The Model of Environmental, Social and Corporate Governance Performance Indicators of a Company

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ABSTRACT

The paper looks into various models of corporate environmental, social, corporate governance and economic indicators and their mutual relations in companies of the Czech manufacturing industry. Mutual linkage of ESG performance indicators was verified in 79 companies from processing industries in the Czech Republic. Data was acquired by empirical research in the Czech Republic which was completed in 2011-2012. The aim of the paper is to model environmental, social, corporate governance and economic indicators for the measurement of a company's performance on the basis of regression analyses and definition of mutual links between them as well as the potential link with Sustainable Corporate Performance. Regression analysis indicates that independent variable environmental and social indicators do not have any important effect on economic performance. Similar results were achieved in modelling the impact of corporate governance performance on environmental, social and economic performance.

Keywords: modeling, models regression analysis, environmental, social, corporate governance, economic performance, sustainable corporate performance (SCP)
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1. INTRODUCTION

The modelling of environmental, social and corporate governance (ESG) performance indicators is based on evaluating (or measuring) the current status of a situation determined simultaneously by several factors. The purpose of modelling ESG performance indicators on the corporate level is to define the appropriate key indicators with which to measure the sustainable performance of companies.

Since the decisions about ESG indicators are based on measurements of a situational status determined simultaneously by multiple factors (indicators), it is appropriate to use the logical, empirical, qualitative and quantitative methods of research, such as modelling.

Modelling could be categorized from different viewpoints. For example, by description, it can be verbal, visual, quantitative, qualitative, and analytical. By type, it could be deterministic or stochastic, static or dynamic, etc. [1]. Modelling facilitates our understanding of the complex real-world phenomena that surround us. Models are simplified images of reality; they capture only those facets of a given entity that are substantive for the model's purpose. By suppressing the insignificant parts, I make it possible to solve the problem as formulated. If we tried to create a perfectly accurate model, it would be too complicated and probably impossible to solve [2], [3].

Authors [4] specialize in modelling performance indicators. These authors claim that measuring and analysing the performance of an organization plays an important role in turning organizational goals into reality. Performance measurement and analysis is crucial for steering the organization toward its strategic and operational goals. The approach they propose is a performance-oriented view of the framework which provides formal tools for analysing organizational and individual performance, and relating the current performance to organizational goals and their satisfaction, as well as to tasks and processes of the organization.

The science of sustainability modelling within a framework containing the interactions of society, ecology, the environment and the economy (SEE), was studied by [5], using an SEEOSG model featuring the essential structural relationships that incorporate the environmental and economic conditions required for sustainability. It also incorporated welfare economics issues such as efficiency and fairness in inter-temporal allocation of natural, environmental and physical resources, the effects of the SEE discount rate on the optimal growth path and sustainability, and the relative importance of different variables and parameters of the SEE system in affecting the rate of growth in the economy.

The article uses methodology that focuses on examination, analysis and categorization of contemporary characteristics in the area of economy, environment, social responsibility, and corporate governance in relation to a measure of progress, or dynamics of development, of the overall company performance. The research will focus on the critical partial processes in the areas of interest: integration of environmental performance, integration of social performance, integration of corporate governance and integration economic in Sustainable Corporate Performance (SCP).

2. CONCEPTUAL AND THEORETICAL ANALYSIS

Sustainable corporate performance (SCP) requires balancing a corporate environmental, social, governance and economic performance. Autors [6] ask sustainable corporate performance (SCP) requires balancing a corporate economic, social, and environmental performance. However, at the present time it is impossible to separate the impact of corporate governance from environmental, social and economic development.

Corporate environmental performance is associated primarily with the introduction of cleaner technologies, optimisation of technologies that reduce resources, environmental management systems (EMS) and other voluntary instruments that lead to a safe improvement of the environmental status of the company. In the Czech Republic the environmental management systems are based on the EN ISO 14001 standard.

Corporate economic performance includes financial performance but increasingly it will have to reflect the broader impact of the company on the economy. The most common division of indicators seems to be the structuring of performance assessment approaches using financial and non-financial indicators, as many Czech and foreign authors agree [7], [8], [9], [10]. The classical approach to business performance assessment prevails in the Czech Republic. It is based on the monitoring of standard indicators of return on equity (ROE), return on assets (ROA), return on long-term capital employed (ROCE), return on sales (ROS) and liquidity, leverage and turnover on assets [11], [12]. However, there has been a gradual shift towards an assessment of business performance through the economic value added (EVA) indicator [13], [14].

Corporate social performance is another important component of the economic and environmental performance of a company. In the Czech Republic it is important to take note of OHSAS 18001, SA 8000 or Safe Company systems. CSR is a current trend that emphasizes social aspects of sustainable development. CSR is the basis of the Europe 2020 strategy objectives for smart, sustainable and inclusive growth, including a target of 75% employment rate [15]. Socially Responsible Investment (SRI) combines financial performance with social, environmental and ethical factors. The relationship between social responsibility (SR) and ISO 26000 is put in the context of the Global Reporting Initiative (GRI 3.1).

Corporate governance in a company is based on the OECD Principles (2004). Since 2001 the Code of Corporate Governance has been in place in the Czech Republic which is based on the OECD principles; the last update was in 2004. Corporate Governance by authors [16] examines the ways in which corporations are led, administered and controlled. Corporate governance also addresses the relations among different internal and external stakeholders as well as the processes of CG that are designed to help the corporations to achieve their objectives. The centre of interest is such mechanisms and provisions that are designed to help to reduce or eliminate the problem of conflict of interest. Authors [17] said, that corporate governance is about how companies are directed and controlled. Good governance is an essential ingredient in corporate success and sustainable economic growth. Research in governance requires an interdisciplinary analysis, drawing above all on economics and law, and a close understanding of modern business practice of the kind which comes from detailed empirical studies in a range of national systems.

3. REASERCH METHODOLOGY

Based on previous empirical research [18], [19] a conceptual framework of ESG and economic performance indicators were established for manufacturing companies according to CZ-NACE by a factor analysis. The PCA method was applied with VARIMAX rotation, the appropriateness of data was tested by the Bartlett's Test of Sphericity where the value in presented results was below $p < 0.05$. Also applied was the KMO where the recommended minimum value to perform a factor analysis is 0.6 (Sharma, 1996). The basis for empirical research was a questionnaire prepared with the use of international sources (GRI 2006, 2011, EMAS III, IFAC, 2012, ASSET 2010, EFFAS-DVFA 2008, ISO 26000, CSR, OECD Principles of Corporate Governance 2004, Green Paper -The EU corporate governance framework 2011, Czech Statistical Office, 2012, and financial statements of companies). 79 companies with an established ISO 14 001 standard were selected from this database for interviews. The factor analysis resulted in establishing a conceptual framework of ESG performance for companies in manufacturing industry CZ-NACE, see Table 1. All calculations were analyzed by the SPSS program for Windows, version 21, using a combination of different statistical methods, and regresses analyses

Table 1 Framework of ESG and economic indicators of performance

Measurement Area		Key performance indicators
Environmental	Investment	EN1-Acquired investments for environmental protection.[CZK]
		EN2-Environmental cost.[CZK]
	Emissions	EN3-Total annual emissions.[t/CZK]
		EN4-Total annual emission of greenhouse gases. [t/CZK]
	Consumption resources	EN5-Energy use.[MWh/CZK]
		EN6-Renewable energy use.[%]
		EN7-Material use.[t/CZK]
		EN8-Recycled materials use.[%]
		EN9-Water Use.[m³/year/CZK]
	Waste	EN10-Production of waste.[t/CZK]
		EN11-Production of hazardous waste.[t/CZK]
Social	Human rights	SO3-Discrimination.[%]
		SO4-Equivalent opportunities.[%]
	Society	SO1-Community.[%]
		SO2-Allowances to municipalities.[CZK]
	Labor Practices and Decent Work	SO5-The rate of staff turnover.[%]
		SO6-Expediture on education and training.[%]
		SO7-Occupational illnesses.[%]
		SO8-Number of deaths.[%]
	Product Responsibility	SO9-Marketing communication.[%]
		SO10-Labelling of products and services.[%]
Corporate	Monitoring	CG1-Information about the company.[occurrence]
	Effectiveness CG	CG2-Responsibility Corporate Governance.[occurrence]
		CG3-Ethical behaviour.[occurrence]
	Composition CG	CG4-Remuneration Corporate Governance.[CZK]
		CG5-Effective composition of Corporate Governance.[%]
		CG6-Equal opportunities: Ratio of women/men in CG.[%]
	Compliance	CG7-Corruption.[%]
		CG8-Observance of legal standard.[CZK]
Economic	Return on	EC1-Return on Assets (ROA).[%]
		EC2-Return on Investment (ROI).[%]
		EC3-Return on Sales (ROS)[%]
		EC4-Return on Equity (ROE).[%]
	Economic results	EC5- Added value [%]
		EC6- Profit margin.[%]
		EC7-Earnings after Taxes (EAT).[CZK]
		EC8-Earnings before Taxes (EBT).[CZK]
		EC9-Earnings before Interest and Taxes (EBIT).[CZK]
		EC10-Turnover size.[%]
	Financial indicators	EC11-Liquidity .[%]
		EC12-Debt.[%]
		EC13-Asset turnover .[%]
	Cash Flow	EC14-Volné Cash Flow.[CZK]
		EC15-Operating Cash Flow.[CZK]

(Source: own processing of research)

Computational modelling will be applied to establish the interrelations between environmental, social, governance (ESG) indicators and economic performance in Czech manufacturing companies. The model can be seen as a set of applications of the appropriate theory or as a simplified view of the primary object. Using the model as a means of solving a problem can be more advantageous for a company than a direct solution and in certain conditions it can be feasible in an efficient way [20].

4. RESULTS AND DISCUSSION

Company performance can be measured by various methods, simple or complicated, and they may involve theoretical and/or mathematical models. Corporate performance, and the indicators that measure it, have been addressed by a plethora of studies as a prerequisite for a long-term existence of the company. Authors [21] understand performance to be the system of performance measurement. This inspired the development of Balanced Scorecard, to be used as a performance measurement system and a management planning tool. Later, however, some companies moved away from this approach when they found that the BSC scales can be used for strategic management, allocation of short-term or long-term resources, and learning about strategy. Authors [22] already make a connection between an enterprise and its social responsibility in a system called Sustainability Performance Management (SPM). SPM focuses on the economic, environmental and social aspects of corporate governance in general, especially with regard to the company's societal responsibility. Sustainability Performance Management has a close affinity with sustainability reporting.

Modelling is one of the approaches to regression analysis of environmental, social and corporate governance and economic performance indicators. Generally, the term model means a simplified image of an object (phenomenon or action), whether actual or intended. Models usually display only certain characteristics which are of interest in a particular case, while the remaining characteristics are left out either intentionally or because some of the characteristics of the displayed object are unknown. The correct choice of characteristics to be displayed by the model in view of the purpose pursued by its creation can be considered as essential in the construction of the model [23], [24].

The research tests regression coefficients which indicate a change of the dependent variable when the independent variable changes. The aim of regression analysis was to construct a descriptive regression model and to determine the predictive potential of the identified environmental and social performance indicators and to establish whether these indicators have a positive impact on corporate governance. Mutual links between these performance indicators should verify the overall Sustainable Corporate Performance (SCP).

Thus the hypothesis in this study can be formulated as follows:

H0: Environmental, social performance do not lead to better economic performance.

H1:Better economic performance results in better environmental, social performance in manufacturing companies.

H0: Corporate governance performance does not lead to better environmental, social and economic performance.

H2: Better environmental, social and economic performance results in better corporate governance performance.

The equation to test the hypothesis is expressed in the following basic regression model:

$$EP = b_o + b_1 ENVP + b_2 SP \qquad (1)$$

$$CGP = b_o + b_1 ENVP + b_2 SP + b_3 EP \qquad (2)$$

b_o… Constant, value of the dependent variable when value of independent variables is zero; : Also called intercepts, because it determines where the regression line meets the Y-axis. b_1,….. , b_3…Coefficients, that represents the estimated change in mean value of dependent variable for each unit change in the values of the independent variable. *ENVP-Environmental Performance:* Environmental investments, Emissions, Source consumption, Waste; *SP-Social Performance:* Society, Human rights, Labour, Practices and Decent Work, Product Responsibility; *EP-Economic Performance:* Return on, Economic results, Financial indicators, Cash Flow. *CGP-Corporate Governance Performance:* Monitoring and Reporting, CG Effectiveness, CG Structure, Compliance.

The model was then tested using regression analysis, following a series of test to fulfill its classic assumptions. These are including tests of: autocorrelation, multicollinearity, and heteroscedacity. Based on the results of multicollinearity test obtained that all the independent variables and moderating variable have VIF values < 10, which means there is not multicollinearity. Hypothesis testing was done by using regression method.

The results of processing data in models show the influence of the effect of independent variable performance indicators on the dependent variable in equations (1), (2) that are specified and formulated in multiple regression equations:

Hypothesis 1:
EP(Economic results) = 0.000 + 0.412 F1 Society
$$- 0.324F1 \text{ Environmental Investment} \qquad (3)$$

EP (Financial indicators) = - 0.024 - 0.347F2 Waste
$$+ 0.296 \text{ F1 Society} \qquad (4)$$

EP (Cash Flow) = 0.22 + 0.439 F5 Emission - 0.338 F2 Human
$$\text{Rights} \qquad (5)$$

Hypothesis 2:
CGP (Effectiveness CG) = - 0.001 + 0.370F3 Financial indicators
$$+0.336F4 \text{ Product Responsibility} \qquad (6)$$

CGP (CG Composition) = - 0,002 + 0.346F4 Product
$$\text{Responsibility} \qquad (7)$$

CGP (Compliance) = - 0.024 - 0.515F2 Economic results + 0.338F1 Society - 0.342F2 Waste
$$\qquad (8)$$

The regression analysis results revealed the influence of environmental and social performance indicators on

economic performance and what specific value the economic performance will have (it is determined by profit margin, financial results, financial indicators, and cash flow). Furthermore, it showed the influence of corporate governance performance indicators (CG efficiency, CG structure, monitoring, and compliance) on environmental, social and economic performance indicators the manufacturing industry companies.

Table 2 shows the result for regression analysis by stepwise method. The results use the Forward method to demonstrate the effect of environmental and social indicators on each dependent variable of economic performance (profit margin, economic results, financial indicators, and cash flow). In the research this link was proved by the weak results and it confirms the first hypothesis (H1) only partially. Namely the environmental and social indicators of performance (Model 1) influence economic results. The point of departure are the statistical results which were obtained as adjusted R^2 value of 0.151. Variables F1 Society (+0.412) and F1 Environmental investment (-0.324) are connected with economic results (EAT, EBT, EBIT, profit margin, turnover size).

Table 2 Regressions on economic performance on environmental and social performance

Independent variables		Dependent Variable: q2 F2 Economic results				
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	0.000	0.136	-	0.002	0.998
	q14 F1 Society	0.412	0.141	0.427	2.916	0.006
	q11F1Environmental Investment	-0.324	0.151	-0.315	-2.153	0.037
	R Square	0.189				
	Adjusted R Square	0.151				
	Residual	36.515				
	F	4.996				0.011

Dependent Variable: q2 F2 Economic results
Predictors: (Constant), q14 F1 Society, q11 F1 Environmental Investment

		Dependent Variable: q2 F2 Financial indicators				
Model 2	(Constant)	-0.024	0.136		-0.174	0.863
	q11 F2 Waste	-0.347	0.151	-0.316	-2.296	0.027
	q14 F1 Society	0.296	0.133	0.307	2.230	0.031
	R Square	0.187				
	Adjusted R Square	0.149				
	Residual	36.575				
	F	4.952				0.012

Dependent Variable: q2 F3 Financial indicators
Predictors: (Constant), q11 F2 Waste, q14 F1 Society

		Dependent Variable: q2 F3 Cash Flow				
Model 3	(Constant)	0.022	0.132		0.165	0.870
	q11 F5 Emission	0.439	0.138	0.444	3.189	0.003
	q14 F2 Human Rights	-0.338	0.131	-0.360	-2.588	0.013
	R Square	0.235				
	Adjusted R Square	0.200				
	Residual	34.415				
	F	6.613				0.003

Dependent Variable: q2 F4 Cash Flow
Predictors: (Constant), q11 F5 Emission, q14 F2 Human Rights

(Source: own processing of research)

Environmental and social indicators of performance (Model 2) nonetheless explained 14.9% ($R^2= 0.149$) variations of financial indicators. The variables F2 Waste (-0.347) and F1 Society (0.296) are connected with financial indicators (asset turnover, debt, liquidity The most prominent influence was detected in environmental and social indicators of performance (Model 3) and in cash flow. They explained 20.0 % ($R^2=0.200$) of variations in cash flow, i. e. that 20.0 % are caused by variables F5 Emission, F2 Human Rights. The remaining 80.0 % have to be found in other variables.

Table 3 Regressions on corporate governance performance on environmental, social and economic performance

		Dependent Variable: q29 F1 CG Effectiveness				
Model 1	(Constant)	-0.001	0.139		-0.011	0.992
	q2F3Financial indicators,	0.370	0.141	0.370	2.627	0.012
	q14F4Product Responsibility	0.336	0.140	0.339	2.404	0.021
	R Square	0.270				
	Adjusted R Square	0.231				
	Residual	28.462				
	F	6.850				0.003

Dependent Variable: q29 F1 CG Effectiveness
Predictors: (Constant), , q2 Faktor 3Financial indicators, q14 F 4 Product Responsibility

		Dependent Variable: q29 F3 CG Composition				
Model 2	(Constant)	-0.002	0.150		-0.010	0.992
	q14F4Product Responsibility	0.346	0.151	0.349	2.296	0.027
	R Square	0.122				
	Adjusted R Square	0.099				
	Residual	34.247				
	F	5.273				0.027

Dependent Variable: q29 F3 CG Composition
Predictors: (Constant), q14F4 Product Responsibility

		Dependent Variable: q29 F4 Compliance				
Model 3	(Constant)	-0.024	0.135		-0.175	0.862
	q2F2 Economic results	-0.515	0.145	-0.515	-3.541	0.001
	q14 F1 Society	0.338	0.139	0.351	2.427	0.020
	q11 F2 Waste	-0.342	0.151	-0.311	-2.258	0.030
	R Square	0.327				
	Adjusted R Square	0.271				
	Residual	26.236				
	F	5.838				0.002

Dependent Variable: q29 F4 Compliance
Predictors: (Constant), q2 F2 Economic results, q14 F1 Society, q11 F2 Waste

(Source: own processing of research)

Table 3 shows the influence of environmental, social performance and economic performance on corporate governance performance. Namely the economic and social performance indicators (Model 1) influence Corporate Governance Effectiveness. The point of departure are the statistical test results which were obtained as adjusted R^2 value of 0.231. Variables F3 Financial indicators (+0.370) and F4 Product responsibility (+0.336) are associated with CG Effectiveness. Social performance indicators (Model 2) explained only 9.9% ($R^2 = 0.099$) of variations in CG Composition. Variables F4 Product responsibility (+0.346) are connected CG Composition. The strongest influence is exerted by the variables Society (0.338), Economic Results (-0.515), followed by F2 Waste (-0.342) which have an impact on Compliance (Model 3). Adjusted R^2 value of 0.271 indicates that the variance is 27.1% and is statistically significant (Sig. <0.05).

The first hypothesis states that the independent variables of environmental and social indicators have an impact on improved economic performance. Based on the results of statistical tests it follows that the independent variable indicators have only a small effect on the economic performance determined by financial indicators and cash flow. Thus, hypothesis no. 1 (H1) cannot be confirmed. The second hypothesis (H2) shows better results in deciding whether environmental, social and economic performance indicators affect corporate governance performance; it was confirmed at 27%.). The results of this study are consistent with the research of [25], [26], [27], whose findings show that environmental, social, and corporate governance performance indicators do not have a significant impact on economic performance.

5. CONCLUSIONS

The mutual influence between environmental and social performance indicators and economic performance in the Czech manufacturing companies has not been confirmed. The same results were obtained also from the regression analysis of the influence of corporate governance on environmental, social and economic performance of companies in the manufacturing industry. It follows from the theoretical basis that environmental and social performance has a negative impact on economic success of a company [28], [29].

This regression analysis focuses on the interaction between environmental, social indicators and economic performance indicators of companies in the manufacturing industry in the period 2011-2012. The multiple regression analysis did not demonstrate any significant relationship between ESG performance indicators and economic performance of companies in the manufacturing industry. Hypothesis (H1) indicating that improved economic performance results in improved environmental and social performance of a company in the manufacturing industry has been declined due to inconclusive results. Hypothesis (H2) indicating that better corporate governance results in improved environmental, social and economic performance has not been confirmed either.

The results of the research may lead to the conclusion that Czech companies do not yet show environmental, social and corporate indicators in their report and instead focus on financial indicators based on statutory requirements.

With the introduction of appropriate voluntary reporting of environmental requirements and social responsibility, including the code of corporate governance, the results can become more conclusive and will be able to evaluate a company's sustainable corporate performance in a more comprehensive manner.

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