Environmental Impact of Application on the Concept of Corporate Social Responsibility in Selected EU Countries

Środowiskowe konsekwencje wprowadzania koncepcji Odpowiedzialności Społecznej Biznesu w wybranych krajach UE

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Abstract
By now, does not suffice to evaluate companies only from an economic point of view, but it is necessary to look at the business and the social and environmental context. Environmental degradation and depletion of natural resources is also reflected in the growth of interest in the area of environmental and social research in the industry. This fact highlights the concept of corporate social responsibility (CSR), according to which the environmental area, the concept of the same weight as economic and social level. The environmental consequences of the company are in advanced economies communicated not only with experts but becomes of interest to the whole society and an integral part of evaluating the success of socio-economic development.The study aims to quantitatively analyse and confirm the existence of a direct and indirect dependence on the number of businesses in individual EU countries to voluntarily implement environmental concepts of social responsibility in the form of environmental management and audit, EMAS. The object of quantitative analysis are selected EU countries.

Key words: Corporate Social Responsibility, company, environmental area, waste

Streszczenie
Obecnie nie wystarcza oparcie oceny danej firmy tylko na płaszczyźnie ekonomicznej. Konieczne jest rozpatrywanie biznesu także z perspektyw społecznej i środowiskowej. Degradacja środowiska i kurczące się zasoby surowców naturalnych także przyczynia się do uwzględniania kwestii środowiskowych i społecznych w przemyśle. To także podłoże koncepcji Społecznej Odpowiedzialności Biznesu, według której obszar środowiskowy ma takie samo znaczenie jak ekonomiczny i społeczny. Dyskusja środowiskowych konsekwencji działania danej firmy w ramach zaawansowanej ekonomii odzwierciedla się nie tylko w stanowisku wyrażanym przez ekspertów, ale staje się przedmiotem zainteresowania całego społeczeństwa i integralną częścią oceny rozwoju społeczno-ekonomicznego. Celem niniejszej pracy jest analiza ilościowa i potwierdzenie istnienia bezpośredniej i pośredniej zależności ilości firm w poszczególnych krajach UE od dobrowolnie wprowadzanych idei środowiskowych i społecznej odpowiedzialności w formie zarządzania środowiskowego, audytów i EMAS. Przedmiotem analizy jakościowej są wybrane kraje UE.

Słowa kluczowe: Społeczna Odpowiedzialność Biznesu, firma, obszar środowiskowy, odpady

Introduction

Several countries already seriously deal with the issue of sustainable development from a macroeconomic aspect, and with issues of corporate social responsibility from a microeconomic aspect. Sustainable development refers to a way of economic growth which covers the needs of society by creating conditions of well-being in the short, medium, but especially in the long term. It relies on the assumption that development must meet today's needs without jeopardizing the possibilities of continued growth for future generations. On this theory is linked the definition of corporate social responsibility and procedures that replicate the basic concept of sustainable development, but on a closer, specific plane, created especially for organizations, companies as well as society, which decided to implement the concept of corporate responsibility and procedures in their strategic decisions. Carrol (2003) identified Howard Bowen as the founder of the theory of social responsibility, according to whom social responsibility is a commitment to strive for those policies, to make those decisions or execute those activities that are needed from the perspective of the objectives and values of our society. Current CSR definitions are encountered in in EU documents and from a historical perspective also undergone some changes. European Commission Green Paper (2001) defines Corporate Social Responsibility (hereinafter CSR) as a concept whereby companies voluntarily incorporate into their business operations and relations with stakeholders social and environmental aspects. A decade later considers corporate social responsibility as *the responsibility of enterprises for their impacts on society*, in order to maximize the creation of shared value for their owners / shareholders, their other stakeholders and society as a whole and to identify and mitigate possible adverse effects or avoid them (Renewed EU strategy for corporate social responsibility, 2011, p. 6).

As part of our scientific studies, we focused mainly on the environmental plane, whereby we examined social responsibility as such. The study aims to quantitatively analyse and confirm the existence of a direct and indirect dependence on the number of businesses in individual EU countries to voluntarily implement environmental concepts of social responsibility in the form of environmental management and audit, EMAS. The object of quantitative analysis are selected EU countries. In line with the studies and formulating the research premise, the subject of research is defined, namely the correlation between the number of environmentally oriented companies and selected indicators in the field of the environment. In the analysis, we assumed that an increasing number of environmentally oriented businesses has positive effects on the selected indicators in the environment and is thus not just a formality. We also assume that the introduction of the concept of environmental

management is rather the domain of large companies and those companies with a significant impact on the environment.

Theoretical background to the issue

At present, corporate social responsibility is considered a tool that pushes the country towards sustainable development, linking its economic development with social inclusion, environmental capacity and institutional quality. Currently, increased attention for creating conditions for corporate social responsibility is being paid not only on the level of individual companies, but also at the level of entire countries.

The activities of any enterprise, organization and society as a whole are, in the terms of the researched concepts, considered in three lines, namely the economic line (Profit), environmental line (Planet) and social line (People), i.e. the so-called Triple Bottom Line, respectively, 3P (Hroncová Vicianová, 2014), whereby the individual lines of approach should be balanced. In addition to, the individual lines appear in the definitions the other aspects. Dahlsrud (2008) by examining the 37 definitions of CSR has defined five basic aspects, which are definitions occurred mainly: economic area (the 86% definitions), social area (88%), and environmental area (59%), stakeholders (88%) and voluntary (80%). Environmental area under the abovementioned statistics smallest representation due to the fact that this area started in the definitions mention only since 1999, when the so-called defined. environmental responsibility, which covers the environmental dimension CSR as part of CSR.

Before that CSR is defined as the notion that corporations have an obligation to constituent groups in society other than stockholders and beyond that prescribed by law or union contract, indicating that a stake may go beyond mere ownership (Jones, 1980) and is concerned with treating the stakeholders of the firm ethically or in a socially responsible manner. Stakeholders exist both within a firm and outside. Consequently, behaving socially responsibly will increase the human development of stakeholders both within and outside the corporation (Hopkins, 1998). The current definition in general, corporate sustainability and CSR refer to company activities – voluntary by definition – demonstrating the inclusion of social and environmental concerns in business operations and in interactions with stakeholders (Marrewijk, 2003).

Responsible behaviour and entrepreneurship in the economic field is monitoring and improving the processes that contribute to the development of the economic environment, and seeks to minimize any potential adverse effects of activities in this area. In the social field, it is monitoring and minimizing the negative effects of the activities of organizations and

companies on the social system in which they operate. In the environmental field, it is monitoring and reducing the negative impacts of organizations and companies on the environment. The most important are: recycling, the use of ecological products, compliance with ISO 14000 and EMAS standards, protection of natural resources, use of alternative energy sources, etc. (Trnková, 2004). The environmental field is underpinned by the international standard ISO 14001, which permits the implementation of the environmental management system (EMS). In Slovakia, it takes the form of STN EN ISO 14001: 2005. The EMS model has five main areas: environmental policy, planning, implementation and operation, inspection, and management review. EMAS III (Eco-Management and Audit Scheme) is a system utility of a community to protect the environment and promote sustainable development, it is an active approach to monitoring and progressively reducing the impact of its activities on the environment. The costs of implementing environmental management, however, are one of the most significant barriers to their implementation. However, some environmental measures have significant economic effects in the form of savings (Marková et al., 2015).

A number of EU strategic documents concerning the environment point to the transition of countries to a green economy (Jeck, 2012). In a green economy, many challenges can be transformed into economic opportunities, not only reversing negative environmental trends, but to encourage the use of cost-effective tools to address environmental problems, thereby also becoming a source of investment. One possibility is a so-called Eco-business. The priority of an eco-business at all levels (individual, organizational, regional) are not only financial benefits, but above all environmental care and people´s health. Ecological initiative is one of the key elements which is dependent on active, innovative actions in an eco-market aimed at obtaining income throught satisfying social needs in ecologically friendly living conditions

Waste can also be a valuable resource, however, incorrect disposal entails many risks to the environment and to health. Proper waste management minimizes environmental impacts such as greenhouse gas emissions, promotes efficient use of resources and provides a new source of recycled materials. (The Ecoinnovation action plan, 2011). Environmental investment in actions that bring positive effects on the environment are thus an opportunity to be beneficial to both the business, organizations as well as for society as a whole. The set is also related to the fact, that increasing public environmental protection expenditure brings not only positive results for environment but has also positive impact on economy.

Research methodology

The study aims to quantitatively analyse and confirm the existence of a direct and indirect dependence on the number of businesses in individual EU countries to voluntarily implement environmental concepts of social responsibility in the form of environmental management and audit, EMAS. The object of quantitative analysis are selected EU countries.

The key methods of the scientific research are methods of classification analysis, comparison and abstraction in the development of theoretical and methodological framework for dealing with; methods of quantitative analysis using statistical methods of processing and evaluation of information and methods of synthesis and partial induction in drawing research conclusions.

In line with the studies and formulating the research premise, the subject of research is defined, namely the correlation between the number of environmentally oriented companies and selected indicators in the field of the environment. In the analysis, we assumed that an increasing number of environmentally oriented businesses has positive effects on the selected indicators in the environment and is thus not just a formality. We also assume that the introduction of the concept of environmental management is rather the domain of large companies and those companies with a significant impact on the environment. The number of these companies is identified as x - independent variable, and dependent variables as

x - indicator is the number of EMAS registered companies (Eco-Management and Audit Scheme). It is a voluntary environmental management system implemented by businesses and other organizations from all areas of economic activity.

y_1 - represents the development of basic indices of greenhouse gas emissions based on 1990 levels.

y_2 - represents the amount of sulphur dioxide produced by individual countries in tonnes.

y_3 - represents the amount of nitrogen oxide produced by individual countries in tonnes.

y_4 - expresses the volume of waste production for all economic activities NACE and households in tonnes in selected EU countries.

y_5 - represents the evolution of the volume of expenditure on environmental protection for the private and public sectors in terms of a % share of GDP.

The theoretical basis was the work of domestic and foreign authors (many mentioned in the theoretical background) who have dealt with the issue of corporate social responsibility and their selected concepts (Carrol, Schwartz, 2003; Carrol, Buchholtz, 2012; Dahlsrud, 2008; Hopkins, 1998; Jones, 1980; Maráková, Lament, Wolak-Tuzimek, 2015; Musová,

Table 1. Number of EMAS registered companies (Eco-Management and Audit Scheme), source: Eurostat, 2016

Country/year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Czech Republic	19	18	26	28	34	26	25	24	24	25
Germany	1,619	1,499	1,490	1,443	1,402	1,337	1,296	1,240	1,205	1,229
Spain	445	528	666	924	1,060	1,217	1,217	1,258	992	1,072
France	20	17	17	13	12	17	20	21	26	19
Italy	258	412	570	779	965	1,035	1,103	1,190	1,124	1,017
Hungary	1	2	8	14	18	21	20	20	22	23
Austria	253	261	257	252	259	255	261	249	254	249
Poland	0	1	6	10	12	20	20	26	36	45
Portugal	25	43	52	60	78	76	76	68	59	58
Finland	41	43	42	41	42	24	24	8	6	4
Sweden	118	100	84	71	75	75	75	76	57	19
United Kingdom	61	64	62	69	69	62	56	59	51	48

Table 2. Regression analysis of the correlation of the number of environmentally oriented companies and production of greenhouse gases (base index), source: author's own according to Eurostat, 2016

y1	coeff. R	reliability value	value P reg. co-eff.	value P lok. const.	reg. coefficient	lok. const.
Czech Republic	0.2769	0.0767	0.4386	0.0000151	-0.2706	77.56
Germany	0.7582	0.5749	0.0110	0.0000212	0.0152	56.28
Spain	0.8256	0.6816	0.0033	0.0000001	-0.0418	174.85
France	0.3595	0.1292	0.3076	0.0000016	-0.4843	103.39
Italy	0.8452	0.7144	0.0021	0.0000000	-0.0275	121.79
Hungary	0.9198	0.8461	0.0002	0.0000000	-0.8349	83.39
Austria	0.3214	0.1033	0.3651	0.9237608	0.4725	-12.39
Poland	0.6153	0.3785	0.0583	0.0000000	-0.0889	86.06
Portugal	0.6972	0.4860	0.0250	0.0000013	-0.5403	155.69
Finland	0.7501	0.5627	0.0125	0.0000000	0.4448	86.52
Sweden	0.8207	0.6736	0.0036	0.0000001	0.1971	72.19
United Kingdom	0.6597	0.4352	0.0379	0.0615712	0.7061	37.35
total	0.764	0.583	0.010	0.000	-0.01085	134.38

Table 3. Regression analysis of the correlation of the number of environmentally oriented companies and production of sulphur oxides in tonnes, source: author's own according to Eurostat, 2016

y2	coeff. R	reliability value	value P reg. coeff.	value P lok. const.	reg. coefficient	lok. const.
Czech Republic	0.3725	0.1388	0.2891	0.0026	-2,390.7434	228,982.51
Germany	0.8806	0.7755	0.0008	0.0123	195.9184	165,722.73
Spain	0.9015	0.8127	0.0004	0.0000	-1,207.6156	1,764,168.12
France	0.3633	0.1320	0.3021	0.0146	-9,220.9574	482,495.62
Italy	0.9526	0.9075	0.0000	0.0000	-289.0242	496,581.67
Hungary	0.9147	0.8367	0.0002	0.0000	-482.8131	40,720.61
Austria	0.2763	0.0763	0.4397	0.5717	283.5337	-52,440.39
Poland	0.8639	0.7463	0.0013	0.0000	-10,933.6205	1,210,982.72
Portugal	0.8157	0.6653	0.0040	0.0003	-2,636.3868	241,660.91
Finland	0.8569	0.7342	0.0015	0.0000	723.1595	43,822.01
Sweden	0.9276	0.8604	0.0001	0.0000	136.7435	20,269.43
United Kingdom	0.4588	0.2105	0.1822	0.8951	8,833.4595	-49,783.72
total	0.883	0.779	0.001	0.000	-1,815.16337	10,273,029.12

2013; Morgan, Ryu, Mirvis, 2009; Waddock, 2004, Wood, 1991, etc.), Sustainable Development (Pawlowski, 2008) and research studies which that examined the relationship between public spending on environmental protection and economic growth of the countries (Ada, 2014; Barman, Gupta, 2010).

The complexity of the object of study in the field of the world economy implies a high degree of abstraction in the research of a secondary nature. The secondary collection of information from available statistics of the regional databases of the Statistical Office and Eurostat databases is realized through constructive methods of scientific observation. The information obtained is processed and evaluated by means of statistical methods with emphasis on correlation regression analysis where:

For y dependent on x, the relationship is:

$$a = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2},$$

(1)

constant b is in the form:

$$b = \bar{y} - a\bar{x}$$

(2)

For x dependent on y, the relationship is:

$$a = \frac{\sum (y - \bar{y})(x - \bar{x})}{\sum (y - \bar{y})^2}, \qquad b = \bar{x} - a\bar{y}.$$

(3)

We made the selection according to the complexity of the data over the entire time period.

Results and discussion

The results of correlation and regression analysis were the inputs of assessment of the impact of corporate social responsibility in the environmental field in individual EU countries. As independent variables, we selected a number of EMAS registered companies (Eco-Management and Audit Scheme). It is a voluntary environmental management system implemented by businesses and other organizations from all areas of economic activity. The studied period is 10 years from 2005 to 2014. The largest number of registered firms were recorded for Germany, Spain and Italy, due to the size of their own economies (table 1).

In analyzing the impact of corporate social responsibility in the environmental field (table 2), we investigated the correlation of the number of environmentally oriented companies and greenhouse gases. For four countries studied, the relationship between these two variables could not be explained. The expected positive impact of the number of such companies was confirmed in only some countries. The strongest positive effect was observed in the case of Hungary, which was evidenced by a strong linear dependence with a value of the correlation coefficient of 0.919 and a high level of reliability of 0.84. The regression coefficient reached a desired negative

level - 0.8349. Relatively high values were also obtained in the case of Italy. Negative development occurred in the case of Portugal and Finland. However, in this case the value of the reliability reached a low value, which means that other factors have a significant impact on the development of the relevant indicator. The value of the common regression coefficient reached -0.01. The reliability value reached a low level (0.58), meaning other factors significantly influenced the development of the dependent variable. The regression line has the form $y_1 = - 0.0108 \, x + 134.38$.

The second researched area was the analysis of the dependence of the number of companies on the production of sulphur oxide (table 3). Again, there is no explanation for, in four countries, development of the dependent variable from the independent owing to the fact that the value of regression coefficients P reached values higher than 0.05. The countries with a significant positive impact on the production of sulphur oxide included Italy, Spain and Hungary. In these cases, a high correlation coefficient as well as the values of reliability, which ranged over 80% (the highest in the case of Italy - 90.7%) were demonstrated. The countries with negative effects include Germany, Finland and Sweden. The value of the common regression coefficient reached -1,815.16. The value of the reliability reached a relatively high level - 0.779, which means that the development of the dependent variable is influenced by other factors. The regression line has the form $y_1 = - 1,815.16 \, x + 10,273,029.12$.

In the case of the analysis of the dependence of the variable of the production of nitrogen oxide (table 4), the situation was similar. For the same four countries, we were unable to identify any correlation. The countries with a significant positive impact on the production of nitrogen oxide include again Italy, Spain and Hungary. The countries with a negative impact were again Germany, Finland and Sweden. In terms of the overall impact, a group of a strong linear relationship with relatively high reliability was identified (impact of other factors is also assumed). The value of the common regression coefficient reached -1,858.96 and the regression line has the form $y_3 = -1,858.96 \, x + 14,648,246.4$.

For the analysis of dependent variable on waste production (table 5) it was not possible to prove any correlation in the case of seven countries. The country with the highest positive impact is Hungary, where high dependence - 0.95 as well as a high value of reliability – 0.915 were identified. Poland was the only country with a negative impact. For the other countries, a high value of reliability was not achieved and in most cases, there was only a moderately strong linear dependence. Correlation was more often than not identified as positive. In the case of the total value, the relationship of dependency could not be explained.

Table 4. Regression analysis of the correlation of the number of environmentally oriented companies and the production of nitrogen oxide in tonnes, source: author's own according to Eurostat, 2016

y3	coeff. R	reliability value	value P reg. coeff.	value P lok. const.	reg. coefficient	lok. const.
Czech Republic	0.2571	0.0661	0.4734	0.0058	-2,270.6887	283,942.94
Germany	0.9373	0.8785	0.0001	0.2007	844.5951	214,066.66
Spain	0.8736	0.7633	0.0010	0.0000	-691.4705	1,730,109.62
France	0.3247	0.1054	0.3600	0.0010	-14,481.1497	1,395,612.62
Italy	0.9192	0.8450	0.0002	0.0000	-439.3569	1,374,767.76
Hungary	0.9124	0.8325	0.0002	0.0000	-1,956.7913	170,450.89
Austria	0.3342	0.1117	0.3453	0.5322	2,093.7697	-347,569.26
Poland	0.8051	0.6482	0.0049	0.0000	-2,605.3703	875,432.41
Portugal	0.7487	0.5605	0.0127	0.0000	-1,608.1885	291,181.11
Finland	0.8558	0.7324	0.0016	0.0000	1,187.8347	137,696.54
Sweden	0.8360	0.6989	0.0026	0.0000	545.8597	116,196.01
United Kingdom	0.5689	0.3237	0.0861	0.9297	19,822.3945	55,758.09
total	0.839	0.703	0.002	0.000	-1,858.96971	14,648,246.45

Table 5. Regression analysis of the correlation of the number of environmentally oriented companies and waste production in tonnes (businesses in all NACE classifications and households), source: author's own work according to Eurostat, 2016

y4	coeff. R	reliability value	value P reg. co-eff.	value P lok. const.	reg. coefficient	lok. const.
Czech Republic	0.2226	0.0495	0.5366	0.0000	-61,209.10	25,916,011.50
Germany	0.5690	0.3238	0.0860	0.0000	-31,503.82	413,305,916.76
Spain	0.7721	0.5961	0.0089	0.0000	-49,818.21	184,657,022.87
France	0.2125	0.0452	0.5555	0.0000	-895,560.29	351,750,402.00
Italy	0.3334	0.1112	0.3465	0.0000	8,742.26	154,601,493.60
Hungary	0.9569	0.9156	0.0000	0.0000	-306,300.20	22,750,964.25
Austria	0.0927	0.0086	0.7989	0.6248	-197,743.61	97,361,002.98
Poland	0.9007	0.8112	0.0004	0.0000	755,669.79	143,516,650.62
Portugal	0.7911	0.6258	0.0064	0.0001	-370,090.70	42,340,848.60
Finland	0.6556	0.4298	0.0396	0.0000	-460,574.88	100,578,609.73
Sweden	0.7033	0.4947	0.0233	0.0001	-869,985.09	185,909,205.68
United Kingdom	0.4694	0.2204	0.1711	0.0307	1,589,988.45	167,356,295.42
total	0.1000	0.0100	0.784	0.000	4,091.38	1,728,284,880.36

Table 6. Regression analysis of the correlation of the number of environmentally oriented companies and spending on environmental protection, source: author's own work according to Eurostat, 2016

y5	coeff. R	reliability value	value P reg. co-eff.	value P lok. const.	reg. coefficient	lok. const.
Czech Republic	0.2873	0.0825	0.4210	0.0001	-0.0073	1.47
Germany	0.4115	0.1694	0.2374	0.0000	0.0000	0.89
Spain	0.6358	0.4043	0.0482	0.0000	-0.0002	0.66
France	0.0202	0.0004	0.9559	0.0000	-0.0002	0.59
Italy	0.5380	0.2894	0.1087	0.0000	-0.0001	1.65
Hungary	0.1968	0.0387	0.5857	0.0000	-0.0047	1.14
Austria	0.3599	0.1295	0.3070	0.4450	0.0130	-2.44
Poland	0.7347	0.5398	0.0155	0.0000	0.0057	1.17
Portugal	0.0308	0.0010	0.9326	0.0001	0.0001	0.72
Finland	0.9226	0.8512	0.0001	0.0000	-0.0042	1.12
Sweden	0.9265	0.8585	0.0001	0.0000	0.0015	0.57
United Kingdom	0.7591	0.5762	0.0109	0.0036	0.0087	0.65
total	0.3200	0.1030	0.367	0.0000	-0.00002	1.03

Table 7. Development of the indicator of independent and dependent variables in all the monitored countries, source: author's own according to Eurostat, 2016

	x	y1	y2	y3	y4	y5
2005	2,860	102.94	5,142,129	9,446,334	1,717,689,259	1.00
2006	2,988	103.04	4,993,619	9,167,063	1,740,281,300	1.01
2007	3,280	101.76	4,721,500	8,881,857	1,745,660,140	0.97
2008	3,704	98.47	3,553,286	8,175,098	1,751,038,973	0.92
2009	4,026	91.76	3,066,830	7,492,095	1,738,254,016	0.99
2010	4,165	94.16	3,110,929	7,429,427	1,725,469,053	0.97
2011	4,193	90.96	2,989,521	7,149,261	1,729,936,085	0.97
2012	4,239	88.39	2,884,637	6,900,417	1,734,403,110	0.99
2013	3,856	86.28	2,568,018	6,589,944	1,762,129,410	0.97
2014	3,808	83.35	2,322,773	6,247,872	1,789,855,701	0.95

Table 8. Regression analysis of the correlation of the number of environmentally oriented companies and dependent variables in all the monitored countries, source: author's own according to Eurostat, 2016

|	coeff. R	reliability value	value P reg. coeff.	value P lok. const.	reg. coefficient	lok. const.
y1	0.764	0.583	0.010	0.000	-0.01085	134.38
y2	0.883	0.779	0.001	0.000	-1,815.16337	10,273,029.12
y3	0.839	0.703	0.002	0.000	-1,858.96971	14,648,246.45
y4	0.100	0.010	0.784	0.000	4,091.38833	1,728,284,880.36
y5	0.320	0.103	0.367	0.000	-0.00002	1.03

The last researched area was dependence of the number of environmentally oriented companies and spending on environmental protection from both the private and public sectors (table 6). It presents a direct impact of the environmental strategy of a company. In the case of seven countries it was not possible to prove the relationship, since the value of P far exceeded the required limit of 0.05. A positive relationship was able to prove only for Sweden. Correlation between dependent and independent variables was not proved even for the values for the entire group.

In the group, the analysis was based on an independent variable that was the sum of all the companies of the research sample and dependent variables that were the sum of the values of each country, or the average for all countries in the above group (table 8). The absolute and relative values are presented in the table 7.

The results of the regression analysis revealed only correlation between the number of environmentally oriented companies and the production of greenhouse gases, producing of sulphur oxide and nitrogen oxide. In the other two cases, the correlation could not be proved. The highest dependence was found mainly for the volume of emissions of SO_x and NO_x. In both cases, a fairly strong linear dependence to a relatively high value of reliability was identified. In the case of greenhouse gases, the value of reliability was low and therefore the development is influenced by other factors at a relatively large strength. In all three cases, however, it is noted that the independent variable has some influence on the de-

Figure 1. Regression lines of dependent variable y1 to y3, source: author's own work

a) $y_1 = -0.0108\, x + 134.38$
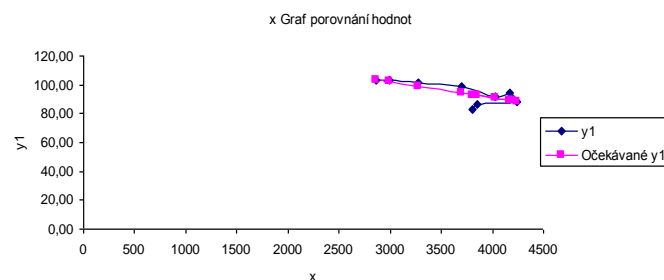
b) $y_2 = -1,815.16\, x + 10,273,029.124$
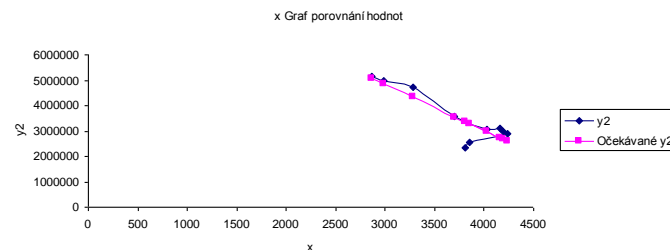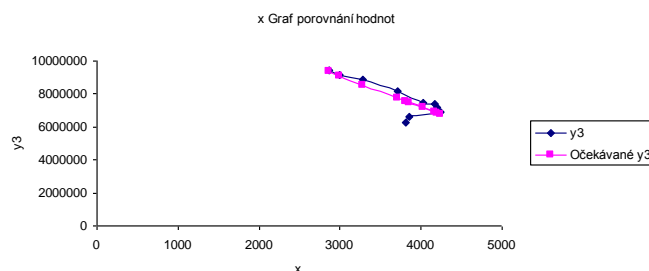

c) $y_3 = -1,858.97\, x + 1,728,284,880.36$

Table 9. Results of assessment of the impact of corporate social responsibility in the environmental field, source: author's own work

	y1	y2	y3	y4	y5	sum	ranking
Czech Republic	0.0	0.0	0.0	0.0	0.0	0.0	9.0
Germany	0.5	1.0	1.0	0.0	0.5	3.0	8.0
Spain	2.5	3.0	3.0	2.5	0.0	11.0	2.0
France	0.0	0.0	0.0	0.0	0.0	0.0	9.0
Italy	2.5	3.0	3.0	0.0	0.0	8.5	4.0
Hungary	3.0	3.0	3.0	3.0	0.0	12.0	1.0
Austria	0.0	0.0	0.0	0.0	0.0	0.0	9.0
Poland	0.0	2.5	2.5	1.0	2.5	8.5	4.0
Portugal	1.5	2.5	2.5	2.5	0.0	9.0	3.0
Finland	0.0	0.5	0.5	2.0	1.0	4.0	7.0
Sweden	0.5	1.0	0.5	2.0	3.0	7.0	5.0
United Kingdom	1.5	0.0	0.5	0.0	2.5	4.5	6.0
total	0.5	3.0	0.5	0.0	0.0	4.0	7.0

Figure 2. The final ranking of the countries surveyed in the field of application of the concept of corporate social responsibility, source: author's own work
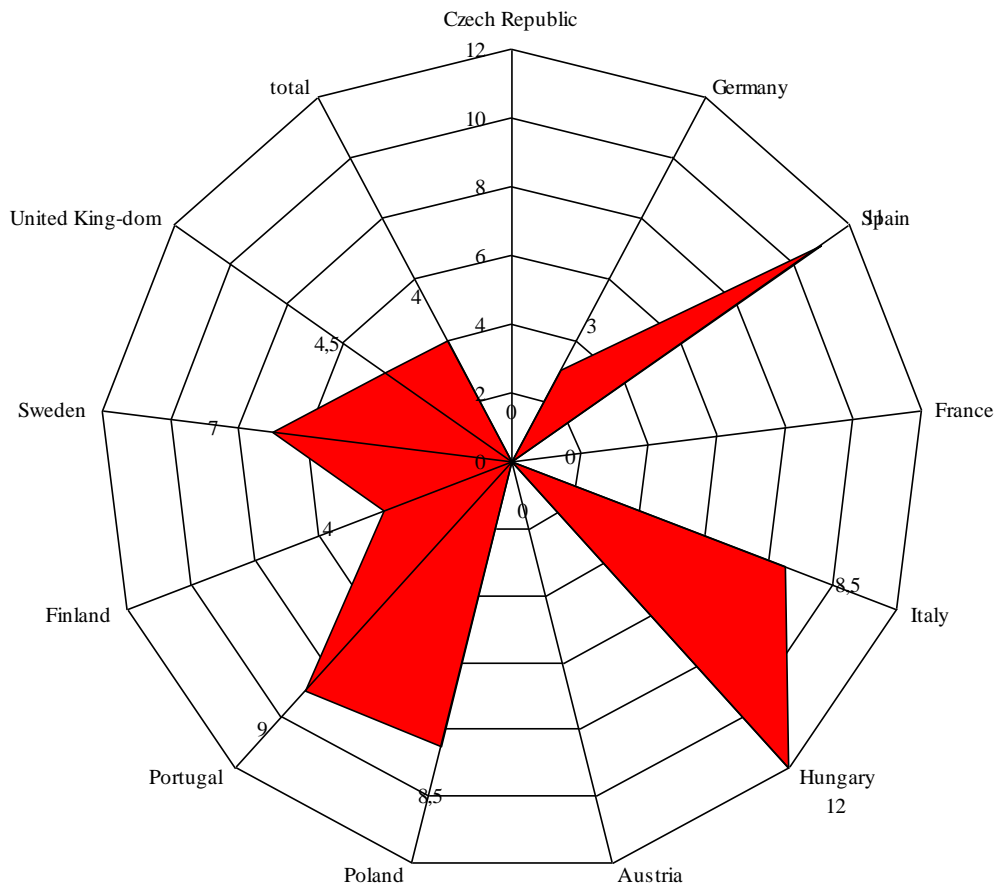
pendent. However, other factors simultaneously operate thereby.

The graphs (figure 1) show a graphical representation of the regression functions and their respective formulas.

As the figure 1 illustrates, all cases result in a desirable effect. Its strength, however, is different, and more or less in each case impacts on their development and other factors.

Conclusion

The study aims to quantitatively analyse and confirm the existence of a direct and indirect dependence on

the number of businesses in individual EU countries to voluntarily implement environmental concepts of social responsibility in the form of environmental management and audit, EMAS. The object of quantitative analysis are selected EU countries. The key methods of the scientific research are methods of classification analysis, comparison and abstraction in the development of theoretical and methodological framework for dealing with; methods of quantitative analysis using statistical methods of processing and evaluation of information and methods of synthesis and partial induction in drawing research conclusions. In line with the studies and formulating the research premise, the subject of research is defined, namely the correlation between the number of environmentally oriented companies and selected indicators on the environment. In the analysis, we assumed that an increasing number of environmentally oriented businesses has positive effects on the selected indicators in the environment and is thus not just a formality.

In the analysis on the impact of corporate social responsibility in the environmental field, we investigated the correlation of the number of environmentally oriented companies and production of greenhouse gases. The strongest positive effect was observed in the case of Hungary, where a strong linear dependence with a correlation coefficient value of 0.919 and a high reliability value of 0.84 were recorded. Relatively high values were also obtained in the case of Italy. Negative development occurred in the case of Portugal and Finland. The second was to analyse the study areas depending on the number of enterprises from production of sulphur oxides. The countries with a significant positive impact on the production of sulphur oxide included Italy, Spain and Hungary. In these cases, a high correlation coefficient as well as the values of reliability, which ranged over 80% (the highest in the case of Italy - 90.7%) were demonstrated. The countries with negative effects include Germany, Finland and Sweden. In the case of the analysis of the dependence of the variable of the production of nitrogen oxide, the situation was similar. The countries with a significant positive impact on the production of nitrogen oxide include again Italy, Spain and Hungary. The countries with a negative impact were again Germany, Finland and Sweden. In terms of the overall impact, a group of a strong linear relationship with relatively high reliability was identified (impact of other factors is also assumed). For the analysis of dependent variable on waste production it was not possible to prove any correlation in the case of seven countries. The country with the highest positive impact is Hungary, where high dependence - 0.95 as well as a high value of reliability – 0.915 were identified. Poland was the only country with a negative impact. For the other countries, a high value of reliability was not achieved and in most cases, there was only a moderately strong linear dependence. Correlation was

more often than not identified as positive. In the case of the total value, the relationship of dependency could not be explained. The last researched area was dependence of the number of environmentally oriented companies and spending on environmental protection from both the private and public sectors. It presents a direct impact of the environmental strategy of a company. In the case of seven countries it was not possible to prove the relationship, since the value of P far exceeded the required limit of 0.05. A positive relationship was able to prove only for Sweden. Results of the analysis were used to determine the overall ranking of the positive impact of the number of environmentally oriented companies to the selected indicators in the environmental field. For countries with no identified dependence the value 0 was allocated; in the case of countries with high values of correlation coefficient and reliability, they were assigned the value 1; for intermediate values, it was 0.5, and for low values, it was 0. In the case of the regression coefficient, in terms of the desired positive or negative value, it was assigned the value 1, and in the case of an unwanted value, it was -1. The concluding summary presents the highest value at the same time as the maximize efficiency of the concept of corporate social responsibility in the environmental field.

The second figure presents the final country ranking in the area of application of the concept of corporate social responsibility in the environmental field.

As the figure shows, the countries with positive effects of the concept of corporate social responsibility include Hungary, Spain and Portugal. On the contrary, the countries with low, respectively, minimal impact include the Czech Republic, France and Austria.

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