The impact of Environmental and Social Performance on the Market Value of Shares of Czech Joint-Stock Corporations

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ABSTRACT

The paper analyses the relationship between the social, environmental and economic performance and the firm market value as determined by the market value of shares in manufacturing companies. Empirical research has been verified according to the EU criteria in 87 joint-stock companies in the Czech Republic with more than 250 employees. Data was acquired by empirical research in the Czech Republic, which was completed in 2011-2015. The objective of the paper is to determine, on the basis of established hypotheses, whether the increased social and environmental performance increases the economic performance and the firm market value. Empirical research has shown that social performance has an impact on economic performance as well as on the market value of the share, that is, on the firm market value. Environmental performance has no significant effect on economic performance or on the market value of the share. Research results can provide investors with information that they only appreciate if social and environmental tools introduced into joint-stock companies increase economic performance while increasing the market value of the company.

The paper deals with the effect of sustainable performance on the market price of shares. The empirical research analysis was conducted for 87 joint-stock companies in the Czech Republic for the period 2011-2015. The aim of the paper is to determine whether the sustainable performance of non-listed joint stock companies increases economic performance and, at the same time, the market price of company shares. This effect was verified based on established hypotheses using linear regression models. The *Firm Market Value of Shares* was determined using the comparable enterprise method. In the paper, sustainable company performance is measured independently on the basis of an assessment of the environmental, social and economic indicators of manufacturing companies as compared to companies in the same industry. Empirical research has implied that social performance has an effect on both the economic performance and the market price of shares. Environmental performance has no significant impact on the economic performance or on the market price of shares. The results of the empirical research may provide investors with important information about the sustainable performance of joint stock companies whether their investment in social and environmental instruments will increase their economic performance, as well as the market price of shares.

Keywords: Sustainability, Principal Component Analysis, Linear regression, Sustainable Corporate Performance, Firm market value, Market value of the share.

1. INTRODUCTION

The essence of sustainability is the fulfilment of three basic objectives - social development that respects the needs of all, effective environmental protection and environmentally friendly use of natural resources and maintaining a high and stable level of economic growth and employment. For better understanding [1] has broken down sustainability into nine fundamental principles, such as ethics, company management, transparency, business relationships, etc. These principles not only make it easier to understand the concept of sustainability, but the company management can incorporate them into their day-to-day decision-making processes. At the same time, they can be continuously observed and quantified. In his view of sustainability, [2] emphasizes that companies must lead their business and maintain a balance between people, planet and profits (three P - people, planet and profit). However, while a number of definitions have been written about sustainable development on the global scale, sustainability of the company has so far lacked a clear description [3].

Sustainability of the company can therefore be seen as a comprehensive set of strategies that allow us to meet social needs through economic means, while fully respecting environmental restrictions. In advanced companies, maximizing profits is no longer the only criterion [4]. In view of the business objectives, it is clear that the business environment will adopt the concept of sustainable development if it is aware - above all - of the economic benefits of a friendly approach to the environment and if respecting the principles of corporate social responsibility contributes to the economic prosperity of the company [5]. From the point of view of the company, this means to perceive the mutual relations between the economic performance, the environmental profile and the performance of the company in the social sphere [6]. However, companies may have different approaches to improving their environmental and social performance. At present, there is a growing number of investors who perceive sustainability as a key success factor in business [5]. Nevertheless, for investors, shareholders and managers it is important to know whether there is a relationship between environmental or social performance and the economic

performance of a company. Especially in the case of Socially Responsible Investment (SRI), the integration of the environmental, social and economic performance is seen as Sustainable Corporate Performance. Sustainable Corporate Performance can be defined as the company's performance in all aspects and dimensions to support the sustainability of the company [7]. This means that Sustainable Corporate Performance is such performance that behaves responsibly to the society and to the values it honours and does not burden the environment by its activities more than necessary. This aspect is one of the issues related to the environmental protection by companies.

This paper, based on a theoretical approach that concerns sustainable corporate performance assessed on an integrated basis, analyses the direct and indirect implications for the market value of unlisted joint-stock companies of the manufacturing industry from 2011 to 2015. The firm market value of shares was determined by the method of comparable companies. The firm market value of the share is one of the key values from which the company value is derived. In the paper, sustainable corporate performance is measured independently on the basis of an evaluation of environmental, social and economic indicators of the manufacturing industry company compared to the companies in the same industry. Research should demonstrate the importance of implementing sustainability in the companies, but also the importance of preserving the balance between environmental, social and economic growth from the point of view of economic sustainable development of society.

The first part of this paper focuses on the main area of research and its contribution. The second part of the research describes the theoretical knowledge and deals with methodology and hypothesis determination. The third part of the research deals with the data that are analysed with respect to the companies of manufacturing industry not listed on the stock exchange in the Czech Republic and with the methodology. The fourth part of the research describes the results and the discussion. The fifth part deals with conclusions and implications based on empirical research findings.

The research department of the Faculty of Business and Management at Brno University of Technology has studied sustainability at the corporate level since 2010 as part of grant projects of the Grant Agency of the Czech Republic and is currently working on a grant project from the CR GA called "Modelling and simulation of sustainable investment decision-making".

2. CONCEPTUAL AND THEORETICAL ANALYSIS

Sustainability is the goal that all companies should achieve. Companies in the Czech Republic strive for an intensive focus on sustainability. The research has shown that 71 % of companies operating in the Czech Republic have a long-term strategy in the field of sustainable development. Over the last three years, a total of 79 % of companies have changed their attitude to sustainability. The results show that generally, financial reasons serve as the drives to activity. Companies want to remain competitive and still attractive to customers, and they see the opportunity in the sustainability activities. Sustainability measurement using economic, environmental and social indicators becomes a necessity [8]. Sustainable corporate performance as such stands on the balance of three key performances: economic, social and environmental.

Economic performance includes the following indicators: 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, etc.

Environmental performance is related to the use of inputs (materials, energy, water) and on the nature of outputs (emissions, industrial wastewater, wastes).

Social performance is based on the concept of the Corporate Social Responsibility (CSR).

The social performance and economic performance of a company and their mutual relationship are based on the principle of sustainability and related to the CSR. Many authors have dealt with these relationships and suggested that there is a positive relationship between the social performance and the economic performance.

Companies that have incorporated the CSR into business gain many benefits, such as the reduction of the costs of materials, raw materials, personnel costs and capital costs [9], sales growth [10], as well as improvement in the relationship between companies and consumers [11]. Social performance can improve satisfaction of stakeholders, and they can then support the higher economic performance of a company.

H1: Companies with better social performance have better economic performance.

The interdependence of the environmental and economic performance has been the subject of many research studies and projects. Author [12] in his study dealt with the relationship between environmental and economic performance; this relationship is defined by the curve of environmental profit. This means that he describes the difference between environmental revenues and costs. He considers environmental profit as the isolated net economic impact of the environmental level on the performance of company. He considers the revenue-related costs over time and captures the flow of costs and revenues associated with changes in environmental impacts.

H2: Companies with better environmental performance have better economic performance.

Social, environmental and economic performance can lead to the creation of higher value of the company for shareholders, but also for other stakeholders. The importance of social and environmental responsibility is given in relation to responsible investments known as Socially Responsible Investments (SRI). The introduction of social and environmental responsibility in companies can be considered as an effort to help focus the management on maximizing the value of the company.

H3a: Increased social performance will increase the firm market value of shares.

H3b: Increased environmental performance will increase the firm market value of shares.

H3c: Increased economic performance will increase the firm market value of shares.

3. RESEARCH METHODOLOGY

An important prerequisite for modelling the interrelationships between social, environmental and economic performance, as well as the sustainability and value of the company is the determination of appropriate methods and their indicators. Empirical research is based on social, environmental and economic performance indicators [5], [8] of Czech

manufacturing companies. For modelling, data of social, environmental and economic indicators for the period 2011 to 2015 were obtained according to CZ_NACE from 87 joint-stock companies with more than 250 employees, which are EMS certified according to ČSN EN ISO 14001.

This research uses SPSS 25 program. The descriptive statistics analysis appears in Table 1.

Table 1 Descriptive Statistics

Variables and Indicators	Minimum	Maximum	Mean	Std. Deviation
Environmental performance indicators				
IEn1-Total emissions to air[t]	-1.796	3.959	0.886	1.267
IEn2- Total greenhouse gas emissions [t]	-1.301	1.920	-0.198	0.880
IEn3- Total annual production of waste[t]	1.279	5.286	2.983	0.759
IEn4- Total annual production of hazardous waste [t]	-0.432	3.854	1.839	0.975
IEn5 - Total consumption of renewable energy [GJ]	-1.876	4.784	1.724	1.603
IEn6 - Total annual consumption of water [m³/rok]	2.004	5.873	4.170	0.930
Social performance indicators				
ISoc1 - Total amount of money for gifts [CZK]	0.954	4.217	2.263	0.739
ISoc2 - Total amount of money of charitable work in support of local communities [CZK]	0.699	4.903	2.471	1.286
ISoc3- Number of terminated employments.	0.000	2.408	1.522	0.524
ISoc4- Number of women	0.602	3.046	1.966	0.530
ISoc5 - Education and training expenditures [CZK]	1.477	3.831	2.826	0.624
ISoc6 - Number of employees	1.415	3.239	2.628	0.402
Economic performance indicators				
IEco1- EAT / Equity (ROE)	0.151	1.739	0.979	0.315
IEco2 - EBIT / Total Assets (ROA)	0.125	1.428	0.782	0.315
IEco3 - EBIT / Sales (ROS)	0.077	1.316	0.722	0.296
IEco4 - ROCE = EBIT/ Equity + Long-term liabilities	0.120	1.674	0.951	0.320
IEco5 – Cash Flow / Total Assets;	-1.626	0.475	-0.981	0.277
IEco6 - Added value	4.192	6.307	5.443	0.482
IEco7 - EBT	1.964	6.095	4.624	0.715
IEco8 - EBIT	2.993	6.037	4.662	0.643
IEco9 - EAT	5.854	9.007	7.518	0.707
IEco10 – A/ Liabilities;	-2.011	0.052	-0.499	0.234
Firm Market Value of Shares	1.225	5.053	3.394	0.753

Author´s own source

Table 2 Environmental, social and economic performance indicators

Environmental and social indicators I_{ESi}		
Indicators	***Factors***	*Measure (Unit)*
I_{Eni} - *Environmental indicators*	***ENVfactor1_Environmental outputs***	I_{En1}*-Total emissions to air[t] ;* I_{En2}*- Total greenhouse gas emissions [t];* I_{En3}*- Total annual production of waste[t] ;* I_{En4}*- Total annual production of hazardous waste [t].*
	ENVfactor2 - Environmental inputs	I_{En5} *- Total consumption of renewable energy [GJ];* I_{En6} *- Total annual consumption of water [m³/rok].*
I_{Soci} - *Social indicators*	***SOCfactor1 - Society***	I_{Soc1} *- Total amount of money for gifts* [CZK]*;* I_{Soc2} *- Total amount of money of charitable work in support of local communities* [CZK]*;* I_{Soc3}*- Number of terminated employments.*
	SOCfactor2 - Labour Practices and Decent Work	I_{Soc4}*- Number of women;* I_{Soc5} *- Education and training expenditures* [CZK]*;* I_{Soc6} *- Number of employees.*
Economic indicators I_{Eco}		
I_{Ecoi} - *Economic indicators*	***ECOfactor1 -Profitability***	I_{Eco1}*- EAT / Equity (ROE);* I_{Eco2} *- EBIT / Total Assets (ROA);* I_{Eco3} *- EBIT / Sales (ROS);* I_{Eco4} *- ROCE = EBIT/ Equity + Long-term liabilities;* I_{Eco5} *– Cash Flow / Total Assets;*
	ECOfactor2 - Economic results	I_{Eco6} *- Added value;* I_{Eco7} *- EBT;* I_{Eco8} *- EBIT;* I_{Eco9} *- EAT;* I_{Eco10} *– A/ Liabilities.*

Author's own source

Social, environmental and economic performance indicators were determined by the method of the Principal Component Analysis (PCA) for the companies in manufacturing industry, Table 2.

The conceptual framework of the model proposed in this paper as shown in Figure 1.

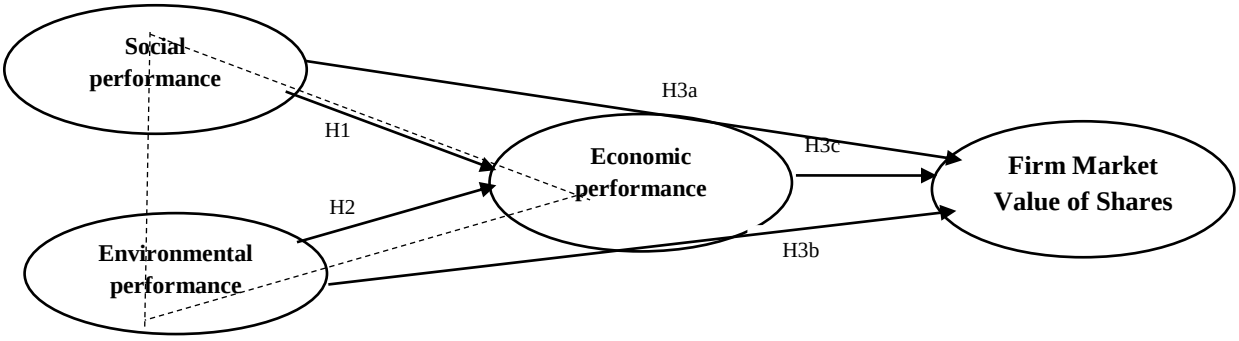

Figure 1 Model (Author´s own source)

Linear regression models were used to verify the hypotheses of Figure 1. During modelling in the linear regression model, the effort is made to estimate the linear relationship between the explanatory variables and the explained variable. This functional relationship can be written for the i-th observed variable ***y*** as follows:

$$Y_i = \beta_o + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots\ldots + \beta_k X_{ik} + \varepsilon_i \quad (1)$$

where

β_0, β_1…are unknown coefficients determining linear dependence and ε_i is random error.

The equation totest the hypotehesis is expressed in the folowing basic regression model:

$$ECO_{factor1} = \beta_0 + \beta_1 SOC_{factor1} + \beta_2 SOC_{factor2} + \varepsilon_i$$

$$ECO_{factor2} = \beta_0 + \beta_1 SOC_{factor1} + \beta_2 SOC_{factor2} + \varepsilon_i \quad (2)$$

$$ECO_{factor1} = \beta_0 + \beta_1 ENV_{factor1} + \beta_2 ENV_{factor2} + \varepsilon_i$$

$$ECO_{factor2} = \beta_0 + \beta_1 ENV_{factor1} + \beta_2 ENV_{factor2} + \varepsilon_i \quad (3)$$

$$MV = \beta_0 + \beta_1 SOC_{factor1} + \beta_2 SOC_{factor2} + \varepsilon_i \quad (4)$$

$$MV = \beta_0 + \beta_1 ENV_{factor1} + \beta_2 ENV_{factor2} + \varepsilon_i \quad (5)$$

$$MV = \beta_0 + \beta_1 ECO_{factor1} + \beta_2 ECO_{factor2} + \varepsilon_i \quad (6)$$

β_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. $\beta_1 \cdots$ Coefficients, that represents the estimated change in mean value of dependent variable for each unit change in the values of the independent variable. *SOCfactor1 – Society, SOCfactor2 - Labour Practices and Decent Work, ENVfactor1_Environmental outputs, ENVfactor2 – Environmental inputs, ECOfactor1 –Profitability, ECOfactor2 - Economic results, MV – Firm Market Value of shares.*

4. RESULTS AND DISCUSSION

The model was tested using the linear regression analysis in the SPSS 25 program after a series of tests, in order for it to fulfil the assumptions of the regression analysis. This includes the following tests: autocorrelation, multicollinearity and heteroscedasticity. Based on the results of the multicollinearity test, it was found that all independent variables and measurement variables have the VIF values <10, which means that no multicollinearity exists.

The results of data processing in the models show the influence of the effect of independently variable performance indicators on the dependent variable in equations (2) to (6); the resulting regression equations:

H1:

$$ECO_{factor2} = 9.018 + 0.662 SOC_{factor2}$$

H2:

$$ECO_{factor2} = -0.081 + 0.336 ENV_{factor1}$$

H3a:

$$MV = 8.721 - 0.572 SOC_{factor1} + 0.814 SOC_{factor2}$$

H3b:

$$MV = 8.524 + 0.273 ENV_{factor1_i}$$

H3c:

$$MV = 8.767 + 0.376 ECO_{factor1} + 0.543 ECO_{factor2_i}$$

The results of the regression analysis have shown - on the basis of a model - what impact social and environmental performance indicators have on economic performance and the specific value of economic performance (*ECOfactor1 – Profitability, ECOfactor2 - Economic results*). In addition, by exploring the model, it has been found what impact social, environmental and economic performance indicators have on the market value (*MV – Firm Market Value of shares*) of manufacturing companies.

Results of the testing of hypotheses H1 to H3:

H1: The results of testing the relationship between social performance (*SOCfactor1 – Society, SOCfactor2 - Labour Practices and Decent Work*) and economic performance (*ECOfactor1 – Profitability*) are not significant.

In the case of economic performance (*ECOfactor2 - Economic results*), the results are significant, p-value 0.000 < 0.05, but only in the case of *SOCfactor2 - Labour Practices and Decent Work*, which is given by indicators *Number of employees, Education and training expenditures, Number of women*. It shows that social performance (*SOCfactor2 - Labour Practices and Decent Work*) has a significant positive impact on economic results of the company (*EBT, EAT, EBIT, Added Value, indebtedness*), which makes H1 accepted. Table 3 shows the result for regression analysis by the Enter method. The results show the effect of social performance (*SOCfactor2 - Labour Practices and Decent Work*) with the dependent variable of economic performance (*ECOfactor2 - Economic results*).

Table 3 Regressions on economic performance on social performance

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Model 1	(Constant)	9.018	0.075		119.511	0.000
	SOCfactor2- Labour. Practices and Decent Work	0.662	0.071	0.952	9.288	0.000
	R Square	0.906				
	Adjusted R Square	0.895				
	F	86.268				0.000

Author´s own source

H2:

The results of testing the relationship between environmental performance (*ENVfactor1_Environmental outputs, ENVfactor2 - Environmental inputs*) and economic performance (*ECOfactor1 –Profitability*) are not significant. In the case of economic performance (*ECOfactor2 - Economic results*), the results are significant, p-value 0.003 < 0.05, but only in the case of *ENVfactor1_Environmental outputs*, which is given by indicators *Total emissions to air, Total greenhouse gas emissions, Total annual production of waste, Total annual production of hazardous waste*. Environmental performance (*ENVfactor1_ Environmental outputs* decrease economic results (*EBT, EAT, EBIT, Added value)*, but this impact is very small). Due to poor results, the H2 hypothesis was not confirmed, see Table 4.

Table 4 Regressions on economic performance on environmental performance

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Model 1	(Constant)	-0.081	0.116		-0.693	0.491
	ENVfactor1_Environmental outputs	0.336	0.108	0.356	3.116	0.003
	R Square	0.127				
	Adjusted R Square	0.114				
	F Change	9.712				0.003

Author´s own source

H3a:

The results of testing the relationship between social performance (*SOCfactor1 – Society, SOCfactor2 - Labour Practices and Decent Work*) and *Firm Market Value of shares* are significant, p-value 0.000 < 0.05. They show that social performance has a significant positive impact on influencing *Firm Market Value of shares*, making H3a accepted, see Tab. 4.

H3b:

The results of testing the relationship between environmental performance (*ENVfactor2 - Environmental inputs*) and *Firm Market Value of shares* are not significant.

In the case of environmental performance (*ENVfactor1_Environmental outputs*), the results are significant, p-value 0.049 < 0.05. Environmental performance (*ENVfactor1_Environmental outputs*) has a small impact on influencing *Firm Market Value of shares.* E*nvironmental outputs* decrease *Firm Market Value*, the impact is negligible *Firm Market Value of shares*; this relationship has shown very poor results and the H3b hypothesis was not confirmed, see Tab. 4.

H3c:

The results of testing the relationship between environmental performance (*ECOfactor1 –Profitability, ECOfactor2 - Economic results*) and *Firm Market Value of shares* are significant, p-value 0.000 < 0.05. They show that economic performance has a positive significant impact on influencing *Firm Market Value of shares*, i.e. economic indicators increase its market value, making H3c accepted, see Table 5.

Table 5 Regressions on Firm Market Value on social, environmental and economic performance

Social performance		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	8.721	0.116		75.246	0.000
	SOCfactor1_Society	-0.572	0.196	-0.311	-2.925	0.019
	SOCfactor2_Labour. Practices and Decent Work	0.814	0.074	1.170	11.016	
	R Square	0.954				
	Adjusted R Square	0.943				
	F Change	83.627				0.000
Environmental performance		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	8.524	0.145		58.646	0.000
	ENVfactor1_Environmental outputs	0.273	0.136	0.233	2.004	0.049
	R Square	0.054				
	Adjusted R Square	0.041				
	F Change	4.015				0.049
Economic performance		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	8.767	0.49		177.621	0.000
	ECOfactor1_Profitability	0.376	0.50	0.486	7.568	0.000
	ECOfactor2_Economic results	0.543	0.050	0.701	10.922	0.000
	R Square	0.728				
	Adjusted R Square	0.720				
	F Change	88.287				0.000

Author's own source

The link between environmental and economic performance has been widely discussed in the literature in recent years. The results of this empirical research are confirmed by the research by [13] who analysed the relationship between environmental and economic performance, including the impact of corporate strategies with respect to sustainability and the environment for European paper-making industries. The results have shown that companies with preventive protection against pollution, where the environmental strategy is the goal, have a positive relationship between environmental and economic performance, thus improving the sustainability of the company. Author [14], argue in their research that not only the level of environmental performance, but mainly the environmental management, by which a certain level is achieved, have an impact on economic results. Another research by [15], dealt with the impact of business sustainability on organizational processes and performance in 180 American companies. They found that companies that had voluntarily adopted sustainability were referred to as companies with high sustainability compared to companies that had not adopted sustainability and were referred to as companies with low sustainability. Research has confirmed that in terms of stock market, high-sustainability companies outperform their competitors in the long run. It was investigated the link between the social component of corporate social responsibility and market value of equities. The results show that all the social subsets are positively related to a goodwill, but those that are related to human capital are more significant. Social expenses therefore prove to be a social investment, creating value for both social stakeholders and shareholders.

5. CONCLUSIONS

Based on empirical research and its results, it can be stated that increasing the social performance the economic performance given by the economic results also increases (EBT, EAT, EBIT, Added Value) in joint-stock companies in manufacturing industry. With respect to environmental performance given by environmental outputs (emissions, wastes), here the hypothesis was not confirmed; there was only a very low dependence. The social and environmental impacts on economic performance are explored in the short term and will only be appreciated by investors if economic performance is increased.

The impact of social, environmental and economic performance on the market value of a company has achieved similar results. Research results can provide investors with information that non-financial indicators have an impact on the market value of a company and become an important factor in deciding on investments in manufacturing companies in the Czech Republic. It can be therefore said that increased social performance improves the economic performance of joint-stock companies, while increasing the market value of the company. The proposed model has its limitations; it only analyses the relationship between non-financial performance and economic performance and market value; further research will focus on inclusion in the corporate governance model and on risk, but also on the directions of the relationship between the variables, both in the short term and in the long term, with the use of sensitivity analysis.

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