

Using Balanced Scorecard to Improve Environmental Management System

Zdravko Krivokapić* - Jelena Jovanović
Center for quality, Faculty of Mechanical Engineering, Montenegro

As ISO 14001 standard is quite flexible it allows great adaptability in its implementation. It is for this reason that some organisations have adopted the standard with an aim to improve their environmental performance, while others in order to enter new potential markets and to satisfy their customers. It is not rare that Environmental Management System (EMS) is adopted in parallel with others management systems: that will drive the organisation to inefficiency. The balanced scorecard management performance system is a very suitable tool for the assimilation of ISO 14001 in everyday activities and across the whole management system. Therefore, the research presented in this paper focuses on an analysis of EMS integration into the classical model of the Balanced Scorecard. It is suggested that in this way organisations could improve environmental performance through the implementation of the strategy.

© 2009 Journal of Mechanical Engineering. All rights reserved.

Keywords: environmental protection, management systems, standards ISO, ISO 14001

0 INTRODUCTION

Research shows that various organisations adopt ISO certification for various reasons: on the basis of the demands of the government [1], to publicly show their environmental orientation [2], to serve as an advantage in entering to the international markets [3], or to meet a direct client's demand [4].

Despite the fact that the majority of studies show that ISO 14001 certification improves environmental performance, some organisations still suggest that future ISO certification has to include both certain elements of management performance and certain actions that will ensure everyday harmonisation with the demands of the system.

ISO 14001 standard analyses (from 2004) indicate that certain trends exist towards the improvement of the environmental performance of the organizations. For instance, requirements 4.3.3 Objectives, Targets and Programme(s) of standards (ISO 14001:1996 and ISO 14001:2004) expect organisations to set and maintain environmental objectives, but the new standard (2004) underlines that those objectives and indicators should be measurable.

This assimilation that includes involvement of ISO 14001 in an already existed

management system as well as in everyday actions, represents the key solution for improvement [5].

1 ISO 14000 AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

The leading system for managing the environment protection is ISO 14001 including its auxiliary ISO 14031 for measurement of the efficiency of environmental protection. The ISO 14001 includes only the audit [6], while the quality of the audit is random and variable. Moreover the independence of auditing is limited [7] and [8].

Therefore the standard does not identify environmental performance as key to certification as the standard is process-oriented and does not guarantee an impact on environmental performance. Some organisations stated that it is not hard to obtain an ISO 14001 certificate and that the certification would have greater influence if it is merged with developed environmental performance measures.

On the other hand, the request for environmental protection is becoming more important. EMS has evolved significantly beginning with the standardisation of regulatory rules for environmental protection, cutting

pollution and improving eco efficiency and sustainability. This action directs market movements from the process to reaching the results of that process (Figure 1).

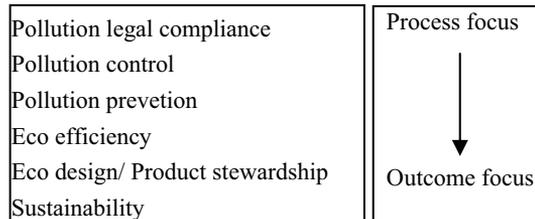


Fig. 1. Evolution of EMS [9]

If the real result of the process is examined, a question arises; is the environmental protection defined by ISO 14001 sufficient or are there any additional actions aiming at assurance of better environmental performance inside an organisation?

Different organisations have different experiences concerning the implementation and adoption of ISO 14001.

There are different opinions about question "is ISO 14001 certification only a 'green wash' or does it real improve environmental performance? Analyses show uneven results. While in some empirical researches [10] and [1] it can be found that ISO 14001 adoption improves environmental performance of organisations, in other research [11] and [12] the respective authors came to contradictory results. Results even show that some performances are significantly worse after an ISO 14001 certification. In analysis [4] it is shown that organisations that have implemented EMS and involve ISO 14000 in their everyday activities have quite improved the environmental performance. In an empirical analysis [13] it is shown that EMS is very useful but not useful enough to effectively improve environmental aspects/parameters within the organisations.

The most appropriate explanation for contradictory opinions and results that are given by previous research could be that efficiency of an ISO certification related environmental performance improvement depends on how organisations designed and created EMS and how they utilise this system. Some organisations could involve elements of management performance within their EMS that are ISO 14001 based, while

some other organisations do not operate in a similar manner as it is not requested by certification. This explains why various organisations have very different experiences with an efficiency related ISO certification.

Balanced scorecard, as one of the performance management systems, is a very suitable tool for ISO 14001 assimilation in everyday activities and in the whole management system.

2 BALANCED SCORECARD MODEL

The balanced scorecard (BSC) is a performance management system that transforms strategy into a continuous process of management and improvement that all employees inside an organization utilise on all organisational levels.

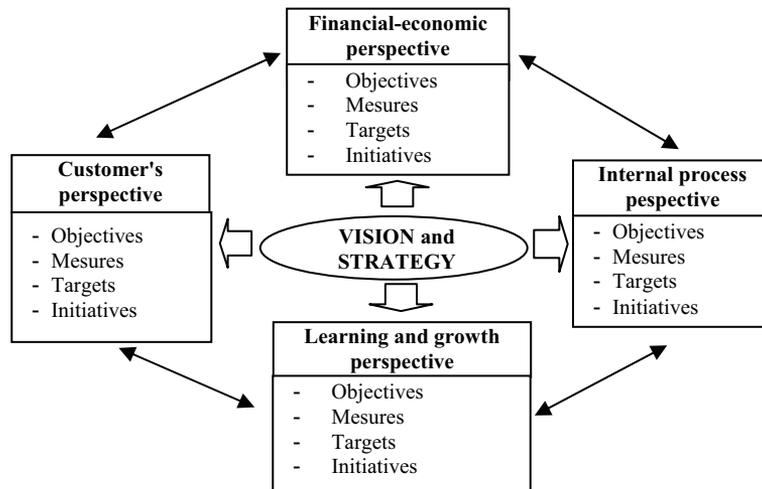
BSC represents a balance between the former and coming orientation, quantitative and nonquantitative analysis and financial and nonfinancial data [8].

Kaplan and Norton [14] presented BSC as an organizational tool to manage the requests of stakeholders and to transform strategy into action through a PDCA cycle structured management system.

Research [14] shows that organizations have two main reasons to implement BSC. On one hand, a high number of different information systems present a relatively inflexible system, so BSC could be very helpful for their gathering. On the other hand, managers want a clear description of their processes through clearly defined objectives and measures to reach those objectives. In this case BSC is a very useful tool for the measurement of process efficiency.

The classical model of BSC is given in Figure 2 where four principles or perspectives are observed [15]:

- Financial-economic perspective (What do stakeholders expect?)
- Customer's perspective (What are clients' demands?)
- Internal processes perspective (What are the key internal processes and which one has to be improved to meet customers' demands?)
- Learning and growth perspective (How organization should structurally develop and learn?)

Fig. 2. *Balanced scorecard [14]*

The four perspectives are recommended by the founders of BSC, but the different environments in which businesses operate can create different visions and strategies. Furthermore there is no general way for their adoption. That is why organizations could increase the number of perspectives but they have to take into account the balance of those perspectives.

In the last few years, it has been observed that with the increase of concerns about the environment more and more organizations emphasize the importance of the implementation of environmental objectives into their business strategy and into BSC as well.

With the original BSC, focusing on the financial perspective is most important as this is the most important aspect and objective for all the interested parties both inside and outside of the organisation. All non-financial determinants have to be adopted within financial objectives and indicate financial gain. The rule is that even the work of each individual can be linked with the profit of an organisation. This suggests that financial perspective is the most important strategic objective for profit-making organisations. Kaplan and Norton [14] claim:

"Cause-and-effect chain of all BSC has to be linked with finance".

That is why it is necessary to connect financial perspective with all BSC elements in the new perspective design/creation and generally in defining the environmental protection as a strategic orientation of an organisation.

Connecting these perspectives with financial objectives is quite complex. In literature different ways of integrating EMS inside the BSC environment are presented.

3 APPROACHES AND INTEGRATION OF EMS

Widely presented literature sources about BSC ([14], [18],...) do not specialize in the environmental aspects, but there are many research analyses that focus on the sustainable BSC concept approach, more precisely on SBSC (Sustainability BSC). This concept is predominantly oriented towards defining important environmental strategies and social objectives of the organisation. These strategies and these objectives will lead to the creation of economic values through the cause-and-effect links from elements of all the perspectives.

To achieve sustainability, three elements should be linked: financial, environmental and social. In many organizations that have EMS, there exists a basic lack of connection between this system and any other management system. A fundamental question may be: which of these approaches is the most adaptable for one particular organisation and in which way could EMS be implemented to the management system.

According to [16] the environmental and social aspects could be implemented into BSC in three ways: 1. implementation into four already existing perspectives; 2. a creation of new (the fifth or even the sixth) perspectives which will include these elements; 3. a creation of a special environmental/ social scorecard.

3.1 Integration of Environmental and Social Aspects in 4 Perspectives

Environmental and social aspects should be included in the framework of four already existing perspectives through strategic elements, objectives and measures.

Using this method, environmental and social aspects become an integral part of standard BSC and they will be automatically integrated inside the cause-and-effect chain that has the financial perspective at the top of its hierarchy as presented in Fig. 3. These aspects should be integrated in the market system.

3.2 Appending New Environmental/Social Perspectives

In the previous model environmental and social aspects are not completely integrated in market changes. The reason is that these aspects are not market oriented. Moreover, from the point

of view of many organisations, environmental and social aspects are a peripheral concern.

The creation of new perspectives creates a clearer picture about the integration of environmental and social aspects in the standard structure of primarily market oriented BSC. Elements of added perspectives should be connected with all other perspectives and not only with the financial perspective. Also, it is possible to create perspectives that include special social and environmental requests, as shown in Fig. 4.

3.3 Creation of Induced Environmental/Social Scorecard

The third approach for the integration of environmental and social aspects into BSC is based on the creation of a special environmental/social scorecard. Thus, creation of a sustainable scorecard has to be parallel with the conventional scorecard.

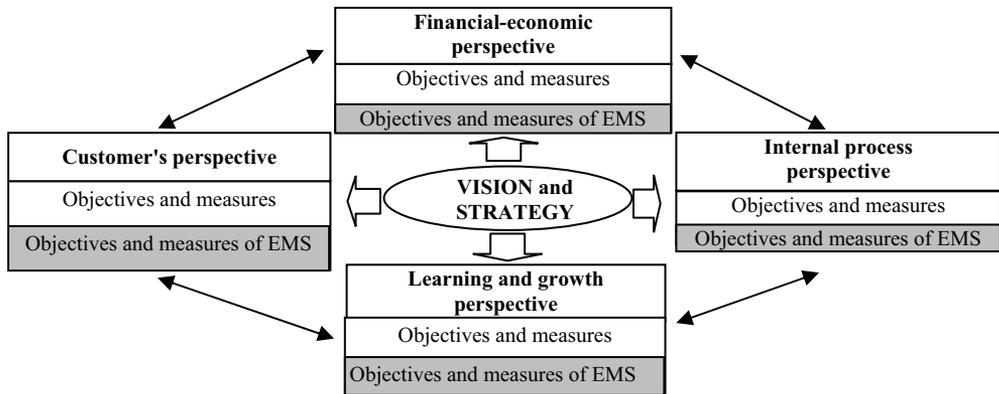


Fig. 3. Integration of environmental and social aspects in 4 perspectives

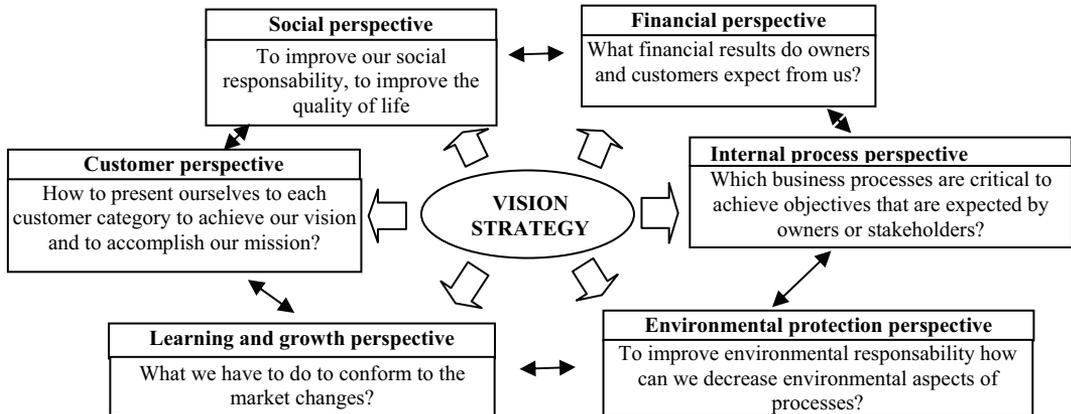


Fig. 4. Adding one or more new perspectives

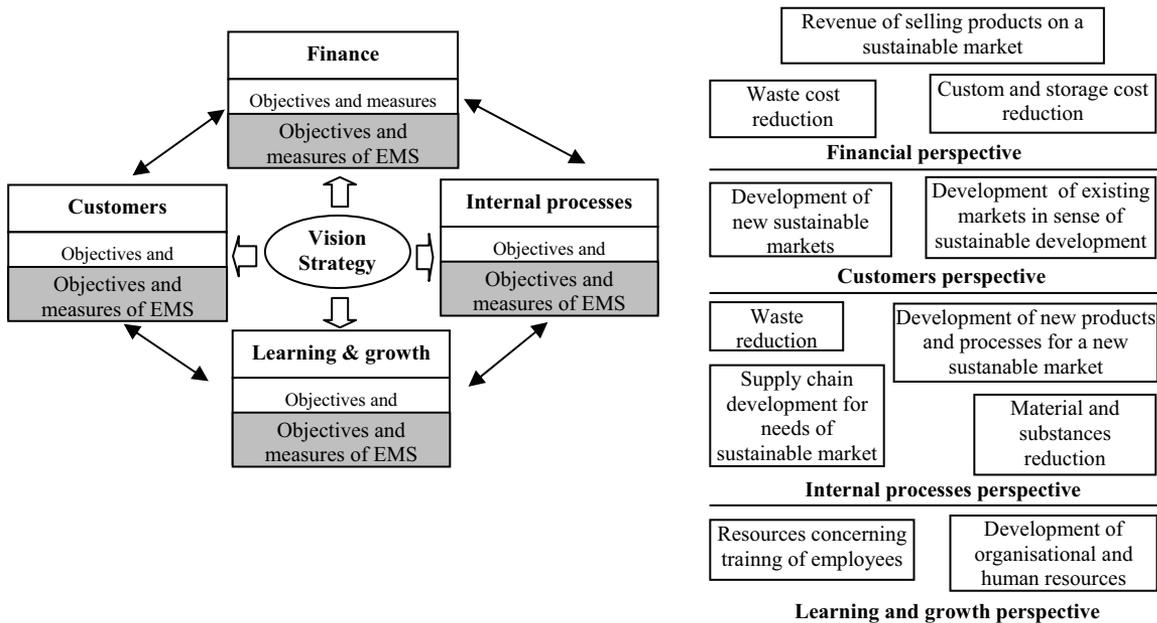


Fig. 5. Creation of induced environmental/social scorecard

Sustainable environmental/social scorecard is not independent from traditional BSC and to emphasize this aspect, it can and it should be connected with the traditional BSC.

An example of sustainable scorecard for a hypothetical organisation through a map of the cause-and-effect chain of all perspectives is presented in Fig. 5.

Observing the division of SBSC from [16] it can be concluded that most organisations adopt the first approach, but also the integration of environmental aspects into already existing perspectives. In this case the sustainable aspects could be found in all four perspectives. For example the customer perspective could include external stakeholders as contractors, customers, loan organisations, government, environmental organisations, stakeholders etc. On the other hand, the financial perspective could include complaints and costs concerning environmental protection. Other perspectives could include environmental and social aspects.

It is important to mention that environmental and social aspects could be included within the four already existing perspectives of conventional BSC while at the same time it could be created as an additional perspective. These two types do not exclude each other. The creation of an additional perspective is suggested if environmental and social objectives

are strategically relevant and if it is impossible to include them in the four existing perspectives.

The choice of how to include these aspects depends on the definition of strategic environmental and social aspects during the process of defining the SBSC.

On the other hand, the creation of special environmental scorecard would completely include all the elements of EMS throughout the full management system but in this way there is a possibility of creating a parallel system which could be business neglected. With good linkage with BSC an organisation could reach good results concerning EMS organisation.

According to [17], [18] there are five ways to implement environmental systems into SBSC:

- "Partial approach" includes the integration of one or two sustainable indicators in some well chosen dimension of the traditional BSC which is most sensitive to the integration of those aspects (internal process or customers). The integration of sustainable management could be realised even with this method. Still, some respective researchers argue that effects in practice are limited.
- The second option is "Enlarged SBSC" presenting an approach where the fifth option relating to EMS would be added. This option presents great improvement compared to the

previous approach and it could be found only in organisations that have a well established environmental system.

- "Transversal BSC" focuses on the environmental sphere in all dimensions of the organisation in order to become a promoter for future success. This way, the environmental aspects are integrated as leading indicators in all four perspectives. This approach demands great conscience concerning environmental protection inside the organisation.
- "Total SBSC" aims at integrating all the environmental aspects within all perspectives and present a combination of transversal and enlarged approaches.
- "Divided service of SBSC" considers the implementation of environmental aspects only into particular segments within organisations, therefore it will not have a great impact on the integral objectives of an organisation. This approach would be possible for all previously mentioned alternatives.

In [16] it is described how previous types of SBSC could be implemented taking into account the four types of strategies that include environmental protection. It does not include strategies that do not concerning environmental

protection. A description of the four types of strategies that include environmental protection and their correlation with the five previously defined approaches relating to SBSC is given in Table 1.

These types of strategies mutually overlap and could not be clearly separated. For instance, types 2 and 3 also imply the use of type 4.

It should be emphasized that within an organisation where there has been no attempt to integrate the EMS with BSC adoption, these two systems are driven in parallel, which easily results in inefficiency.

The original BSC is an instrument of management and measurement of performance, but environmental and social aspects are very hard to measure.

It should be emphasized that BSC is a tool for strategy transformation into a real action and that organisations have to define their strategy concerning environmental protection prior to finding a method for its effective implementation. Good connection of EMS's elements with strategic objectives and actions of other perspectives is a key element for the improvement of the environmental performance of an organisation.

Table 1.

Type of strategy that include environmental protection	Adequate type of SBSC
<p><i>Clear: protection of market share</i> The objective of this strategy is to satisfy customer requests concerning environmental protection and to publicly show that the organisation is environmentally aware.</p>	<ul style="list-style-type: none"> ○ Partial SBSC ○ Divided service of SBSC
<p><i>Efficient: strategy to transform environmental costs into environmental efficiency</i> This structure is oriented on environmental objectives and measures that reduce their costs.</p>	<ul style="list-style-type: none"> ○ Partial SBSC
<p><i>Innovative: the environmental strategy differentiate by environmental products</i> The strategy is oriented on executive pro-active environmental activities that are market oriented.</p>	<ul style="list-style-type: none"> ○ Partial SBSC ○ Total SBSC
<p><i>Progressive: strategy development in the direction of an environmental market</i> Organisations that are oriented toward this strategy of sustainable development are oriented on environmental and social objectives and actions as a way to increase their share on existing market and to enter the new ones.</p>	<ul style="list-style-type: none"> ○ Total SBSC ○ Enlarged SBSC

4 SYSTEM OF MEASUREMENT OF BSC

The measurement system of BSC assures internal transparency that enables managers to measure performance on the sector level, department level, and even on the employee level, but it is not rare that inside the frame of BSC, the financial objectives and other actions that are not easy to measure are dominant.

It is very important to choose the right measures. On one hand, they have to include all key processes of an organisation. On the other hand they have to ensure that this number is not too high because in this case the picture of the organisation becomes unclear and complicated for monitoring. In accordance with Pareto analysis [20] and the act 80/20 [20], the greatest strategic impact could be realized by operating and measuring a small number of Key Performance Indicators (KPI). This is in accordance with the BSC philosophy and a small number of actions that are necessary to define (4 to 6 actions per perspective).

In choosing the KPIs, an organisation should take into account all relevant actions and choose the most important ones by detached calibration and then find the best way for their monitoring and quantification. The actions relating to environmental protection have to include identified environmental aspects of an organisation. It is not uncommon that in choosing this small number of actions an organisation chooses ones that are easy to measure. In this way they can eliminate actions that are strategically important but that are not easy for quantification (environmental and social).

Excluding the top limit for a number of indicators the organisations should take into account some other constraints that indicators have to satisfy [14]:

- Indicators have to be both quantitative and qualitative.
- Indicators have to be measurable.
- Sustainable aspects concerning social and moral performances are important in a qualitative sense, but these aspects are not easy to measure.
- Sustainable indicators have to be relevant internally and important externally.
- Indicators have to be strategically relevant for organisation.

- Choice of actions should assure reaching defined objectives of the organisation [19].
- Chosen indicators have to be simple and comprehensive.
- Indicators have to impact the behaviour within the organisation [19].

After selecting the indicators, the cause-and-effect analysis of indicators must be conducted. The majority of authors [17] and [19] consider cause-and-effect links of SBSC as in Figure 6, where everything is oriented towards financial gain.

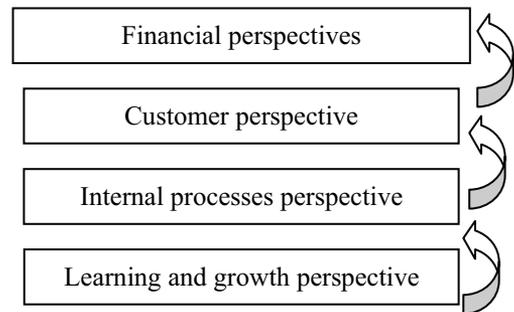


Fig. 6. *Effect-Causal links of SBSC*

Employee training could help to prevent of pollution and decrease problems with environmental protection that are directly connected to internal processes. Improved internal processes will decrease law violation and increase the reputation of organisations. Satisfied stakeholders reduce the cost of penalties and improve the reputation of organisation, helping to achieve financial success. Therefore, it is essential that a strategic map is established so that the investment in environmental protection drives toward financial gain and that all investment in environmental protection that does not reach financial gain is not retained. Lower levels of an organisation and some managers still consider that this connection between environmental and economic indicators is too strong and that it is not easy to maintain it in practice.

SBSC created in this way is easy to include in an already existing BSC because the disposition of perspectives is identical and the strategy is oriented towards the financial gain of the organisation.

The concept of BSC for non-profit organisations is oriented towards accomplishing the defined mission of the organisation in the

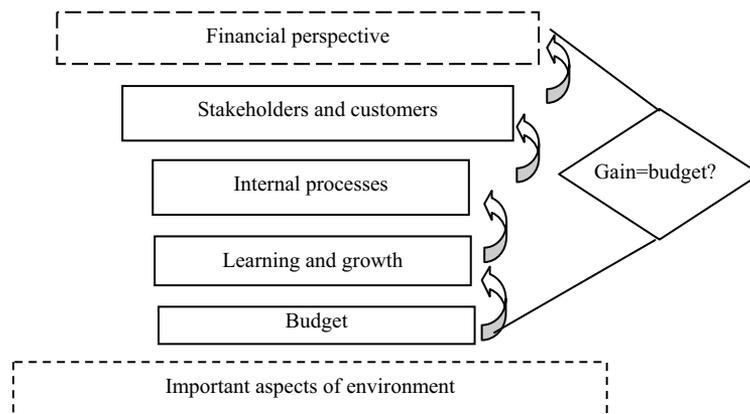


Fig. 7. *Effect-Causal links of SBSC of non-profitable organisations*

context of its disposable budget and in this sense customer perspective is most important. It would be possible to reach a better effect of environmental protection of organisations, if non-profit organisations defined their budget and created an SBSC map, starting with the financial perspective through learning and development, internal processes and stakeholder's satisfaction that also leads to financial gain (Fig.7).

To avoid the budget assigned for environmental protection being treated as a cost, it is important to join this correlation with financial perspectives and consider possible advantages from stakeholder satisfaction relating to this case.

This model of SBSC is not easy to implement inside an already existing BSC due to very different strategic concepts and dispersion of perspectives. Thus, the strategic map of SBSC defined in this way does not induct connection as a standard BSC, but it could assure a better relationship concerning the environment than a system that is only oriented towards financial gain. Budget definition is done upon the identification of important environment aspects. This model of SBSC is appropriate until the budget and financial gain equalize. Then, the effect-causal relation of objectives could be oriented toward financial perspective and perform a complete fusion with BSC of organisation (Fig. 7). Furthermore, the system could exist independently and connect some environmental activities to the management system, but as an independent part. Its aim is usually measurement of performance and improvement.

5 CONCLUSIONS

SBSC is a tool that provides a good chance of integrating of environmental and social objectives and actions into an existing management system. SBSC is not a substitute for other systems such as ISO 14000, but in any case it does help promotion of methods of sustainable development within an organisation's processes and connect them with a traditional management system. Still, it is not easy to define sustainable development and stakeholders' rights yet. On the operational level there is the problem of quantification as well as the integration of environmental and social objectives and actions.

BSC is very good for the dialogue of improvement at the level of top managers, especially in the definition of strategic aspects and the polarization of all activities inside the organisation. But, it has been shown in practice that when the integral SBSC is defined for the whole management system in which there are only some objectives relating to environmental protection, then the entire environmental department is impacted by BSC. Resources that were previously given over to environmental protection will be reduced if the organisation changes orientation to other strategic spheres [8].

This could be quite a dangerous mechanism that should be avoided, creating an SBSC, which has a basic defined budget. On the other hand, in organisations that have a clear view of the importance of environmental protection and enjoy managerial support, this could help with the integration of those aspects with all

levels of an organisation. The problem is that every BSC includes 20 to 25 actions that could be enough if they considered only the social and environmental objectives of an organisation, but could not be enough for the whole management system. Adding the new perspectives will bring some improvement but not enough, while the independent SBSC could include all elements of sustainable development. However, it is necessary to also link it with an already existing BSC or management system if it is not to be completely ignored.

6 REFERENCES

- [1] Muller, A., Schaltegger, S. The sustainability balanced scorecard as a framework for eco-efficiency analysis.
- [2] Sustainability and performance management – a case of implementation of sustainable balanced scorecard in a food processing company, http://www.licom.pt/ea2007/papers/EAA2007_0111_final.pdf.
- [3] Rowland-Jones, R., Pryde, M., Cresser, M. (2005) An evaluation of current environmental management systems as indicators of environmental performance. *Management of Environmental Quality* 16(3): 211-219.
- [4] O'Dwyer, B., Owen, D. (2005), Assurance statement practice in environmental, social and sustainability reporting: a critical evaluation, *British Accounting Review* 37: 205-229.
- [5] Graham Hubbard Sustainable organisation performance: Towards a practical measurement system", *Monash Business Review*, vol. 2, i. 3, November 2006.
- [6] Prakash, A., Potoski, M. (2005), "Covenants with Weak Swords: ISO 14001 and Facilities Environmental Performance", *Journal of Policy Analysis and Management* 24.
- [7] Kang, Y. (2005), "Third Party Inspections on Environmental and Safety Regulation: Theory and Empirical Evidence", Ph.D. Dissertation. Philadelphia PA: University of Pennsylvania.
- [8] Dahlstrom, K., Howes, C., Leinster, O., Skea, J. (2003), "Environmental Management Systems and Company Performance", *European Environment* 13: 187–203.
- [9] Matthews, D.H. (2001), *Assessment and Design of Industrial Environmental Management Systems*. Ph.D. Dissertation. Pittsburgh, PA: Carnegie-Mellon University.
- [10] Yin, H., Schmeidler, P. (2007) "Does ISO 14001 Certification Enhance Environmental Performance? Conditions under which Environmental Performance Improvement Occurs", Wharton Risk Center Working Paper no. 07-07, March 2007.
- [11] Hamschmidt, J., Dyllick, T. (2002), "ISO 14001: Profitable - Yes! But is it Eco-effective?", *Greener management International*, vol. 34.
- [12] Andrews, R.N., Charm, J., Habicht, H., Knowlton, T., Sale, M., Tschinkel, V. (2001), "Third-Party Auditing of Environmental Management Systems: U.S. Registration Practices for ISO 14001." <http://www.ndol.org/documents/emsreport.pdf>.
- [13] Delmas, M. (2000), "Barriers and Incentives to the adoption of ISO 14001 in the United States", *Duke Environmental Law and Policy Forum* Fall: 1-38.
- [14] Naveh, E., Marcus, A.A. (2004), "When Does the ISO 9000 Quality Assurance Standard Lead to Performance Improvement? Assimilation and Going Beyond", *IEEE Transactions on Engineering Management* 51 (3): p.352-363.
- [15] Bieker, T., Dyllick, T., Gminder, C.U., Hockerts, K. "Towards a Sustainability Balanced Scorecard linking environmental and social sustainability to Business strategy", [http://www.iwoe.unisg.ch/org/iwo/web.nsf/1f29e779b01d72c8c12569f50045e85c/af0f51dab5ad967ec12569f2003c7416/\\$FILE/BS&E%20Conference%202001%20Bieker,%20Dyllick,%20Gminder,%20Hockerts.pdf](http://www.iwoe.unisg.ch/org/iwo/web.nsf/1f29e779b01d72c8c12569f50045e85c/af0f51dab5ad967ec12569f2003c7416/$FILE/BS&E%20Conference%202001%20Bieker,%20Dyllick,%20Gminder,%20Hockerts.pdf).
- [16] Kaplan R., Norton D., (1996), *The Balanced Scorecard – Translating strategy into action*, Harvard Business School press, Boston, Massachusetts.
- [17] Figge, F., Hahn, T., Schaltegger, S., Wagner, M. (2002), "The Sustainability Balanced Scorecard - Theory and Application of a Tool for Value-Based Sustainability

- Management", Greening of Industry Network Conference, Gothenburg.
- [18] Bieker, T., Gminder, C.U., Towards a sustainability Balanced Scorecard, http://www.oikos-stiftung.unisg.ch/academy2001/Paper_Bieker_Gminder.pdf
- [19] Johnson D.S. Identification and selection of environmental performance indicators: application of the balanced scorecard approach, *Corporate Environmental Strategy*, 5(4): 34-41.
- [20] Kamberović B., Stanivuković D. (1998), Metode i tehnike unapređenja kvaliteta TOM1/TOM2/TOM3, IIS-Istraživački i tehnološki centar, Novi Sad.