Measuring Firm's Performance Using Triple Bottom Line Approach

Flavio Hourneaux Junior*, Marcelo Gabriel

Nove de Julho University – Av. Francisco Matarazzo, 612 – São Paulo – Brazil
e-mail: flaviohjr@uol.com.br; mgabriel@gmail.com.br

Abstract

This paper aims to propose and validate a model for measuring a firm's performance from Triple Bottom Line (TBL) perspective. In order to do so, the three dimensions for TBL were threefold: economic, represented by BSC's financial indicators, according to Henri (2009); environmental and social, represented by indicators from Global Reporting Initiative (GRI) (2008). The research universe was the group of companies associated to Centre of Industries of Sao Paulo State (CIESP), Brazil and the sample summed up 149 companies. The results suggest that it is possible to consider a firm's sustainable performance through a set of 24 indicators: six for economic; nine for environmental and also nine for social performance.

Introduction

Several authors have attempted to define models for sustainability management in companies [e.g. 1, 2, 3]. Although sustainability indicators and indices are widely recognized as being important tools for policy making, and also to communicate information and as a path of measuring corporate performance on environmental, economic, social and technological areas [4], the meaning of both sustainability and its indicators can lead to some misunderstanding, confusion or deceiving [5, 6, 7]. In this fashion, according to several authors, a sustainable perspective should comprise not only the economic bottom line, but three [8, 9], adding both social and environmental dimensions to the traditional economic results to measure a firm's sustainable performance.

In this fashion, according to several authors, a sustainable perspective should comprise not only the economic bottom line, but three, adding both social and environmental dimensions to the traditional economic results to measure a firm's sustainable performance [8, 9].

Hence, one of the basic concepts of sustainability is the "Triple Bottom Line" (TBL). This concept encompasses three distinct dimensions: economic, social and environmental, giving a broader perspective for companies' performance. Despite contrary opinions to this concept [10, 11], in which the impossibility of its implementation is argued, the TBL concept has been expanded since its acceptance and has been more and more widespread [8]. Thus, this paper aims to propose and validate a model for measuring a firm's performance from Triple Bottom Line (TBL) perspective. In order to do so, the instrument for data collection was threefold: for economic dimension, six BSC's financial indicators, according to Henri (2009) [12]; for environmental and social dimensions, respectively nine and twenty two indicators from Global Reporting Initiative (GRI) (2008) [13]. This study is both descriptive and quantitative and was done through a survey comprising 149 companies associated to Centre of Industries of Sao Paulo State (CIESP), Brazil.

Discussion

Perhaps the most known definition related to sustainability the one brought by Brundtland Commission, stating that sustainable development “meets the needs of the present without compromising the ability of future generations to meet their own needs” [14]. Regardless of the definition taken into consideration, sustainability issues have gained importance for both society and companies to continuous carry on living.

And the relationship between sustainability and firms is close: a sustainable company would be the one that contributes to sustainable development while creates, simultaneously, economic, social and environmental benefits [15]. This approach brings a new perspective of management and behavior to companies, acting in a sustainable basis. Besides that, “Sustainability in practice can be seen as the art of doing business in an interdependent world. […] Sustainability means operating a business in a way that causes minimal harm to living creatures and that does not deplete but rather restores and enriches the environment. […] also respects the interdependence of various elements in society on one another and on the social fabric. Sustainability means operating a business in a way that acknowledges the needs and interests of other parties (community groups […] and that does not fray but rather reinforces the network of relationships that ties them together” [16].

An uneasy task is to define what sustainability in fact comprises. Epstein and Roy (2003) [17] and Epstein (2008) [18] summarized the main issues related to a sustainable approach to business, as being: Ethics; Governance; Transparency; Business relationships; Financial return; Community involvement and economic development; Value of products and services; Employment practices; Protection of the environment. According to the authors, these principles should guide an organization towards a sustainable performance. In order to accomplish that, the principles are supposed to have three attributes: (i) they make the definition of sustainability more precise; (ii) they can be integrated into day-by-day management decision processes and into operational and capital investment decision-making; and (iii) they can be quantified and monetized [18].

Possibly due to its complexity, one of the basic concepts of sustainability that is overall recognized is the "Triple Bottom Line” (TBL). This concept encompasses three distinct dimensions: (i) economic - a sustainable economic system must be able to produce products and services in a continuous way, without taxes or without generating financial problems to its various participants in the value chain; (ii) social - a social system achieves sustainable social justice and income generating opportunities through social services such as health and education, and equal treatment to all its members; (iii) environmental - an environmentally sustainable system does not compromise the foundation of resources, either renewable or nonrenewable, using them sparingly, and seeking to maintain biodiversity, atmospheric stability and other functions of the ecosystem [9].

Despite some opposition to this approach by some authors [10. 11], to whom TBL’s application would be impossible, the acceptance of TBL as a proxy for measuring firm’s sustainable performance [8].

Thus, this study aims to propose and validate a framework for measuring a firm’s performance from Triple Bottom Line (TBL) perspective, according to the following research steps.

Methodological Procedures

This study is both descriptive and quantitative. Despite the non-probabilistic sampling, this set of companies can be considered as a homogeneous group, with at least one common characteristic, as belonging to one industry, as recommended by Flynn et al. (1990) [19]. The

research universe was the group of companies associated to Centre of Industries of Sao Paulo State (CIESP), Brazil, through an invitation letter by CIESP's Board of Social Responsibility. Although there were 347 accesses to the instrument, only 149 could be considered as complete and valid.

In order to represent the three dimensions for TBL, the instrument for data collection was threefold: for economic dimension, 6 BSC's financial indicators, according to Henri (2009) [12]; for environmental and social dimensions, respectively 9 and 22 indicators from Global Reporting Initiative (GRI) (2008) [13]. The complete list is presented in Table 1.

Table 1: Triple Bottom Line (TBL) Dimensions and Indicators used in the survey

TBL Dimension	Indicator	Code
Economic Indicators (based on Henri, 2009)	Operational income	BSCF1
	Sales growth	BSCF2
	Return-on-investment (ROI)	BSCF3
	Return-on-equity (ROE)	BSCF4
	Net cash flows	BSCF5
	Cost per unit produced	BSCF6
Environmental Indicators (based on GRI, 2008)	Materials	GRI_ENV_A
	Energy	GRI_ENV_B
	Water	GRI_ENV_C
	Biodiversity	GRI_ENV_D
	Emissions, effluents and waste	GRI_ENV_E
	Environmental aspects of products and services	GRI_ENV_F
	Environmental compliance	GRI_ENV_G
	Transporting	GRI_ENV_H
	General environmental issues	GRI_ENV_I
Social Indicators (based on GRI, 2008)	Employment	GRI_SOC_A
	Labor/Management Relations	GRI_SOC_B
	Occupational Health and Safety	GRI_SOC_C
	Training and Education	GRI_SOC_D
	Diversity and equal opportunity	GRI_SOC_E
	Investment and procurement practices	GRI_SOC_F
	Non-discrimination	GRI_SOC_G
	Freedom of association and collective bargaining	GRI_SOC_H
	Child Labor	GRI_SOC_I
	Forced and Compulsory Labor	GRI_SOC_J
	Security Practices	GRI_SOC_K
	Indigenous Rights	GRI_SOC_L
	Community	GRI_SOC_M
	Corruption	GRI_SOC_N
	Public Policy	GRI_SOC_O
	Anti-competitive behavior	GRI_SOC_P
	Compliance	GRI_SOC_Q
	Customer health and safety	GRI_SOC_R
	Product and service labeling	GRI_SOC_S
	Marketing communications	GRI_SOC_T
	Customer privacy	GRI_SOC_U
	Compliance of products and services	GRI_SOC_V

Source: created by the authors, based on Henri (2009) and GRI (2008).

To each of these indicators the respondent should identify its degree of use, respecting a seven-point scale, with "1" being "not at all" and "7" as "at a great extent", with verbal anchors at the extremes. The scale was validated using Confirmatory Factor Analysis (CFA). CFA is useful to test hypothesis based on past evidence and/or theory and requires a strong knowledge of observed measures that define the latent variable. Conversely from Exploratory Factor Analysis (EFA), CFA provides a greater emphasis on theory testing and also offers a

robust set of analytic procedures, not available on EFA [20]. Since CFA is focused only on the link between the factors and their measured variables, in the context of a Structural Equation Modeling (SEM) represents the measurement model (Byrne, 2009). Since CFA is focused only on the link between the factors and their measured variables, in the context of a Structural Equation Modeling (SEM) represents the measurement model [21].

PLS-SEM was used for model measurement and the constructs were hypothesized as reflective. Reflective models are the most used measurement model in social sciences and have its roots on classical test theory. This measurement model is useful when the hypothesis of causality is generated from the construct to the indicators. Data were analyzed using SmartPLS 2.0 (M3) [22].

Main Results

The survey respondents summed up 149 companies. In general, among their main characteristics we can highlight: the predominance of transformational industrial companies (87.2%); mostly of them are micro, small and medium companies, with annual revenues less than $ 60 million (73.2%) and number of employees less than 99 (59.1%). Of these companies, mostly, only 11.4% are negotiated in the open market. They mostly have domestic (79.9%) and private capital (99.3%).

The estimation of a measurement model imply in the definition of relationships between the indicators (observed variables) and the construct (the latent variable). To perform the assessment of a certain measurement model, several criteria of reliability and validity must be evaluated. The complete assessment of a measurement model includes the composite reliability to evaluate internal consistency, individual indicator reliability and average variance extracted (AVE) to check convergent validity, Fornell-Larcker criteria and cross-loadings to assess discriminant validity [23].

Composite reliability (ρc) is measured from 0 to 1 and higher values are equal to higher levels of reliability. As a rule of thumb values between 0.7 and 0.9 are considered satisfactory. Indicator reliability and AVE are common measures of convergent validity. Indicator reliability is measured by its outer loading and the expected measure is above 0.7. AVE should be above 0.50. Finally discriminant validity is assessed by two measures: Fornell-Larcker criteria and cross-loadings. Fornell-Larcker criteria compare the squared root of the AVE of each construct to the correlations with other latent variables (or constructs) and the value of AVE should be greater. All indicators presents outer loading above 0.7 and cross-loading confirmed discriminant validity. All parameters fitted or exceeded the minimum threshold. Table 2 presents the results of AVE and composite reliability for each construct:

Table 2: AVE and composite reliability for each construct

Latent Variable	AVE	ρ_c
BSC_FIN	0.5677	0.8866
GRI_ENV	0.6450	0.9420
GRI_SOC	0.5961	0.9298
Reference Values	**> 0.50**	**> 0.7 ~ 0.9**

Source: created by the authors.

All indicators presents outer loading above 0.7 and cross-loading confirmed discriminant validity. Table 3 shows the squared root AVE (bold) compared to the latent variable correlations:

Table 3: Correlations among constructs

	BSC_FIN	GRI_ENV	GRI_SOC
BSC_FIN	**0.753**		
GRI_ENV	0.486	**0.803**	
GRI_SOC	0.505	0,745	**0.772**

Source: created by the authors.

All parameters fitted or exceeded the minimum threshold suggested by the literature, giving validation to the proposed scale. Figure 4 represents the model suggested by the results.

The three dimensions presented in Figure 4 show the validated measurement models and their graphic representation. The latent variables are represented as ellipses and the indicators, or observable variables, as squares.

Discussion

All parameters fitted or exceeded the minimum threshold suggested by the literature, what validates the proposed scale. Thus, the results suggest that it is possible to consider a firm's sustainable performance through a set of 24 indicators, six for economic; nine for environmental and also nine for social performance, as presented in Table 4.

Table 4: Triple Bottom Line performance measurement and indicators for each dimension

Economic Dimension	Environmental Dimension	Social Dimension
Operational income	Materials	Labor/Management Relations
Sales growth	Energy	Occupational Health and Safety
Return-on-investment (ROI)	Water	Training and Education
Return-on-equity (ROE)	Biodiversity	Non-discrimination
Net cash flows	Emissions, effluents and waste	Freedom of association and collective bargaining
Cost per unit produced	Environmental aspects of products and services	Child Labor
	Environmental compliance	Forced and Compulsory Labor
	Transporting	Security Practices
	General environmental issues	Compliance

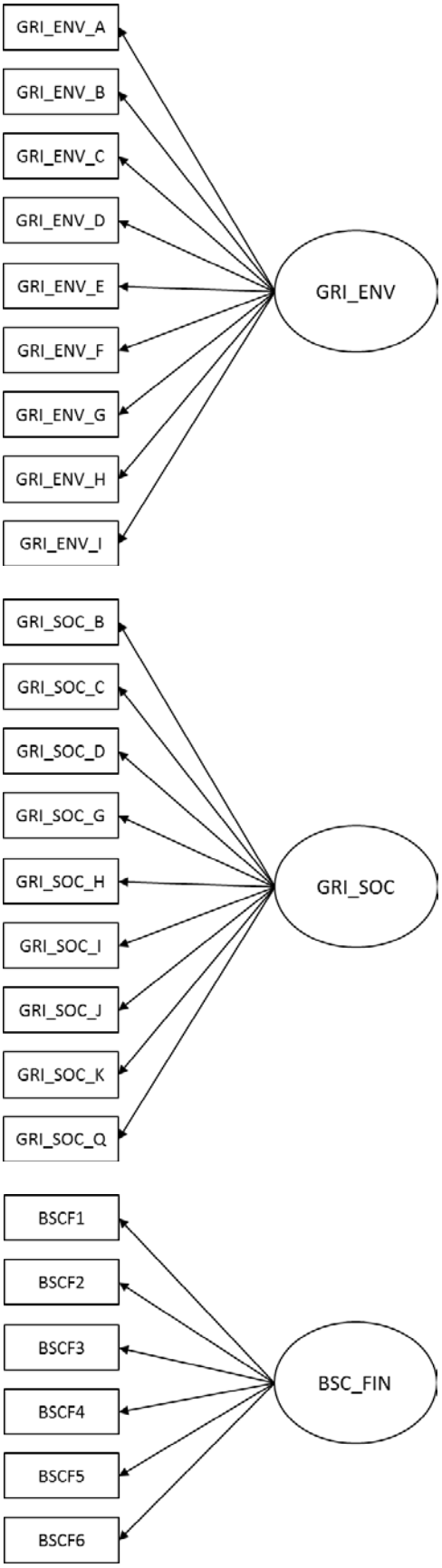
Source: created by the authors.

Conclusions

In brief, performance measurement is multidimensional and complex. Although this framework could not be considered a complete or ideal solution to measure a firm's sustainable performance, it can be another path in order to recognize the importance of sustainability for companies' management.

The proposed model is not expected to be considered as the only possible approach to support the assessment of TBL in organizations but is intended to be a minimum set of indicators that could provide managers, policymakers and researchers subsidies to identify gaps and opportunities to enhance the overall performance of a certain organization on regard of sustainability.

Figure 4: Final model



Source: created by the authors.

It is important to emphasize that several other factors can also influence the sustainable performance assessment, such as: industry, company size, local regulation, stakeholders' efforts, competitive scenario, company lifecycle, amongst many others that could be used as moderators and/or mediators in the proposed model, generating a broader comprehension of TBL in practice and its impact on managerial aspects of every company, given an unique nature of every business.

This minimum set of indicators is intended to be used as a reliable instrument to sustainable performance assessment of the current stage of the TBL deployment and provide alternative approaches to address specific issues related to the environmental, social and economic sustainability.

Furthermore, considering the comprehensive scope of TBL and its importance on businesses worldwide the proposed set of indicators has a collateral effect on provide to global companies an assessment tool that can deployed amongst subsidiaries without subjective bias and generate a fair ranking, valid for internal purposes and to investors that could evaluate TBL of different companies in different countries and industries using the same reliable and validated gauge.

Future researches could also investigate the fitness of the model for companies, and also take into consideration variables that could moderate or mediate the sustainable performance assessment.

References

(1) Veleva, V. & Ellenbecker, M. (2001). Indicators of sustainable production : framework and methodology, Journal of Cleaner Production, Vol. 9, pp. 519–549.

(2) Azapagic, A. (2004). Developing a framework for sustainable development indicators for the mining and minerals industry. Journal of Cleaner Production, 12(6), 639–662. doi:10.1016/S0959-6526(03)00075-1

(3) Krajnc, D. and Glavič, P. (2005). A model for integrated assessment of sustainable development. Resources, Conservation and Recycling, 43(2), 189–208. doi:10.1016/j.resconrec.2004.06.002

(4) Singh, R. K., Murty, H. R., Gupta, S. K. and Dikshit, A. K. (2009). An overview of sustainability assessment methodologies. Ecological Indicators, 9(2), 189–212. doi:10.1016/j.ecolind.2008.05.011

(5) Léle, S. M. (1991) World Development, 19 (6): 607-621.

(6) Montibeller Filho, G. (2004) O Mito do Desenvolvimento Sustentável: meio ambiente e custos sociais no moderno sistema produtor de mercadorias. Florianópolis: Ed. da UFSC, 2a. ed. Rev., 306 p.

(7) Barbieri, J.C. Organizações inovadoras sustentáveis in Barbieri, J.C. and Simantob, M.A. (Org.). Organizações inovadoras sustentáveis: uma reflexão sobre o futuro das organizações. São Paulo: Atlas, 2007.

(8) Elkington, J. (2001) Canibals with forks and knives. São Paulo: Makron Books.

(9) Harris, J., Wise, T., Gallagher, K. and Goodwin, N. (Org.) (2001) A survey of sustainable development: social and economic dimensions. Washington: Island Press.

(10) MacDonald, C. and Norman, W. (2004) Getting to the bottom of “Triple Bottom Line”. Business Ethics Quarterly. Chicago: Apr. 14 (2): 243

(11) MacDonald, C. and Norman, W. (2007) Rescuing the baby from the triple-bottom-line bathwater: a reply to Pava. Business Ethics Quarterly. Chicago: Jan, 17 (1): 111.

(12) Henri, J.F. (2009) Taxonomy of Performance Measurement Systems. Advances in Management Accounting, Volume 17, 247-288.

(13) GRI (Global Reporting Initiative) (2008) Elaboração de relatórios de sustentabilidade. Available in: <https://www.globalreporting.org/languages/Portuguesebrazil/Pages/Elabora%c3%a7%c3%a3o-de-relat%c3%b3rios-de-sustentabilidade.aspx>. Access 15 june 2012.

(14) WCED (World Comission on Environment and Development). (1987) Our common future. Oxford: Oxford University Press.

(15) Hart, S.L. and Milstein, M.B. (2003). Creating sustainable value. Academy of Management Executive, 17, 56-69.

(16) Savitz, A. W. and Weber, K. (2006) The triple bottom line: how today´s best run companies are achieving economic, social and environmental success – and how you can too. San Francisco: John Wiley & Sons. United States.

(17) Epstein, M. J. and Roy, M. J. (2003) Improving Sustainability Performance: Specifying, Implementing and Measuring Key Principles. Journal of General Management; Autumn, 29 (1): 15-31.

(18) Epstein, M. J. (2008) Making sustainability work: best practices in managing and measuring corporate social, environmental, and economic impacts. Sheffield: Greenleaf Publishing Limited.

(19) Flynn, B.B.; Kakibara, S.S., Schroeder, R.G., Bates, K.A. and Flynn, E.J. (1990) Empirical Research Methods in Operations Management, Journal of Operations Management, Vol. 9, No. 2.

(20) Brown, T. A. (2006). Confirmatory factor analysis for applied research. Guilford Press.

(21) Byrne, B. M. (2009). Structural equation modeling with AMOS: Basic concepts, applications, and programming. CRC Press.

(22) Ringle, C. M., Wende, S. and Will, A. (2005). SmartPLS 2.0 (M3) beta, Hamburg: Available in http://www.smartpls.de. Access 12 December 2013.

(23) Hair Jr., J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2013) A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Sage, Thousand Oaks.