EFRI Exclusive Working Papers 2018-005

SUSTAINABLE VALUE ADDED VALUED – THE INTEGRATIVE MEASURE OF BUSINESS SUSTAINABILITY

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This research was supported by the
Faculty of Economics, University of Rijeka
https://www.efri.uniri.hr/en
ISSN:

Faculty of Economics, University of Rijeka
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EFRI WORKING PAPER SERIES

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Sustainable Value Added - Integrative Measure of Business Sustainability

Dejan Miljenović

Abstract

Implementation of business models based on Corporate Social Responsibility (CSR) and the Triple Bottom Line (TBL) resulted in a new analytical approach that can be used for holistic/integral evaluation of all the aspects contained in economic value. Because CSR and TBL are strategically oriented on objectives of sustainable development and eco-efficiency of the business operations, this newly observed economic value was named – Sustainable Value Added (SVA). However, the scientific proposals and constructive critics of the SVA model weren't appropriately tested by applicable econometric modelling. In this paper author introduces the empirical model for testing the sensitivity of SVA on all aspects of the Triple Bottom Line: 1) financial, 2) environmental and 3) social ones. The aim of this paper is to confirm SVA as an integrative measure that can be explicitly used for quantitative assessment of company contributions to the long term objectives of sustainable development. Therefore, author also advocates another important thesis regarding the extraction of the TBL data, which implicates that the process of data extraction can be ensured only when relevant number of companies, across different benchmarks, regularly publish annual CSR reports that transparently represent and unify essential TBL data essential for measurement and analysis of the SVA.

Key words: *Corporate Social Responsibility, Sustainable Value Added, Triple Bottom Line, Reporting, Company, Sustainability*

JEL classification: *O31, Q32, Q57*

1. Introduction

Paradigm of sustainable development is exclusively discussed in the qualitative context of business sustainability. However, quantitative measurement of business effects regarding sustainability aspects of the company Triple Bottom Line (1. financial, 2. environmental and 3. social - TBL) is rarely discussed and analyzed. Quantification and measurement of mentioned aspects of business sustainability came to a focus with growing environmental and social concerns of global sustainable development. Environmental and social effects, especially risks that are being provoked by companies, became relevant factors of business sustainability and issues of global sustainability in general. Basic research question became: How to measure and value mentioned ″non-financial″ business effects, especially when some environmental and social results of business operations cannot be quantified? There is an inconsiderable number of different contemporary indicators developed for measuring aspects of business sustainability that are based on the expression of the TBL data. Development of such indicators and measures has a purpose of analysing company performance (success) by using qualitative aspects of business, especially in the area of ecology, health, safety and factors of social development. In their paper from 2001, researchers Vesela Veleva and Michael Ellenbecker from the Lowell's Center for Sustainable Production support two basic ideas related to development of business sustainability indicators (2001: 520):

1. it is possible to have a standard set of indicators (i.e., indicators applicable to any company); and
2. as Volmann (1996) points out, it is better to measure the right things approximately than the wrong ones with great accuracy and precision.

However, when it comes to defining the aforementioned indicators some objective obstacles stand out. Determination of the form, and then measuring and presenting indicators of business sustainability, requires higher engagement due to their qualitative expression. This is important when it comes to economic decision-making, especially within the companies, where quantification of sustainability indicators is required (Olsthoorn et al., 2001: 457). Quantification encourages development of models for monetary analysis of sustainability indicators and measures. Negative environmental effects of business are usually assessed in terms of ecological damages and biodiversity rehabilitation. However, CSR management strategies are oriented on prevention of negative environmental effects and proactive evaluation of positive contributions to sustainable development. This type of evaluation is often prevented by significant differences in the content of the CSR reports. This is a matter of CSR report standardization. However, even standard formats of CSR reports (Miljenović, 2016: 42-48) are not always mandatory and their contents more often subjects to company self-initiative types of social reporting. In addition, there are pronounced sector differences that cause difficulties in comparing sustainability indicators. Reason for this is that the efficiency of business processes is differently measured across industries, for example for oil industry in relation to the food industry (Lyrstedt, 2005: 31). Petrini and Pozzebon (2009: 185-187) highlight organizational structure as a significant factor of business efficiency, which also derives across different sectors. Taking this into account author presents the *hypothesis that SVA can be used as an integrated measure of achieving efficiency within TBL aspects of financial, environmental and social responsibility of the company.* By this author also implies another crucial research element: *testing has to be conducted using exclusively standardized CSR reports, which content ensures required TBL data*. In this purpose SVA model, relevant literature and methodology review will be provided within the paper. Scientific objective is to provide empirical data based on TBL theory and methodology and

then use SVA conception of analysis to provide relevant scientific results on SVA as integrated measure of business contribution to sustainability.

Further organization of the paper follows into the second section in which literature review is provided relating to the basic and contemporary findings on the SVA determination as an integrative measure of business performance. In this part special attention is given to the integration of efficiency parameters within the TBL business model. The third section delivers data description with all the relevant methodology parameters to be used for empirical analysis. This section also provides relevant characteristics for defined groups of sustainability variables (dependent and independent). Derived model specifications are described in the fourth section where empirical analysis is being conducted with all the findings relevant to prove the hypothesis. The fifth section contains results and accompanying discussion related to economic significance of the empirical results. Summarized conclusion is presented in the sixth section of the paper.

2. Literature review

When it comes to SVA most relevant findings where provided by British-German scientific ″duo″ Frank Figge[1] and Tobias Hahn[2]. Their research represents chronological development of the sustainable value added concept (2002, 2004a, 2004b, 2005, 2006 and 2009). Question of SVA occupied the attention of academic and business community stating (Figge, Hahn, 2002: 1): *″How sustainable is your company? More and more companies have been confronted with this question over the last decade. To answer this question the contributions of companies to sustainability must be assessed.″* This statement implied regular absence of a single quantitative measure intended to evaluate different aspects of business sustainability in practice. Application of the SVA presented by Figge and Hahn (2002) is based on the economic principles and logic of investment, an approach made of three key elements:

1. *company eco-efficiency* – efficient distribution and creation of socially valuable impacts in business operations,
2. *opportunity costs* – occur if the value that is created (or destroyed) by using a limited natural resource more (or less) effective than in other companies within the specific industry/sector and
3. *benchmark analysis* – intended for setting the price of capital (resources) engaged, respecting effective return on investment (ROI) for the specific industry (return to cost ratio).

Sustainability at a company level can be determined as value added arisen from company TBL. SVA therefore represents the economic growth that exceeds the costs of environmental (EIA_i) and social impacts (SIA_i) of the business. According to the original Figge-Hahn model (Figge, Hahn, 2004a: 182) this condition is expressed by the following function:

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[1] Frank Figge, full professor at Euromed Management School, Marseille (previously at University of St. Andrews & Sustainable Development Research Centre, SDRC)

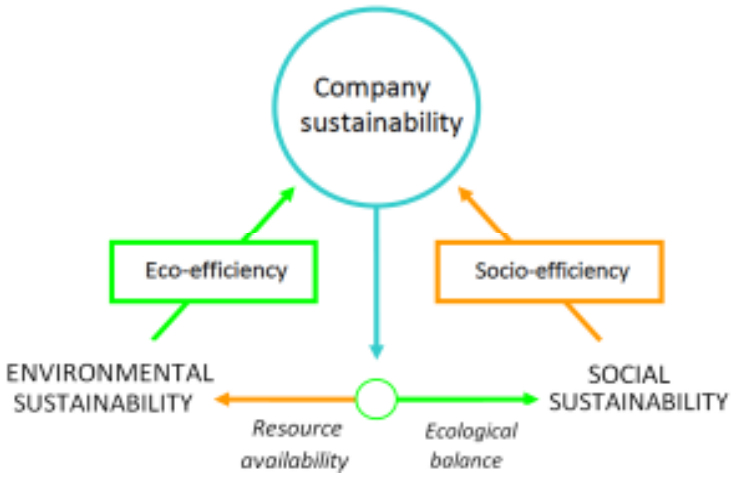
[2] Tobias Hahn, associate professor at Euromed Management School, Marseille (previously at IZT-Institute for Futures Studies and Technology Assessment)

$$VA_{t1} - VA_{t0} \geq \frac{1}{n+m}\left(\sum_{i=1}^{n} EE_{i,b} \cdot (EIA_{i,t_1} - EIA_{i,t_0}) + \sum_{j=1}^{m} SE_{j,b} \cdot (SIA_{j,t_1} - SIA_{j,t_0})\right) \quad (1)$$

where:
VA_{t1} = Value Added of the company in t_1
VA_{t0} = Value Added of the company in t_0
n = number of relevant environmental impacts
m = number of relevant social impacts
$EE_{i,b}$ = eco-efficiency of the benchmark for environmental resource i
$SE_{j,b}$ = social efficiency of the benchmark for social resource j
$EIA_{i,t0}$ and $EIA_{i,t1}$ = eco-effectiveness for environmental impact i in t_0 and t_1
$SIA_{j,t0}$ and $SIA_{j,t1}$ = social effectiveness for social impact j in t_0 and t_1

TBL concept suitably includes both efficiency and effectiveness regarding financial, environmental and social impacts of the company. The whole paradigm of CSR insists on simultaneous company efficiency when achieving environmental impacts (eco-efficiency) and social impacts (social efficiency). Sources of long-term sustainability in generating business results can be precisely identified using the integrated efficiency parameters of the business model (Scheme 1). These aspects are regularly and transparently presented in companies CSR reports.

Scheme 1. Integration of efficiency parameters within the TBL model



Source: author's adaptation based on Dyllick, T., Hockerts, K. (2002) ″Beyond the Business Case for Corporate Sustainability″, *Business Strategy and the Environment*, Vol. 11, No 2, pp. 130-141.

Business efficiency concept relates to numerous possibilities of achieving balanced results within the TBL. Generating larger quantities of goods and services with smaller use of available resources, materials, water, energy, waste and generated greenhouse gas emissions (GHG) reflects the efficiency of the production process. In the process of achieving its financial results, company inevitably affects environment and society. This is done every time when a company uses natural or human resources, as well as accounting all potential effects

that may arise from unwinding organizational activities. Eco-efficiency and social efficiency are indirectly involved in achievement of company sustainability. Therefore, it is a matter of mutual interaction between three elements of TBL: 1) financial sustainability, 2) environmental sustainability and 3) social sustainability. For example, a precondition for social sustainability is sufficient allocation of resources required for future development. At the same time, only sustainable social activities can ensure balance between current and the future use of available resources. To achieve sufficiency of environmental and social resources it is of the utmost importance to engage factors of sustainability within the companies, in which TBL effects have significant impact (International Integrated Reporting Council**,** 2012: 4 and International Integrated Reporting Council, 2013: 13). Respecting this, eco-efficiency and social efficiency occur as two main drivers of the long-term economic sustainability that arises from the microeconomic level (level of the company) to the macroeconomic level.

At macroeconomic level, all contributions of individual companies inside one national economy generate GDP as a measure of economic growth. At company level measure of economic growth (EG) is most appropriate for determination of created value added for a given period of time (previously indicated as VA_{t1} i $VA_{t0)}$ i.e. this is a company value added in time units t_1 i t_0. Thus, the economic growth of the company based on its value added is expressed as:

$$EG = (VA_{t1} - VA_{t0)} \tag{2}$$

Time component of value added (t_0 i t_1) is relevant parameter for measuring sustainability. In accordance with the premises of sustainable development, sustainable value is being created only when the company has achieved positive value added in comparison to other companies of the same industry. Positive value added is to be generated only when the total consumption of each production resource is kept at the level of the previous production time period (t_0). This implies that integrative measure of company efficiency in generating TBL is possible to interpret by specific form of value added, which in this context has a structure and the context of Sustainable Value Added. SVA, therefore, can be concluded as:

$$SVA = EG - \frac{1}{n+m}\left(\sum_{i=1}^{n}\left(EG - SVA_{si,i}\right) + \sum_{j=1}^{m}\left(EG - SVA_{si,j}\right)\right) \tag{3}$$

Proposed model implies tracking derivations of any efficiency change caused by different usage of environmental or social resources, which reduces sustainability parameters of economic growth. Negative changes of company effectiveness related to environmental and social impacts represent costs i.e. the reduction of value added along with its sustainability components. In this case SVA is being calculated as the difference of economic growth (EG) and costs that can cause adverse changes in effective realization of environmental ($SVA_{si,i}$) and social ($SVA_{si,j}$) effects. Any such change reduces the potentially achievable economic growth i.e. the potential added value of the company.

Theoretical and practical approach to value added in the sphere of sustainability was the subject of research for a number of distinguished authors: Ball, Owen and Gray (2000), Hart

and Milstein (2003), Graham and Bertels (2006), Ehrmann (2008) and Kuosmanen and Kuosmanen (2009). In their paper Hart i Milstein (2003) recognize the processes of creating sustainability values as different forms of CSR. This is enhanced by research of Graham and Bertels (2006) considering that creation of described sustainability values has to be followed by development of appropriate strategic frameworks for its control, measurement and analysis. Kuosmanen and Kuosmanen (2009) also distinguish SVA as a suitable integrative measure of rating company sustainable development. They also criticize the content of the Figge-Hahn model; however, they do not empirically support their critics by testing any TBL parameter included in the SVA. Therefore, as not empirically proven, their critic is not significantly accepted. Along with the proposed SVA measure Ehrmann (2008: 1-3) suggests measurement of a company sustainability by using a simple analysis of values and indicators contained in the TBL and application of the DEA method. Although these two proposals do not represent integrated assessment of company sustainability Ehrmann´s research confirms that any type of TBL analysis is being preconditioned by availability of unified and consistent set of published CSR data. Only standardised CSR reports represent reliable source of qualitative CSR data appropriate for business sustainability analysis. All relevant issues of standardisation and sources of TBL data can be dealt by using *Sustainability Reporting Guidelines* of the Global Reporting Initiative (2013). These guidelines integrate company's financial, environmental and social impacts. Aim of this paper is to test SVA as justified and relevant integrative sustainability measure, which reflects financial, environmental and social business impacts. Confirmation for this at the appropriate level of empirical reliability was not the subject of any previous scientific research. To explain SVA integrative characteristics TBL parameters need to be presented as relevant statistical variables and subjected to affirmative conception and methodology of analysis.

3. Methodology

Methodology for empirical analysis of SVA as an integrative measure of company sustainability in a large extent depends on available TBL data sources, due to the aforementioned issues of non-uniformed CSR reporting among companies and different industries. To realize the condition of Figge-Hahn model, which implies benchmark analysis, research has included different types of industries across countries (financial services, energetic sector and energy utilities, food and beverage, mining, aviation, construction, media and metals products). Only benchmark analysis can ensure identification of eco-efficiency and social efficiency ratios. Companies subjected to analysis had to be production oriented so that TBL variables like energy and water consumption, GHG emissions and generated waste can be tested along with financial variables. Condition of production orientation eliminated subject companies from financial services and media industry. For each industry there was a data evaluation process with two basic empirical requests: 1) each company had to have minimally 3 data periods (CSR reports during a 3 years period) and 2) there had to be full transparency and availability of published data. The last one was ensured by using GRI standards and its applicable frameworks, which allowed successful TBL data collecting. Also, there was a sample quantity condition, which wasn’t present in all of the remaining sectors/industries. Based on this companies from the food and beverage industry ensured a relevant sample.

Characteristic of the sample define the model of empirical research used in this paper. Sample is consisted of 150 data panels in a 3 years time period. It's a data panel of short time series and numerous companies. The regression model panel used in this paper is as follows:

$$y_{it} = FP_{it}\beta + OP_{it}\gamma + DOP_{it}\delta + a_i + u_{it} \quad \text{za } t = 1,...,T \text{ and } i = 1,...,N \tag{4}$$

where:
y_{it} = dependent variable representing the company business result (Sustainable Value Added or Value Added) per individual company and time t,
$FP_{it}\beta$ = matrix of independent financial variables with the corresponding coefficient β,
$OP_{it}\gamma$ = matrix of independent environmental variables with the corresponding coefficient γ,
$DOP_{it}\delta$ = matrix of the independent social variables with the corresponding coefficient δ,
a_i = denotes specific factors characteristic of each country and
u_{it} = the case of a random deviation.

Matrix of independent financial variables ($FP_{it}\beta$) includes values of: VA, gross profit, gross revenues, financial revenues, EBIT, EBITDA, long-term assets, short-term assets, capital, long-term liabilities, short-term liabilities and long-term debt. Matrix of independent environmental variables ($OP_{it}\gamma$) includes values of: GHG emissions (in tons of CO^2 equivalent), consumed energy (in kWh), consumed water (in m^3), and generated waste (in tons). Matrix of the independent social variables ($DOP_{it}\delta$) represent ″dummy variables″ of different CSR aspects including: D1-Program/value of employee education/training, D2-Average hours of education/training per year per employee, D3-Program/value of safety at work, D4-Lost work days due to injuries at work (per million working hours), D5-Percentage of women in the governing bodies, D6-Value/existence of investments in local community, D7-Programs realised in cooperation with the local community bodies, D8-Value of donations, D9-Policies of corporate governance, D10-GRI index, D11-GRI LevelCheck. Value of the SVA as dependent variable was separately calculated. Social variables were chosen to represent diversity of company respecting norms of gender equality, safety at work, engagement and cooperation with community in general.

The common dilemma of the researchers about models of panel regression refers to choosing a model of fixed or random effects. Model of fixed effects is usually applied when data pattern includes relatively long time series and when it is assumed that there is an autocorrelation within the selected data set (conditioned by certain common characteristics of the company, country, etc.) In the case of data sample where panel is consisted of a larger number of the research subjects, and the time series is shorter, it is preferable to give advance to the model of random effects. Given data sample consists of a large number of companies in the specific sector (food and beverages) collected from eight sub sectors across a number of different countries. Therefore, it can be stated that sample has the features of a random choice sample.

Within the defined model analysis will be conducted of independent variables affecting on two dependent variables - sustainable value added (SVA) and value added (VA). Reason for this approach is the evaluation of effects caused by changed methodology of company performance measurement. Namely, it is expected that the change of independent variables -

financial, environmental, and variables of social responsibility (TBL variables) will have different impacts depending on the methodology used for measuring financial performance or TBL performance of a company. SVA as a business performance measure includes assessment mechanisms for environmental impacts and built-in aspects of corporate responsibility (employee training, safety at work, co-operation with the local community, etc.), which is opposed to traditional business performance measures or indicators that do not internalize these variables. Described methodological approach should confirm or refuse at significant certainty level set hypothesis on SVA as sustainability integrative measure.

4. Empirical data and analysis

This part of the paper explains the results obtained by the application of the panel regression model elaborated in the previous chapter. It is important to emphasize that the characteristics of the sample, analysis of the descriptive statistics and the correlation analysis defined final form of the econometric analysis method - panel regression analysis of random effects. This approach generated multiple model specifications with respect to the elimination of part of the financial variables. Tables 1 and 2 represent results of the analysis within five specifications of the model. It is important to notice that Table 1 represents results of empirical analysis where value added (VA) is set as dependent variable, and in Table 2 sustainable added value (SVA) is set as dependent variable. Distinguishing effects of the independent variables on dependent variables (VA and SVA) is of crucial importance for proving the underlying research hypothesis. VA as a performance measure primarily incorporates financial business results. Therefore, VA serves as a traditional concept of measuring company's performance without indulging fundamental CSR definition: integrated business result presented by TBL. Opposite to the VA is the SVA which complements basic financial performance with aspects of environmental and social performance of a company. SVA marks the methodological shift from measuring results based on economic growth toward measuring achievement of sustainable development objectives, which embodies an integral approach of measuring holistic business performance. Within the modest findings of previous researches (Alexander, Buchholz, 1978, Aupperle, Carroll, Hatfield, 1984, Blackburn, Doran, Shrader, 1994, Orlitzky, Schmidt, Rynes, 2003, Peloza, 2009, Kapoor, Sandhu, 2010) it is confirmed that there is a strong interdependence and a positive correlation between CSR and business performance indicators. Recent research conducted by Kapoor and Sandhu (2010) on a sample of 93 companies in India confirmed that this type of empirical testing is usually in comply with traditional business performance indicators. Therefore, a criticism of above-mentioned research, which states that companies with better financial results can afford additional CSR investment, is strongly emphasized. The complexity of this causality carries out the question whether investments in the direction of CSR improves company performance or is the company success predictor for its CSR activities. This question is further aggravated by issues of short time series that are present in empirical patterns of aforementioned research's where it is not possible to give an unambiguous answer.

At the same time, the current research of business sustainability indicators (Herzig, Schaltegger, 2006, Figge, Hahn, 2002, Olsthoorn et al. 2001, Lyrstedt, 2005, Veleva, Ellenbecker, 2001, Petrini, Pozzebon, 2009) do not simultaneously test the effects of environmental and social variables on traditional performance indicators nor integrated performance indicators (as it is the case with VA and SVA in this paper). Instead of time series analysis, this research aims to answer to the needs of introducing a systematic and

standardized integral approach of measuring company success in terms of TBL and all of its sustainability aspects (financial and non-financial ones). This can be done only thru comparison of the effects that independent variables have on dependent variables. This comparison is done separately for traditional performance indicators (Table 1 for VA) and for integrated performance indicators (Table 2 for SVA).

Table 1. Effects of environmental, financial and social responsibility variables on the growth of VA

Dependent variable	Value added				
Independent variables	Model1	Model2	Model3	Model4	Model5
GHG emissions	0.1089968 1.57	0.0596903 0.82	0.1008391 0.156		0.0548515 0.73
Energy	0.2137392 2.13**	0.1940935 2.07**	0.2741058 (2.71)***		0.2295722 2.31**
Water	-0.0503407 -0.79	-0.0710805 -1.14	-0.0270501 -0.42		-0.0542517 (-0.83)
Waste	0.070091 1.15	0.1467187 2.00**	0.0143412 0.23		0.0769953 (0.93)
Financial revenues		0.0257022 0.84		0.0429246 (1.20)	0.0356884 (1.09)
Capital		0.2209246 3.30***		0.2776852 (3.72)***	0.225542 3.14***
Long term debt		0.0215683 1.29		0.0321109 1.71*	-0.0980211 -0.87
D1			-0.1918357 -1.52	-0.1791497 (-1.50)	-0.0980211 (-0.87)
D2			0.1212026 (1.03)	0.1009433 0.91	0.0965887 0.98
D3			-0.10201 (-1.04)	0.0647001 0.67	0.0055191 0.06
D4			0.0100897 (0.08)	0.1380804 1.10	0.098532 0.88
D5			-0.1793056 (-1.64)	0.0154438 0.13	0.0073574 0.07
D6			0.1255405 (1.05)	0.1349447 1.16	0.0946648 0.92

D7			-0.308547 (-1.73)**	-0.2226077 -1.27	-0.2334875 -1.49
D8			-0.1455707 (-1.05)	-0.1924517 -1.39	-0.2111592 -1.73
D9			-0.1160835 (-0.69)	-0.0471391 (-0.27)	-0.0780914 -0.49
D10			-0.1361315 (-1.25)	-0.3034904 (-2.78)***	-0.1953971 -1.93***
D11			0.2877464 (2.84)***	0.2364489 (2.34)***	0.2347481 (2.59)***
Constant	15.74337 (1.97)**	5.564311 4.01***	8.247965 (6.78)***	8.511355 (8.63)***	5.81979 3.95***
Opservations (n)	140	112	139	115	111
Groups	49	42	49	44	42
R^2(within)	0,02	0,13	0,15	0,21	0,28
R^2(between)	0,41	0,47	0,48	0,21	0,53
R^2(total)	0,43	0,51	0,49	0,42	0,56

- Remark: *, **, *** indicate the level of statistical significance of 10%, 5% and 1%
- ″Dummy variables″ representing different CSR aspects: D1-Program/value of employee education/training, D2-Average hours of education/training per year per employee, D3-Program/value of safety at work, D4-Lost work days due to injuries at work (per million working hours), D5-Percentage of women in the governing bodies, D6-Value/existence of investments in local community, D7-Programs realised in cooperation with the local community bodies, D8-Value of donations, D9-Policies of corporate governance, D10-GRI index, D11-GRI LevelCheck

In terms of environmental variables and their effects results of the regression analysis shown in Table 1 indicate that energy consumption highly and significantly affects on the increase of the company VA. In a somewhat lower extent, environmental variables also affect the increase of waste, which has significant value in only one specification. Water consumption and emissions of GHG pollutants are neutral for business performance. The results obtained can be explained by the fact that increased production causes higher energy consumption and additional creation of waste. Because of this the cost of the mentioned inputs (outputs) is significantly lower than the created VA, which consequently enables the creation of positive financial results. In this case energy consumption and generating waste positively contribute to VA. The neutrality that is set forth in terms of GHG emissions and water consumption may indicate that these costs are not internalized - i.e. the manufacturer does not pay the price of such pollution (through emission taxes or fees). On the other hand, the volume of GHG emissions and water consumption seems to be somewhat internalized (by restrictive regulation regarding GHG emissions, by conservation of water sources or by the wastewater treatment) within the company's costs (especially the level of water consumption due to the negative coefficient value, however, it does not have a high statistical significance).

When it comes to the assessment of effects that financial variables have on business performance there is a positive impact of owned capital. However in this case it is highly difficult to determine whether companies of better performance have higher capital or there is

a presumption that high owned capital is predictor of better performance and, therefore, a lower use of the external capital sources (lower financial leverage).

Conducted analysis of different CSR variables (D1 – D11) indicates negative coefficient values for most of the variables, which leads to the conclusion that such investments represent a pure business cost (when assessed by traditional performance indicator of VA). However, most of the values are not statistically significant except for the aggregate GRI index (investment programs in the local community in one specification have a significant and negative value). It is interesting that there is a negative value of the GRI index while the GRI levelcheck is positive and significant. This clues some of the research (Peloza, Papania, 2008, Lii, Lee, 2012, Maistriau, Bonardi, 2014 and Salaiz, 2015) that generally prove relevance of CSR regarding company reputation, which has an indirect positive impact on financial performance.

Table 2. Effects of environmental, financial and social responsibility variables on the growth of SVA

Dependent variable	Održiva dodana vrijednost				
Independent variables	Model1	Model2	Model3	Model4	Model5
GHG emissions	-1.911051 (-2.68)***	-1.991017 -2.64***	-1.826432 (-2.46)**		-1.739446 -2.17**
Energy	0.3700886 (0.79)	0.401665 0.84	0.2893909 (0.59)		0.342198 0.68
Water	0.9650315 (1.62)	1.748811 3.19***	1.147504 (1.95)**		1.809092 3.35***
Waste	-0.7840885 (-1.49)	-2.018239 -3.84***	-1.003918 (-1.86)*		-2.25482 -4.15***
Financial revenues		0.1365616 0.31		-0.2839207 -0.60	0.2445557 0.52
Capital		1.844458 (4.02)***		1.219689 2.26**	1.884316 4.09***
Long term debt		0.4216891 (1.60)		0.2159537 0.72	0.4475285 1.57
D1			-0.4842321 (-0.27)	1.948622 0.92	-0.5463569 -0.26
D2			0.2151433 (0.13)	-1.486774 -0.80	-0.1670527 -0.09
D3			-1.13279 (-0.79)	-0.5205125 -0.29	0.2178453 0.13
D4			-1.63052 (-0.91)	-2.234874 -1.06	-0.6375291 -0.32

D5			-0.4174143 -0.29	1.133873 0.63	1.218365 0.74
D6			-0.1041943 -0.06	-1.704915 -0.85	-0.2220342 -0.11
D7			-1.39564 -0.60	-1.749175 -0.65	-1.659615 -0.67
D8			-0.3430855 -0.20	-1.677648 -0.81	-1.932765 -1.00
D9			-1.203468 -0.55	-1.736924 -0.67	-1.233027 -0.53
D10			-1.005672 -0.66	0.3682527 0.20	-2.230696 -1.25
D11			1.478386 1.03	2.114942 1.23	2.973475 1.82*
Constant	15.74337 (1.97)**	-8.785121 (-1.01)	20.82727** 2.35	-5.684693 -0.68	-7.063795 (-0.71)
Opservations (n)	144	116	143	119	115
Groups	49	42	49	44	42
R^2(within)	0,04	0,01	0,03	0,00	0,01
R^2(between)	0,17	0,57	0,29	0,33	0,66
R^2(total)	0,16	0,56	0,27	0,33	0,64

Remark: *, **, *** indicate the level of statistical significance of 10%, 5% and 1%

As noted, Table 2 shows interdependence results for the group of financial, environmental and social responsibility variables in relation to the dependent variable of SVA. In the case of SVA as an independent variable, in comparison to the VA, there are significantly different results of analysis when it comes to the effects of environmental variables. Namely, the GHG emissions and generated waste record extremely high negative and statistically significant values of their coefficients. In other words, the concept of sustainable value measurement highlights and integrates extremely negative developmental effects of GHG emissions and waste pollution. On the other hand, values of energy and water consumption are extremely positive and, in the case of water consumption, they are statistically significant. The results of conducted analysis confirm significant difference of environmental variables effects in relation to selected dependent variables. Traditional performance metrics in the case of VA include the effects of environmental variables only through company costs while the concept of SVA also successfully integrates the harmful long-term development effects that are neglected within the traditional approach. This confirms SVA as an integrative sustainability measure, which was assumed by the initial hypothesis of this paper.

Regarding the effects of financial variables, the results in Table 2 are consistent. Only the variable of capital has positive and statistically significant effects in listed specifications of the model. The equal conclusions can be set when it comes to CSR variables. It appears that only a set of socially responsible business practices (presented by variable of GRI levelcheck)

leads to statistically significant and positive effects on sustainable development of a company. Moreover, this is worth in both cases when business performance/success is measured by a traditional VA or by a new integral SVA-TBL approach.

5. Results and discussion

Research concluded two basic findings: 1) there is a statistically significant difference when business performance is measured by traditional or by integrative measures and 2) SVA model successfully integrates theoretically defined Triple Bottom Line parameters promoted by CSR management. There is also an additional conclusion related to the collection of TBL data: for research purposes author used only the data provided by companies whose CSR reports where published in compliance with the *Guidelines* of Global Reporting Initiative. This application method enabled presence of all the data primarily relevant for determination of the SVA, which is in the case of environmental or social data sometimes extremely hard to approach. GRI reports maintain data transparency for analytically relevant period of time, which was essential for SVA calculation, and foremost, these reports provide quantified data sources (expressed in kWh for energy consumption, in m^3 for water usage etc.).

Results that have determined similar effects of financial variables on the measures of VA and SVA confirmed that SVA is not only relevant for integrating non-financial business aspects but also it is a very practical and reliable sustainability indicator of basic financial performance. Different findings regarding environmental variables in the case of VA determines its disadvantages due to negative effects of environmental variables regarding energy usage and waste generation. However, as a traditional financial performance measure VA respects and internalizes GHG emission costs along with the water inputs. This is mainly due to existing international regulation on pollution and a long time applied standards regarding waste water treatment. This also indicates that energy and waste efficiency ratios are still not fully respected in measuring and analyzing general company performance and its sustainability. By empirically proving that integrative SVA approach results in a reliable and quantified integral measurement model of companies performance this research draws attention to the insufficiency of sustainability content within traditional performance measures. This has multipurpose relevance in practice: 1) business analysts can go beyond financial risks, to measure and report on environmental and social risk aspects, 2) managers can ″stern″ company value by managing the balance between financial, environmental and social variables of the given value, 3) economic value objectives are being expanded to additional value generators in the area of environmental and social effects of the business. This research raises SVA as a tested and proven measure for linking all the relevant aspects of full business-to-society sustainability as a core issue of contemporary management.

6. Conclusion

Basic hypothesis of the paper is confirmed, stating that SVA can be used as an integrated measure of achieving efficiency within TBL aspects of company financial, environmental and social responsibility. Sustainability issues overgrew pure environmental activism and came back to the source of the problem - the corporate responsibility. Business operations on a global scale gain not only a financial momentum, but also a strong environmental and social impact. When responsibility for these impacts is taken by the companies than, also, an

appropriate measurement system has to be applied. Traditional business performance measures, unfortunately, do not asses non-financial components of business development. Therefore, Figge-Hahn SVA model occurred as justified research question. Research in this paper represents a significant contribution because SVA, although modelled, until now was not appropriately tested as a business performance measure, especially by using a full set of TBL data. It was necessary to conduct a research by empirically using five specifications of the panel regression model so it can engage all the relevant sustainability aspects within the company. Empirical results presented in this paper draw attention on issues and advantages of correct and applicable business and sustainability measurement system. Reason for this is that managers and investors use more and more of non-financial data along with financial ones to gain holistic picture on business impacts related to environment and society. These impacts, as it shown by research results, have significant relevance in creation of overall business result. Moreover, as research predictors, these impacts are previously theoretically and empirically customed as relevant aspects of managing company internal and external sustainability issues. This was done by using only one model for managing sustainability issues in business - the TBL. The relevance of this research is also that it was conducted on data collected exclusively by using the *Guidelines* of the Global Reporting Initiative, which were used as standard frame for unifying financial, environmental and social data in one place – the CSR report. By doing this the research also promotes importance GRI *Guidelines* and confirms them as a basic and reliable source of TBL information for any type of accompanied sustainability analysis. Within this paper, grounds for future research are made especially on the issues of sustainability evaluation and developing TBL metrics. Every industry has a specific set of parameters that is moulding its efficiency ratios. These ratios are extremely relevant in development of environmental and social indicators, which provide feedbacks on company sustainability performance and add up to traditional financial indicators. Described holistic approach is therefore a prerequisite for future development of TBL measures and indicators of business and social sustainability. On a global market, which is aware of sustainable development issues, growing number of products and services is permeated by ecological and socially responsible characteristics. These characteristics are originally established in the production process, within the company organization and in a way it uses available environmental and social resources. If the management is able to fully apply responsibility standards on relevant issues across the processes of extraction, production and market engagement than it will be able to provide sustainable products and services. This is in accordance with the developing CSR paradigm and sustainability thesis developed on the microeconomic level i.e. the level of the company. Criticism of CSR paradigm was usually founded on the lack of indicators that exhibit contributions of CSR policies to business success. SVA as an integrative sustainability measure denies this type of critics while conducted empirical research provides this measure as a practical tool for CSR management and analysis. To gain practical momentum for using sustainability measures in everyday business it is crucial to promote and develop additional research and indicators frames with objectives of broad application across different sectors and industries.

References

Alexander, G. J., Buchholz R. A. (1978) ″Corporate social performance and stock market performance″, *Academy of Management Journal*, Vol. 21, No. 3, pp. 479-486, doi: https://doi.org/10.2307/255728.

Aupperle, K. E., Carroll, A. B., Hatfield, J. D. (1985) ″An empirical investigation of the relationship between corporate social responsibility and profitability″ *Academy of Management* Journal, Vol. 28, No. 2, pp. 446-463. doi: https://doi.org/10.2307/256210.

Ball, A., Owen, D. L., Gray, R. (2000) ″External transparency or internal capture? The role of third-party statements in adding value to corporate environmental reports″, *Business Strategy and the Environment*, Vol. 9, No. 1, pp. 1-23, doi: https://doi.org/10.1002/(sici)1099-0836(200001/02)9:1%3C1::aid-bse227%3E3.0.co;2-h.

Blackburn, V. L., Doran, M., Shrader, C. B. (1994) ″Investigating the dimensions of social responsibility and the consequences for corporate financial performance″, *Journal of Managerial Issues*, Vol. 6, No. 2, pp. 195-212, available at: http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1002&context=management_pubs.

Dyllick, T., Hockerts, K. (2002) ″Beyond the Business Case for Corporate Sustainability″, *Business Strategy and the Environment*, Vol. 11, No 2, pp. 130-141, doi: https://doi.org/10.1002/bse.323.

Ehrmann, M. (2008) ″Comparing Sustainable Value Approach: Data Envelopment Analysis and indicator approaches - An application on German dairy farms″. In *12th Congress of the European Association of Agricultural Economists (EAAE),* August 26th-29th, Ghent, Belgium: EAAE, pp. 1-14, available at: http://ageconsearch.tind.io//bitstream/44140/2/233.pdf.

Figge, F., Hahn, T. (2002) ″Sustainable Value Added″. In *10th International Conference of the Greening of Industry Network*, June 2002 , Göteborg, Sweden: School of Economics and Commercial Law at Göteborg University and the Centre for Environment and Sustainability at Chalmers University of Technology, pp. 1-25.

Figge, F., Hahn, T. (2004a) ″Sustainable Value Added: measuring corporate contributions to sustainability beyond eco-efficiency″, *Ecological Economics*, Vol. 48, No. 2, pp. 173-187, doi: https://doi.org/10.1016/j.ecolecon.2003.08.005.

Figge, F., Hahn, T. (2004b) ″Value-oriented impact assessment: the economics of a new approach to impact assessment″, *Journal of Environmental Planning and Management*, Vol. 47, No. 6, pp. 921-941, doi: https://doi.org/10.1080/0964056042000284901.

Figge, F., Hahn, T. (2005) ″The Cost of Sustainability Capital and the Creation of Sustainable Value by Companies″, *Journal of Industrial Ecology,* Vol. 9, No. 4, pp. 47-58, doi: https://doi.org/10.1162/108819805775247936.

Figge, F., Hahn, T. (2006) ″Looking for Sustainable Value″ *Environmental Finance*, Vol 7, No. 8, pp. 34-35, doi: https://doi.org/10.1787/19901135.

Figge, F., Hahn, T. (2009) ″Not measuring sustainable value at all: A response to Kuosmanen and Kuosmanen″, *Ecological Economics*, Vol. 69, No. 2, pp. 244-249, doi: https://doi.org/10.1016/j.ecolecon.2009.08.003.

Graham, R., Bertels, S. (2006) ″Achieving Sustainable Value: Sustainability Portfolio Assessment″, *Greener Management International,* No. 54, pp. 57-67, available at: http://www.jstor.org/stable/greemanainte.54.57.

Global Reporting Initiative – GRI (2013) *Sustainability Reporting Guidelines G4: Reporting Principles and Standard Disclosures*, Amsterdam: GRI, available at: https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf.

Hart, S. L., Milstein, M. B. (2003) ″Creating sustainable value″, *Academy of Management Executive*, Vol. 17, No. 2, pp. 56-69, doi: https://doi.org/10.5465/ame.2003.10025194.

Herzig, H., Schaltegger, S. (2006) ″Corporate Sustainability Reporting: An Overview″. In Schaltegger, S., Bennett, M., Burritt, R., ed., Sustainability Accounting and Reporting. Dordrecht: Springer, doi: https://doi.org/10.1007/978-1-4020-4974-3_13.

International Integrated Reporting Council (2012) *″Towards integrated reporting – Communicating value in the 21st century″*, London: IIRC, available at: http://integratedreporting.org/wp-content/uploads/2011/09/IR-Discussion-Paper-2011_spreads.pdf.

International Integrated Reporting Council (2013) *″International Integrated Reporting Framework″*, London: IIRC, available at: http://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf.

Kapoor, S., Sandhu, H. S. (2010) ″Does it Pay to be Socially Responsible? An Empirical Examination of Impact of Corporate Social Responsiblity on Financial Performance″ *Global Business Review*, Vol. 11, No. 2, pp. 185-208, doi: https://doi.org/10.1177/097215091001100205.

Kuosmanen, T., Kuosmanen, N. (2009) ″How not to measure sustainable value (and how one might),″ *Ecological Economics*, Vol. 69, No. 2, pp. 235-243, doi: https://doi.org/10.1016/j.ecolecon.2009.08.008.

Lii, YS., Lee, M. (2012) ″Doing Right Leads to Doing Well: When the Type of CSR and Reputation Interact to Affect Consumer Evaluations of the Firm″, *Journal of Business Ethics*, Vol. 105, No. 1, pp 69-81, doi: https://doi.org/10.1007/s10551-011-0948-0.

Lyrstedt, F. (2005) ″Measuring Eco-efficiency by a LCC/LCA Ratio: An Evaluation of its Applicability – A case study at ABB″, *ESA Report*, Vol. 11, Göteborg, Sweden: CPM – Centre for Environmental Assessm ent of Product and Material Systems, available at: http://www.cpm.chalmers.se/document/reports/05/Measuring%20Eco-efficiency%20CPM%20Report%202005_8.pdf.

Maistriau, A. E., Bonardi, J. P. (2014) ″How Much Does Negative Public Exposure on Environmental Issues Increase Environmental Performance?″, *Academy Of Management Proceedings,* Vol. 2014., No. 1., pp. 11328-11328, doi: https://doi.org/10.5465/ambpp.2014.11328abstract.

Miljenović, D. (2016) ″Smjernice i standardi nefinancijskog izvještavanja″, *Računovodstvo, revizija i financije*, Vol. 26, No. 5, pp. 42-48, available at: http://www.rrif.hr/brza_pretraga.html?trazi=Smjernice+i+standardi+nefinancijskog+izvje%C5%A1tavanja.

Olsthoorn, X. et al. (2001) ″Environmental indicators for business: a review of the literature and standardisation methods″, *Journal of Cleaner Production*, Vol. 9, No. 5, pp. 453-463, doi: https://doi.org/10.1016/s0959-6526(01)00005-1.

Orlitzky, M., Schmidt, F. L., Rynes, S. L. (2003) ″Corporate Social and Financial Performance: A Meta Analysis″, *Organization Studies,* Vol. 24, No. 3, pp. 403-441, doi: https://doi.org/10.1177/0170840603024003910.

Peloza, J., Papania, L. (2008) ″The missing link between corporate social responsibility and financial performance: Stakeholder salience and identification″, *Corporate Reputation Review*, Vol. 11, No. 2, pp. 169-181, doi: https://doi.org/10.1057/crr.2008.13.

Peloza, J. (2009) ″The Challenge of Measuring Financial Impacts From Investments in Corporate Social Performance. *Journal of Management*″, Vol. 35, No. 6, pp. 1518-1541, doi: https://doi.org/10.1177/0149206309335188.

Petrini, M., Pozzebon, M. (2009) ″Managing sustainability with the support of business intelligence: Integrating socio-environmental indicators and organisational context″, *Journal of Strategic Information Systems*, Vol. 18, No. 4, pp. 178-191, doi: https://doi.org/10.1016/j.jsis.2009.06.001.

Salaiz, A. (2015) ″Is Corporate Social Performance a Balancing Act? The impact of CSR and CSiR on Firm Reputation″ *Academy Of Management Proceedings*, pp. 14682-14682, doi: https://doi.org/10.5465/ambpp.2015.14682abstract.

Veleva, V., Ellenbecker, M. (2001) ″Indicators of sustainable production: framework and methodoloy″, *Journal of Cleaner Production*, Vol. 9, No. 6, pp. 519-549, https://doi.org/10.1016/s0959-6526(01)00010-5.

Vollmann T. (1996) *The transformation imperative: achieving market dominance through radical change*, Boston, MA: Harvard Business School Press.

Održiva dodana vrijednost - integrativna mjera održivosti poslovanja

Dejan Miljenović

Sažetak

Implementacija poslovnih modela zasnovanih na društvenoj odgovornosti poduzeća (DOP) i trostrukom rezultatu poduzeća (eng. Triple Bottom Line – TBL) rezultira novim analitičkim pristupom koji se temelji na holističkoj/integralnoj procjeni aspekata ekonomske dodane vrijednosti. Budući da su DOP i TBL strateški orijentirani na ciljeve održivog razvoja i eko-efikasnosti u poslovanju ta nova promatrana ekonomska vrijednost naziva se održivom dodanom vrijednosti (eng. Sustainable Value Added – SVA). Dosadašnja istraživanja i konstruktivne kritike SVA modela nisu prikladno testirani primjenom odgovarajućih ekonometrijskih metoda. U ovom radu autor predstavlja empirijski model za testiranje SVA kao mjere koja integrira sve aspekte TBL-a: 1) financijski, 2) okolišni i 3) društveni aspekt. Cilj ovog istraživanja je potvrditi SVA kao integralnu mjeru koja se isključivo može koristiti za kvantitativnu procjenu dugoročnih učinaka koje poduzeće ostvaruje u smislu doprinosa održivom razvoju. Iz ovog razloga autor istovremeno zastupa još jednu važnu tezu glede nužnosti prethodnog prikupljanja podataka o trostrukom rezultatu, implicirajući da se taj proces može osigurati samo kada značajan broj poduzeća, različitih industrijskih sektora, redovito objavljuje godišnje izvještaje o DOP-u, a koji objedinjeno i transparentno prikazuju sve podatke nužne za analizu održive dodane vrijednosti.

Ključne riječi: *društvena odgovornost poduzeća, održiva dodana vrijednost, trostruki rezultat, izvještavanje, poduzeće, održivost*

JEL classification: *O31, Q32, Q57*

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