information in the two country groups. Relative frequencies (%)

	Old member states (%)	Post-communist member states (%)
Newspapers	50	44
Magazines	15	13
TV	71	73
Radio	21	2
Films/documentaries	32	34
Conversations	13	10
Books	5	4
Internet	21	24
Brochures	8	8
Events	3	3

Environmental Information, Attitude and Behaviour in the Old Member States and Post-Communist Member States of the EU

In the followings the analysis investigated the case of perceived environmental information, respectively environmental attitudes in the two country groups, both in terms of percents of respondents adhering to different intensities of the Likert type scales, both in terms of comparative mean scores (Table 3).

Regarding the perceived information about environmental issues (Q1), respondents declared significantly more informed in the old member states compared to the post-communist member states. Concerning the personal importance of the environmental protection (Q2) results seem to confirm the paradigmatic shift approach of Dunlap et al. (1993), that is when the importance of environmental protection should be judged, citizens living in different societal and economic contexts express similar high levels of attachment towards the environment. In the other two cases, that is, the confidence in one's own ability to play a role in environmental protection (Q3), respectively the willingness to buy environmentally friendly products (Q4), citizens from the old member states express significantly more intense environmentally friendly attitudes compared to their Eastern counterparts.

Table 3. Relative frequencies (%), means, standard deviations and significant differences on the scales of perceived environmental information and environmental attitudes in the old and post-communist member states of the EU

	Old member states	Post-communist EU member states
Perceived information about the environment (Q1)		
Very well informed	7 %	3 %
Fairly well informed	54 %	43 %
Fairly badly informed	30 %	44 %
Very badly informed	8 %	10 %
Scale Mean	2.60	2.40
Standard deviation	0.736	0.709
T-test results	t=20.792, p<0.001	
The personal importance of environmental protection (Q2)		
Very important	66 %	64 %
Fairly important	31 %	32 %
Not very important	3 %	3 %
Not at all important	0.6 %	0.3 %
Scale mean	3.61	3.61
Standard deviation	0.576	0.562
T-test results	t=0.883, p>0.05	
Belief that as an individual you can do something for the environment (Q3)		
Totally agree	49 %	35 %
Tend to agree	41 %	46 %
Tend to disagree	8 %	14 %
Disagree	2 %	5 %
Scale mean	3.36	3.10
Standard deviation	0.732	0.832
T-test results	t=25.751, p<0.001	
Would buy environmentally friendly products even if more expensive (Q4)		
Totally agree	31 %	25 %
Tend to agree	51 %	52 %
Tend to disagree	13 %	17 %
Disagree	5 %	5 %
Scale mean	3.07	2.98
Standard deviation	0.801	0.796

As a consequence, the presupposition regarding the existence of an environmental concern deficit in the case of the post-communist countries can be at least partially confirmed: the environment is an as much important value in the old and the new member states, however there is a clear shift between the two country groups in terms of citizens' perceived role in environmental protection and in their disposition to pay more for environmentally friendly products. These results practically mean that as far as more concrete environmental attitudes, respectively the conative side of these attitudes are considered, the environmental concern discrepancy between the two country groups broadens.

The above consideration is further accentuated through the case of the studied environmental behaviours (Q5) for which Table 4 presents the comparative relative frequencies of the respondents declaring the performing of each behaviour.

Table 4. Declared environmentally friendly behaviours performed in the month prior to survey in the two country groups (%)

	Old member states (%)	Post-communist member states (%)
Chosen an environmentally friendly way of traveling	31	30
Reduced the consumption of disposable items	34	19
Separated most of your waste for recycling	65	44
Cut down water consumption	38	36
Cut down energy consumption	51	40
Bought environmentally friendly products marked with an environmental label	21	14
Chosen locally produced products or groceries	24	26
Used the car less	19	10

Chi-square tests based on the analysis of the absolute frequencies corresponding to each of the eight behaviours in the old and new member states suggest that except travelling, reduced water consumption, and choose of local products, the five other behaviours are declared performed by significantly more individuals in the old than in the new member states (disposable items: Chi-square=674.054, df=1, $p<0.001$; waste separation: Chi-square=1160.68, df=1, $p<0.001$; energy consumption: Chi square=331.080, df=1, $p<0.001$; labelled products:Chi-square=212.536, df=1, $p<0.001$; less care use: Chi-square=363.734, df=1, $p<0.001$).

The mean score of a computed index based on the eight behaviours which practically intends to determine the average number of environmental behaviours performed in each of the two groups of countries suggest also that there is a significant difference ($t=31.193$, $p<0.001$) in the performance of environmental behaviours in the old and new member states: citizens of the old member states perform in average 2.85 behaviours (SD=1.821), compared to the citizens of the new member states (Mean=2.19, SD=1.542)

Table 5. The structure of the environmental behaviours in the old member states

Behaviours	Component 1 (Consumption)	Component 2 (Energy saving)	Component 3 (Traveling)
Environmentally friendly way of traveling			0.799
Reduced consumption of disposable items	0.489		
Waste separation for recycling	0.376		
Reduced water consumption		0.783	
Reduced energy consumption		0.781	
Bought of products with environmental labels	0.722		
Choose of local products	0.730		
Less car use			0.781
% of variance	18%	18 %	16 %
KMO=0.695; Bartlett test of sphericity: Chi-square=7836.68; df=28; p<0.001			

Principal component analysis. Rotated component solution with Varimax rotation

Table 6. The structure of environmental behaviours in the new member states

Behaviours	Component 1 (Energy saving)	Component 2 (Consumption)	Component 3 (Traveling)
Environmentally friendly way of traveling			0.728
Reduced consumption of disposable items		0.545	
Waste separation for recycling		0.405	
Reduced water consumption	0.797		
Reduced energy consumption	0.813		
Bought of products with environmental labels		0.696	
Choose of local products		0.537	
Less car use			0.771
% of variance	18%	15%	14%
KMO=0.588; Bartlett test of sphericity: Chi-square=2974.421; df=28; p<0.001			

Principal component analysis. Rotated component solution with Varimax rotation

As far as the considered eight behaviours are also very different in their nature I tried also a principal component analysis, resulting in the case of each country group in three components accounting for environmental consumption, energy saving and environmentally friendly travelling behaviours (Table 5 and 6), a result which suggests that albeit the frequency of their performing is different, the structure of environmental behaviours is similar in the two country groups.

The concluding remark is that between the post-communist member states and the old member states of the EU the difference in terms of environmental concern is not mentionable when we refer to the environmental concern understood as a positive value, however there is an environmental concern deficit in the post-communist member states compared to the old member states in terms of perceived environmental information, attitudes towards the perceived individual capacity to bring positive change over the environment and disposition towards buying environmentally friendly products. Moreover, there is a discrepancy between the two country groups in terms of the average number of performed environmental behaviours, respectively the number of citizens performing each of the considered behaviours; however the underlining

structure of the environmental behaviour spectrum is the same in both of the country groups.

Environmental Information, Concern and Behaviour in the Post-Communist Member States. The Role of the Internet

In the followings I turn to investigate the role of the Internet use on citizens' perceived information about environmental issues (Q1), their attitudes towards environmental issues (factor score calculation based on Q2, Q3 and Q4, see Appendix 3 for calculus) and their environmentally friendly behaviours, that is energy saving, consumption and travelling (the components resulted in Table 6 based on Q5) in the case of the group of the ten post-communist member states of the EU.

For the measurement of the impact of the Internet use I considered, in turn, both general Internet use and both specific Internet use. Firstly, I estimated two basic models, testing the correlation between the general, respectively specific Internet use and the considered dependent variables. Secondly, I estimated a model in which the impact of social-demographic variables: age (in years), gender (1=male, 0=female), education (years), type of community (five-category, from small village to cities) is assessed. As far as income was not measured *per se* in the considered Eurobarometer survey I omitted this variable from the model. Thirdly, as far as I wanted to test the question if the possible impact of the Internet use on environmental variables is status implicit or not, I investigated, in turn, the impact of the general and specific Internet use while controlling for socio-demographics.

In the case of the environmental behaviour variables, besides the control variables and Internet use, I introduced as an independent variable environmental attitudes as well (the factor score resulted on the bases of Q2, 3 and 4 – see Appendix 3), assuming – in line with the schematic causal model of environmental concern (Stern, Dietz and Guagnano, 1995) – that environmental concern constitutes a belief system in which specific environmental behaviours are determined by more or less general environmental attitudes.

Moreover, in the final models of the regression analysis I introduced as an independent variable the broadband Internet penetration in the ten countries of the region (see Appendix 4 for variable description), trying to answer the question if the presence of this societal level technological flux, or the declared personal Internet use are more responsible, if any, in determining environmental concern throughout the region.

Table 7. Regression analysis. Dependent variable: perceived environmental information

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Age			0.012	0.080***	0.044**	0.061**	0.019
Gender			0.035**	0.034**	0.034**	0.040**	0.040**
Education			0.178***	0.137***	0.158***	0.142***	0.166***
Community			-0.011	-0.017	-0.010	0.004	0.011
General Internet use	0.180***			0.157***		0.106***	
Specific Internet use		0.157***			0.112***		0.098***
Broadband Internet penetration						0.115***	0.126***
R^2	0.003	0.002	0.032	0.048	0.042	0.052	0.044

Coefficients are standardized Beta. ***p<0.001, **p<0.01, *p<0.05

Table 8. Regression analysis. Dependent variable: environmental attitudes

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Age			0.003	0.069***	0.031**	0.056**	0.009
Gender			-0.037**	-0.038***	-0.038**	-0.029*	-0.08*
Education			0.150***	0.109***	0.133***	0.102***	0.129***
Community			0.043**	0.038**	0.045**	0.033*	0.040**
General Internet use	0.153***			0.152***		0.115***	
Specific Internet use		0.116***			0.095***		0.074**
Broadband Internet penetration						0.018	0.029*
R^2	0.023	0.013	0.026	0.042	0.034	0.029	0.020

Coefficients are standardized Beta. ***p<0.001, **p<0.01, *p<0.05

Table 9. Regression analysis. Dependent variable: energy saving behaviour

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Age			0.105***	0.138***	0.115***	0.130***	0.114***	0.129***	0.109***
Gender			-0.061***	-0.061***	-0.061***	-0.056**	-0.056**	-0.062***	-0.062***
Education			0.041**	0.020	0.034**	-0.004	0.006	-0.003	0.008
Community			0.043**	0.040**	0.043**	0.036**	0.037**	0.028*	0.031*
General Internet use	-0.004			0.077***		0.046**		0.050**	
Specific Internet use		0.001			0.037*		0.014		0.014
Environmental attitudes						0.134***	0.138***	0.148***	0.153***
Broadband Internet penetration								-0.033*	-0.028*
R^2	0.001	0.001	0.016	0.020	0.017	0.037	0.036	0.042	0.040

Coefficients are standardized Beta. ***p<0.001, **p<0.01, *p<0.050

Table 10. Regression analysis. Dependent variable: environmental consumption behaviour

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age			-0.018	-0.051***	0.014	0.038**	0.011	0.014	-0.015
Gender			-0.081***	-0.081***	-0.082***	-0.073***	-0.074***	-0.062***	-0.062***
Education			0.148***	0.106***	0.127***	0.074***	0.089***	0.086***	0.102***
Community			-0.057***	-0.063***	-0.055***	-0.065***	-0.060***	-0.053***	-0.058***
General Internet use	0.148***			0.161***		0.118***		0.084***	
Specific Internet use		0.121***			0.113***		0.085***		0.080***
Environmental attitudes						0.224***	0.230***	0.225***	0.231***
Broadband Internet penetration								0.102***	0.109***
R^2	0.022	0.015	0.030	0.048	0.041	0.091	0.089	0.093	0.090

Coefficients are standardized Beta. ***p<0.001; **p<0.01, *p<0.05

Table 11. Regression analysis. Dependent variable: traveling behaviour

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age			-0.025*	-0.007	-0.016	-0.019	-0.022	-0.022	-0.025*
Gender			0.022*	0.022*	0.022*	0.027*	0.027*	0.036*	0.036**
Education			0.057***	0.045***	0.051***	0.028*	0.029*	0.025	0.027*
Community			-0.023*	-0.025*	-0.023*	-0.027*	-0.027*	-0.024*	-0.023*
General Internet use	0.068***			0.043**		0.014		0.009	
Specific Internet use		0.061***			0.031**		0.009		0.009
Environmental attitudes						0.120***	0.120***	0.135***	0.135***
Broadband Internet penetration								0.003	0.004
R^2	0.004	0.004	0.005	0.006	0.006	0.018	0.018	0.021	0.021

Coefficients are standardized Beta. ***p<0.001; **p<0.01; *p<0.05

A general observation is that through the used variables only a small amount of the variance of the dependent variables could be explained. In the first two models of the regression analyses the singular impact of the general, respectively specific Internet use was tested on the considered environmental variables. Results are quite consistent: no matter we consider the general or the specific Internet use there is a positive, statistically significant linkage between Internet use and perceived environmental information, attitudes and behaviours, except the energy saving behaviour. The Beta coefficients are somewhat stronger in the case of the general Internet use than in the case of the specific Internet use. This situation, which at the first sight appears as strange, at least from the perspective of the literature which explains the role of specific Internet usage on specific

attitudes and behaviours (e.g. Shah et al., 2001), seems to illustrate the fact that there is an implicit relation between Internet use and environmental concern, that is rather surfing the Net opens the minds towards environmental concern than specific Internet use. Differently put, the environmental concern seems to be a side effect of the general Internet use and not necessarily the focused effect of the specific use of the Internet for environmental information. All in all, these results are in concordance with those signalled by Good (2006) who also could not demonstrate the clear impact of the specific Internet use on environmental concern in the case of the general public in the USA.

Another issue which can be deduced from the strength of the Beta coefficients is that in the case of the considered three types of behaviours the Internet use exercises the strongest impact on the variable regarding environmentally significant consumption. From here appears that the role of the Internet seems to be crucial in the case of those environmental behaviours which imply the knowledge or information or the so called enlightenment (cf. Gelissen, 2007) factor, while the impact of the Internet usage is less or no significant in the case of those behaviour clusters which are much more explainable on the basis of economical constraints, i.e. energy saving and sustainable travelling. This finding is further accentuated by the following models of the regression analyses which indicate that the energy saving behaviour is a choice of the older, less educated people from those countries where Internet penetration is lower. The same can be said about the travelling behaviour as well, which based on the results seems to be the option of the less educated younger citizens of the region. On the contrary, environmental consumption seems to be performed by the well-educated, not necessary young, but more urbanite Internet users, who reside in those countries of the region where the broadband Internet penetration is greater.

Based on the analyses would be incorrect to conclude that energy saving and environmentally travelling are not based on environmental consciousness as far as the strongest predictor variable of these behaviours is the environmental attitude of the respondents. This issue signals , on the one hand, that the environmental belief system of the respondents is coherent, but might be interpreted also in terms of socially desirable responding, that is respondents who rate better on the attitudinal dimension might declared themselves pro-environmentalist also in terms of their behaviour.

Turning back to the impact of the Internet usage, seems legitimate to talk about a differentiated effect of the Internet use on environmental concern, both in terms of an existing split between the role of the general ad specific Internet use, both in terms of the role of these Internet usages on the considered variables. Firstly, our results indicate that the general, more or less regular use of the Internet is a much stronger predictor of the environmental concern than the specific use of the Internet, secondly, the analyses signal that once socio-demographical variables, respectively the country-level variable of Internet penetration are controlled, the impact of the Internet becomes more context-specific: both kinds of Net uses exercise a significant impact on perceived environmental information; both kinds of Internet uses are significant predictors of environmental attitudes, no matter which are the country backgrounds in terms of Internet penetration; the personal usage of the Internet is particularly significant in the case of the

consumption behaviour and should be considered especially in the case of the citizens of those countries where Internet penetration is higher.

Our results suggest that in the majority of the cases, Internet use is an important explanatory variable of the environmental concern and thus it can make a difference between individuals, even after controlling for socio-demographics. Moreover, the impact of the Internet use on environmental concern should be considered in its wider context as well, which is the technological flux available throughout the region in terms of broadband Internet penetration.

Conclusions

The above findings added some evidence both to the comparative situation of the environmental concern in the case of the old and post-communist member states of the EU, and both added some data regarding the role of the Internet in enhancing people's environmental concern in the case of the post-communist countries of the EU.

As data signal, nearly two decades after the regime change citizens of the formerly communist countries of the EU still appear significantly less concerned towards the environment than their counterparts from the old member states. Similarities emerge in the case of the item regarding the judgement of the importance for the individual of the environmental protection. This finding is in line with previous data (e.g., Lee and Norris, 2000; Nistor, 2009) and confirms the paradigmatic shift explanation of the environmental concern (Dunlap et al., 1993) which assesses that all over the world citizens tend to value the environment.

Although the majority of the considered environmental behaviours are performed by significantly more individuals in the old members states – and there is also a significant difference between the average number of environmentally friendly behaviours performed by citizens of the old and new member states – the structure of the environmentally friendly behaviours spectrum is similar: in both country groups three major types of environmental behaviours hold together: environmentally significant consumption, energy saving behaviour and environmentally friendly travelling.

Results of the regression analysis undertook on the level of the post-communist member states group signalled that while environmentally friendly consumption is typically performed by an 'elite' public – i.e. citizens who are well educated, and for whom the information factor plays a significant role, respectively who reside in those countries of the new member states which are more connected to the Internet – the two other types of environmental behaviours are much more constraint-based and are performed by citizens who are not necessary well educated, for whom the Internet usage does not seem to significantly influence the performing of these behaviours and who does not reside in those countries which are the most connected to the Net.

All in all, data indicated that Internet use – no matter we talk about the general Internet usage understood as a more or less regular use of the Internet, or about the specific Internet use for environmental information seeking – has a quite strong, significant impact on the considered dependent variables, except the energy saving and

the environmentally travelling behaviours. Even after controlling for socio-demographical variables (and environmental attitudes in the case of the consumption behaviour) citizens who are especially general Internet users are significantly more committed in terms of environmental concern. The impact of the Internet usage seems to be status-explicit rather than status-implicit: Internet usage can differentiate the environmentally concerned citizens even among the well-educated public.

An important finding of the analysis refers to the fact that not necessarily specific Internet use, but more or less regular Internet use enhances environmentalism: seems that surfing the Net can provide individuals with background knowledge in order to declare themselves more informed about or more committed for the environment.

This issue however should be further investigated as far as the rating of the Internet as a top source of gaining information about environmental issues does not constitute a specific Internet use, it is much more a proxy variable for that. Thus, surveys designed to tap specific uses of the Net for environmental purposes (e.g. what kinds of websites do citizens visit, what do they do environmental activism on the Net, etc.) are welcome and only such kind of analysis can elucidate the impact of the specific Internet use on environmental concern. Moreover, singular country-level analyses are also needed to elucidate about inter-country differences.

Other limitations of the present study should also be considered. Among these is for instance the fact that socially desirable, or differently put, environmentally desirable responding (Ewert and Baker, 2001) might be a side-effect of the Internet usage which in this case may be considered as an important bias factor.

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Appendix 1

The original wording of the dependent variables used in the analyses

Q1
In general, how informed do you feel about environmental issues?
Very well informed
Fairly well informed
Fairly badly informed
Very badly informed
DK

Q2
How important is protecting the environment to you personally?
Very important
Fairly important
Not very important
Not at all important
DK

Q3
As an individual you can play a role in protecting the environment (in our country).
Totally agree
Tend to agree
Tend to disagree
Totally disagree
DK

Q4
Please tell me whether you totally agree, tend to agree, tend to disagree or totally disagree
with the following statement: You are ready to buy environmentally friendly products even if they cost a little bit more.
Totally agree
Tend to agree
Tend to disagree
Totally disagree
DK

Q5

Have you done any of the following during the past month for environmental reasons?

Choosen an environmentally friendly way of travelling (by foot, bycicle, ublic transport)

Reduced the consumption of disposable items (for example plastic bags, certain kind of packaging, etc.)

Separated most of your waste for recycling

Cut down your water consumption (for example not leaving water running when washing the dishes, or taking a shower, etc.)

Cut down your energy consumption (for example turning down air conditioning or heating, not leaving appliances on stand-by, buying energy saving light bulbs, buying energy efficient appliances, etc.)

Bought environmentally friendly products marked with an environmental label

Chosen locally produced products or groceries

Used my car less

Other (spontaneous)

Appendix 2.1

The original wording of the question reagrding general Internet use

Q6

During the last month did you used the Internet?

Yes, at home

Yes, at work

Yes, at school, university, or other study centre

Yes, at other place (Internet cafe, etc.)

No, I did not use the Internet in the last month

No, I do not use the Internet

DK

Appendix 2.2

The original wording of the question regarding specific Internet use

Q7

From the following list, which are your three main sources of information about the environment?

Newspapers

Magazines

Television news

The radio
Films and documentaries on television
Conversations with relatives\ family\ friends\ neighbours\ colleagues
Books
The Internet
Publications\ brochures\ information and material
Events (conferences, fairs\ exhibitions, festivals, etc.)
You are not interested in the environment
Spontaneous(other)
DK

Appendix 3

The factor analysis of the three items measuring environmental attitudes in the case of the post-communist member states of the EU

	Component 1
The personal importance of environmental protection (Q2)	0.712
Individuals can play a role in protecting the environment (Q3)	0.681
Would buy environmentally friendly products (Q4)	0.722
% of variance	50%
KMO=0.606; Bartlett test of sphericity: Chi-square=1541.668; p<0.001	

Principal axis factoring.

Appendix 4

Broadband penetration rates in the ten post-communist member states of the EU in 2008

(Data were delivered from Eurostat:
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsiir150&plugin=1)

The broadband penetration rate describes the number of dedicated, high-speed connections per 100 inhabitants. This indicator shows how widely broadband access to the internet has spread in the countries on the general level, not specifying by user group. Broadband lines are defined as those with a capacity equal or higher than 144

Kbits/s. Various technologies are covered; ADSL, cable modem as well as other types of access lines.

	Broadband penetration rate (2008)
Bulgaria	9.5
Czech Republic	15.8
Estonia	23.6
Hungary	15.7
Latvia	16.3
Lithuania	16.1
Poland	9.6
Romania	10.7
Slovakia	9.6
Slovenia	19.1

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