

IMPACT OF DEMOGRAPHIC FACTORS ON ENVIRONMENTALLY CONSCIOUS PURCHASE BEHAVIOR

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Summary

Over the last years, a number of papers have been published on the topic of the influence of different factors on the environmentally conscious behavior of consumers. It can be noted that interest in the influence of demographic factors on this type of behavior in these papers is diminishing. However, the published papers did not provide a unique answer on this topic. The goal of this paper is to examine the correlation between demographic factors and environmentally conscious purchase behavior using the method of meta-analysis and CMA software. In line with this statistical method, studies that examined the influence of demographic factors on environmentally conscious purchase behavior have been taken into account. Among these, only the studies that published Pearson correlation coefficient have been selected. This way, it was possible to aggregate the samples of these studies and to repeat the testing of the hypothesis that demographic factors influence the environmentally conscious purchase behavior. Results of this analysis provide some proof of this correlation, but also call for an expanded research to deal with this topic in more details.

Key words: *demographic factors, environmentally consumers behavior, meta-analysis.*

JEL: *M31, Q01, Q50*

Introduction

The issue of sustainability is related to the preservation of natural resources and the environment today so that future generations will be able to meet their needs (WCED, 1986). Since the 60s of last century environmental disasters are becoming more frequent and since then arise awareness among people that the development has its limits (Ekins, 1992). Some of the problems are air pollution, soil degradation, water pollution (Marinković

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et al., 2014). To solve these problems started development of new technologies, changes in production processes, changes in strategies, modification of products and services (Kotler, 2011). Also, new international and national legislations was introduced (e.g. WCED, 1986) as well as various programs and ways to support sustainable development (e.g. Nikolić et al., 2017). The contribution of the theory lies in the development of scientific disciplines such as green marketing which “consists of all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants, such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment” (Polonsky, 1994).

In making purchasing decisions, consumers take into account the effect of this purchasing on the environment (Kilbourne, 1998). Research of the European Commission (Eurobarometer), conducted in 2012, found that 80% of citizens of the European Union takes into account the effects on the environment caused by products they buy, while a quarter buys green products (Euractiv, 2013). In the USA, sales of organic food and beverages have grown from 1 billion USD in 1990 to 24.8 billion USD in 2009 and within the organic food consumption market, organic condiments have shown the strongest overall growth: 17% in sales to account for 930 million USD of the industry’s sales (Brandongaille, 2015). Conducted survey in Serbia toward purchasing of organic food brought finding that 45.3% of respondents occasionally purchase while 13.8% of respondents are regular consumers (Vehapi, Dolićanin, 2016).

Environmentally conscious, green consumers, are buying products that come from the production processes which are not harmful to the environment, such as an organic food production, do not contain toxic substances nor substances which damage the ozone, are manufactured from recycled materials, can be recycled (Ward, 2017). For companies, these consumers are a chance for increasing its market share through production and sales of products and services that are environmentally friendly (Schlegelmilch et al., 1996).

The Greens are also interesting to scholars, and a large number of studies have been directed to study the behavior of consumers who are environmentally conscious (Webster, 1975; Van Liere, Dunlap, 1981; Straughan, Roberts, 1999; Kim, Choi, 2005). However, Diamantopoulos et al. (2003) noted that in recent years a small number scientific studies take into account or reports on demographic factors. Considering that the demographic data are collecting during each survey, this is a very interesting fact. Also, when companies are doing market research for their own purposes they always include these factors and take them into account in the analysis (Diamantopoulos et al., 2003; McDonald, Dunbar, 1998).

Based on all of the foregoing, it is interesting to examine whether there is a correlation between demographic factors and the environmentally conscious consumer behavior. One of the ways that we can come up with an answer to this question is that we start from the published papers on this topic, use reported results and use meta-analysis to re-test the hypothesis and examine whether there is a correlation between demographic factors and environmentally conscious consumer behavior or not.

Literature review

Environmentally conscious consumers are also known as green and ethical consumers (Chan, 2001). These consumers in buying process are “consistently seek product or company information and attempt to integrate a variety of environmental and or societal influences with their buying behavior” (McEachern, McClean, 2002).

Many studies have investigated and found a connection between demographic factors and environmentally conscious consumer behavior (Webster, 1975; Straughan, Roberts, 1999; Mostafa, 2007; Florenthal, Arling, 2011). However, McEachern and McClean (2002) argued that despite the increased papers on this topic they are relatively under-researched. This is supported by the fact that the results of these studies are not consistent and the differences can obtain because of a variety of ways and methods used in research, a variety of the number of subjects, the differences between cultures, economies. Among demographic factors, most often examined are age, gender and level of education (Webster, 1975; Straughan, Roberts, 1999; Diamantopoulos et al., 2003).

Age as an independent variable was the subject of research in many studies (Abruthnot, Lingg, 1975; Ostman, Parker, 1987; Straughan, Roberts, 1999; Diamantopoulos et al., 2003). There is a general belief that younger people are more sensitive to environmental issues and therefore more likely is that they will be environmentally conscious consumers and will have positive attitudes about environmentally conscious behavior in consumption. This belief has been confirmed in some papers (Weigel, 1977; Diamantopoulos et al., 2003) while others came to the opposite conclusion (Roberts, Straughan, 1999). Also, there are studies which concluded that there is no correlation between age and environmentally conscious behavior (Ostman, Parker, 1987; Van Lier, Dunlap, 1981).

Hence, one cannot say with certainty that there is a positive or negative correlation between age and the ecologically conscious consumer behavior, nor that this correlation does not exist. For this reason, it is interesting to examine this correlation.

When it comes to education, the belief is that people with higher education are more likely to behave in an environmentally conscious manner. Some studies have confirmed positive correlations (Weigel, 1977; Ostman, Parker, 1987) while some reported that there is no significant correlation between education and green purchase behavior (Diamantopoulos et al., 2003). Therefore, on this subject, there is no unambiguous conclusion. Considering that this is another demographic factor that should be examined.

Many studies have confirmed that women are more environmentally conscious buyers compared to men and have a higher level of awareness and positive attitudes when it comes to environmental issues (Webster, 1975; Bloceker, Lee, 1997; Roberts, Straughan, 1999; Florenthal, Arling, 2011). Only Mostafa (2007) has come to opposite conclusion which is explained by cultural differences of the country where the research was conducted.

Common for all studies is the difference in samples (number of subjects, cultural differences, social differences), in used methods but also the fact that each considers different factors.

The goal of this paper is to try to overcome previously mentioned issues and to examine the influence of demographic factors on the environmentally conscious consumer behavior.

Method of research

Meta-analysis is a research technique that is often used in behavioral sciences, but there is almost no area of science which cannot be applied (Morris, 2008). It is based on the analysis of the results obtained during the previous research, according to obtained results brings a conclusion on the admissibility previous findings (Bartolucci, 2009).

To get to the data that will be analyzed, a few steps need to be done. It is necessary to choose the scientific field which papers belong, to choose the criteria for selection of scientific papers. After that then it is necessary to choose reported indicator or reported result which will be further analyzed (Glass, 1976; Ilić, 2009).

The first step in this research was the selection of published scientific papers based on the subject of their research. For this purpose, we used a web browser and e-library (Kobson) and combinations of words environmentally conscious consumer, environmentally purchase, and green consumers. From results, we were selecting the published papers.

The second step we selected only papers that examined the correlation between demographic factors and environmentally consumers. The further step included a selection of those papers which reported, as a result, Pearson's correlation coefficient to have comparable results.

For data processing software Comprehensive meta-analysis (CMA) is used.

In line with correlation coefficient, selected papers examined the correlation between demographic factors, as follows age, education, and gender, as the independent variable and environmentally conscious consumer behavior (Lovrić, 2009):

$$H_0: \rho = 0$$

Since this is the method of meta-analysis heterogeneity have to be taken into account, or there is no heterogeneity (Bartolucci, 2009):

$$H_0: Q = 0$$

Where Q has a chi-square distribution and is determined depending on a critical value of a certain degree of freedom and $p > 0.05$ (NIST SEMATECH, 2017).

Results

Diamantopoulos et al. (2003) and Weigel (1977) reported a negative correlation between age and the environmentally conscious consumer behavior while Roberts and Straughan (1999) and Ostman and Parker (1987) had the opposite conclusion. The results of these studies are presented in Table 1. The results of the meta-analysis are given in Table 2.

Table 1. The studies used for the analysis: age as independent variable

Study	Correlation	n
Weigel (1977)	-0.24	44
Ostman, Parker (1987)	0.03	329
Roberts, Straughan (1999)	0.16	235
Diamantopoulos et al. (2003)	-0.28	1,627

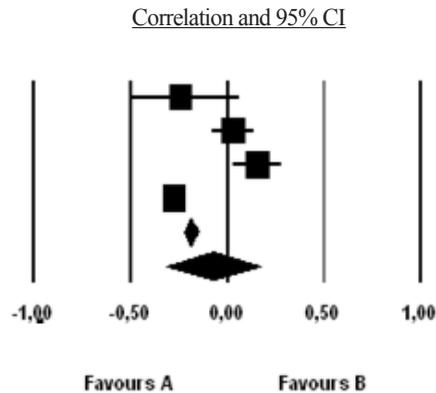
Source: Author’s computation, studies listed in table

Table 2. The results of the meta-analysis: age as independent variable

Model	Study name Correlation	Statistics for each study					
		Lower limit	Upper limit	Z-Value	p-Value		
	Weigel (1977)	-0.240	-0.501	0.061	-1.567	0.117	
	Ostman, Parker (1987)	0.030	-0.078	0.138	0.542	0.588	
	Roberts, Straughan (1999)	0.157	0.030	0.279	2.411	0.016	
	Diamantopoulos et al. (2003)	-0.275	-0.319	-0.229	-11.375	0.000	
Fixed		-0.188	-0.227	-0.147	-8.949	0.000	
Random		-0.077	-0.314	0.169	-0.610	0.542	
Heterogeneity and Tau-squared							
Fixed	Q-value	df(Q)	I-squared	Tau Squared	St. Error	Variance	Tau
	57.874	3	94.816	0.057	0.060	0.004	0.239

Source: Authors’ computation, CMA software

Figure 1. Forest plot for the results of the meta-analysis (age as independent variable)



Source: CMA software

Since the result is $Q=57.874$ (for $p < 0.05$ and $df=3$, $Q=7.815$) we reject the null hypothesis because there is a statistically significant difference among studies. The obtained sample is heterogeneous. This is indicated and by I-squared (I^2), which means that 94.816% is the level of heterogeneity. If we consider a fixed model, we can see that the correlation is negative and weak ($r = -0.188$) but statistically significant ($p < 0.05$).

All studies that have examined the correlation of education (as independent variables) and environmentally conscious behavior reported a positive correlation as a result. They are presented in Table 3. The results of the meta-analysis are given in Table 4.

Table 3. The studies used for the analysis: education as independent variable

Study	Correlation	n
Webster (1975)	0.01	231
Weigel (1977)	0.42	44
Ostman, Parker (1987)	0.20	327
Cerjak et al. (2010)	0.14	600

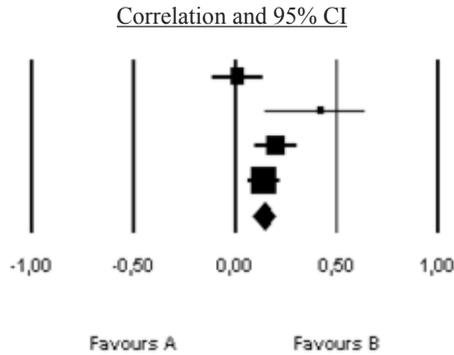
Source: Author’s computation, studies listed in table

Table 4. The results of the meta-analysis: education as independent variable

Model	Study name Correlation	Statistics for each study					
		Lower limit	Upper limit	Z-Value	p-Value		
	Webster (1975)	0.010	-0.119	0.139	0.151	0.880	
	Weigel (1977)	0.420	0.141	0.637	2.867	0.004	
	Ostman, Parker (1987)	0.200	0.094	0.302	3.649	0.000	
	Cerjak et al. (2010)	0.140	0.061	0.218	3.443	0.001	
Fixed		0.142	0.086	0.197	4.941	0.000	
Random		0.154	0.044	0.261	2.725	0.006	
Heterogeneity and Tau-squared							
Fixed	Q-value	df(Q)	I-squared	Tau Squared	St. Error	Variance	Tau
	8.998	3	66.659	0.008	0.011	0.000	0.089

Source: Authors’ computation, CMA software

Figure 2. Forest plot for the results of the meta-analysis (education as independent variable)



Source: CMA software

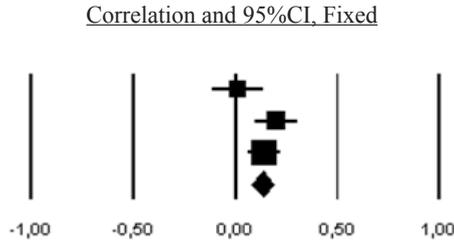
The result is $Q=8.998$ (for $p < 0.05$ and $df=3$, $Q=7.815$). However, if we see Figure 2 we will see that one study differs. Weigel (1977) has reported higher result than others ($r=0.42$) but study has no great significance ($n = 44$), therefore calculations will be repeated without it. The results of this analysis are given in Table 5, for clarification results are additional named as the second step.

Table 5. The results of the meta-analysis: education as independent variable, second step

Model	Study name Correlation	Statistics for each study					
		Lower limit	Upper limit	Z-Value	p-Value		
	Webster (1975)	0.010	-0.119	0.139	0.151	0.880	
	Ostman, Parker (1987)	0.200	0.094	0.302	3.649	0.000	
	Cerjak et al.(2010)	0.140	0.061	0.218	3.443	0.001	
Fixed		0.132	0.074	0.188	4.487	0.000	
Random		0.124	0.029	0.218	2.541	0.011	
Heterogeneity and Tau-squared							
Fixed	Q-value	df(Q)	I-squared	Tau Squared	St. Error	Variance	Tau
	5.062	2	60.489	0.004	0.007	0.000	0.066

Source: Authors' computation, CMA software

Figure 3. Forest plot for the results of the meta-analysis (education as independent variable) second step



Source: CMA software

The result is $Q=5.062$ (for $p < 0.05$ and $df=2$, $Q=5.991$) and we can say we have homogeneity. The correlation between education and environmental behavior exist, it is very weak ($r = 0.13$) and statistically significant ($p < 0.05$).

A list of studies that have been taken into account for examination of the correlation of gender (as independent variables) and environmentally conscious behavior as well as reported results are given in Table 6. In all cases result are related to female. In all cases, scholars have come to the results which indicate that women as consumers are more environmentally conscious compared to men. The results of the meta-analysis are given in Table 7.

Table 6. The results of the meta-analysis: gender as independent variable

Study	Correlation	n
Webster (1975)	0.01	231
Bloceker, Lee (1997)	0.13	1,557
Roberts, Straughan (1999)	0.14	235
Florenthal, Arling (2011)	0.10	101

Source: Author’s computation, studies listed in table

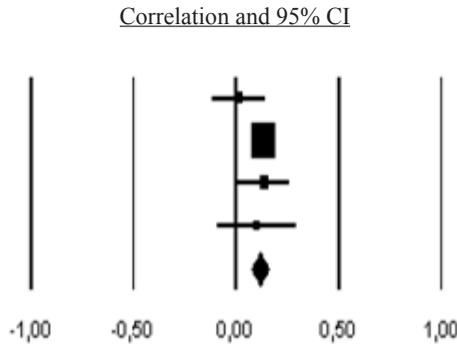
Table 7. The results of the meta-analysis: gender as independent variable

Model	Study name	Statistics for each study				
		Correlation	Lower limit	Upper limit	Z-Value	p-Value
	Webster (1975)	0.011	-0.118	0.140	0.166	0,868
	Bloceker, Lee (1997)	0.130	0.081	0.179	5.154	0,000
	Roberts, Straughan (1999)	0.136	0.008	0.259	2.084	0,037
	Florenthal, Arling (2011)	0.100	-0.097	0.290	0.993	0,321
Fixed		0.117	0.074	0.158	5,380	0,000
Random		0,117	0.074	0.158	5.380	0.000
Heterogeneity and Tau-squared						

Fixed	Q-value	df(Q)	I-squared	Tau Squared	St. Error	Variance	Tau
	2.974	3	0.000	0.000	0.003	0.000	0.000

Source: Authors' computation, CMA software

Figure 4. Forest plot for the results of the meta-analysis (education as independent variable)



Source: CMA software

The results $Q=2.974$ (for $p < 0.05$ and $df=3$, $Q=7.815$) means that homogeneity is confirmed. The correlation between the gender (female) and the environmentally behavior exist, it is a very weak ($r = 0.12$) and statistically significant ($p < 0.05$).

Discussion of results

At the beginning this study we started from the question whether there is a correlation between demographic factors and the environmentally conscious consumer behavior. The results obtained in this paper, based on studies that were used, indicate that we need to be careful with generalizing conclusions.

In a case of age, first of all, the result is heterogeneity. Results obtained indicate the very high level of heterogeneity (94.816%) and suggested that samples from primary studies are very different. Based on the obtained results we cannot confirm the existence of negative correlation (as a result from the fixed model: $r=-0.188$ at $p < 0.05$) between age and environmentally consumer behavior.

Analysis of correlation between education and environmentally consumer behavior pointed out the importance of selected studies. In the second step, when one study was excluded from the analysis, we came to a homogeneous sample. On the possibility of such cases indicates the literature on meta-analysis (Bartolucci, 2009). The obtained results suggest that there is a weak positive correlation (as a result from the fixed model: $r=0.132$ at $p < 0.05$) between education and environmentally consumer behavior. To the same conclusion came Webster (1975), Ostman, Parker (1987) and Cerjak et al. (2010).

In a case of correlation between gender (female) and environmentally consumer behavior we obtain result that there is positive correlation (as a result from fixed model: $r=0.117$ at $p < 0.05$) and to the same conclusion came Webster (1975), Bloecker, Lee (1997), Roberts, Straughan (1999) and Florenthal, Arling (2011).

Conclusion

Based on the results of this paper research, we can say that the correlation between some demographic factors and environmentally friendly consumer behavior exist but also that we need to be careful with generalizing conclusions. The advantages of this research are that the samples can be integrated and hypotheses that are tested in primary studies repeated. However, we should not ignore the limitations of the method used as well as limitations came from primary studies concerning the number of participants, used method and other specifics.

The following limitations of this study refer to the method of selection. It is possible that because of the used database or a combination of the words some studies have not been taken into account. Same refers to the selected indicator.

The obtained results indicate the need for further and comprehensive as well as well-structured research of correlation and the impact of demographic factors on the environmentally conscious consumer behavior. However, the information obtained from this paper can certainly be a starting point for future research and useful for business based on the principles of sustainable development.

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UTICAJ DEMOGRAFSKIH FAKTORA NA EKOLOŠKI SVESNO PONAŠANJE POTROŠAČA

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Rezime

Poslednjih godina, veliki je broj objavljenih radova na temu uticaja različitih faktora na ekološki svesno ponašanje potrošača. Ono što se može primetiti jeste da se sve manje ispituje uticaj demografskih faktora na ovo ponašanje. Do sada objavljeni radovi ne daju jedinstven odgovor po ovom pitanju i radi toga cilj ovog rada jeste da ispita korelaciju između demografskih faktora i ekološki svesnog ponašanja potrošača koristeći metod meta-analize i CMA program. U skladu sa ovom statističkom metodom, odabrane su studije koje su ispitivale uticaj demografskih faktora na ekološki svesno ponašanje potrošača. Među njima su odabrane one u kojima je kao rezultat objavljen Pirsonov koeficijent korelacije. Na ovaj način omogućeno je da se objedine uzorci iz prethodnih istraživanja i da se ponovi testiranje hipoteza o uticaju demografskih faktora na ekološki svesno ponašanje potrošača. Rezultati istraživanja ukazuju da ove korelacije postoje ali i da je potrebno opsežnije istraživanje koje bi obradilo ovu problematiku.

Ključne reči: demografski faktori, ekološki svesno ponašanje potrošača, meta-analiza

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