

# Dynamic Balanced Scorecard: Model for Sustainable Regional Development

KOZENA MARCELA, STRITESKA MICHAELA, SVOBODA ONDREJ

Faculty of Economics and Administration

University of Pardubice

Studentska 84, 532 10, Pardubice

CZECH REPUBLIC

marcela.kozena@upce.cz, michaela.striteska@upce.cz, ondrej.svoboda.@upce.cz

<http://www.upce.cz>

*Abstract:* With the growing importance of sustainability issues many regions try to integrated environmental and social aspects into the strategic management system. However, these attempts were not always successful. The purpose of the paper is to present one way how sustainability could be incorporated into the strategic management of region development. On the base of literature review and analyses of selected case study the draft of sustainable Balanced Scorecard framework for region was developed. The main component of the proposed framework is dynamic strategic model which easily and clearly explains the whole strategy of the region as well as the links between economic, environmental and social aspects.

*Key-Words:* sustainable development, Balanced Scorecard, dynamic model, environmental and social aspect, performance indicators, region.

## 1 Introduction

The primary output of the strategic management on the local government level is a strategic plan. The strategic plan basically enables or facilitates the creation, the implementation and the evaluation of regional politics. However on what basis to decide whether political decisions leading to what is called sustainable development? A simple answer can be found to this question. It is essential to define indicators to the established objectives that will measure success in relation to sustainable development. Indeed, these indicators can give us information if our activities fulfil the objectives or not and how they affect key areas. Therefore it is more than necessary to impose the performance measurement to the strategic management [2], [18].

Case study analysis of Pardubice Region was carried out to map the current state of issue. The data analysis of the case study was performed according to Miles and Huberman [23]. For the data evaluation was in particular used the analysis oriented on a case that considers the case as whole entity and seeks configurations, associations, causes and consequences within the case, eventually it carries out the comparison between few cases [11].

Method of structured interview with officials responsible for strategic planning of Pardubice Region as well as analyses of all available strategic documents (Program of Development) were used for

critical evaluation of the quality of the current strategic plan.

The analysis shows following shortcomings:

- to some “soft” specific objectives no performance indicators are defined,
- methodology of measuring, the goal value of a current year and a goal value which should be achieved in the planned period are not provided,
- the results of set performance indicators are not reflected in update of strategic documents,
- the defined performance indicators are not used in political decision-making process at all levels in organisation,
- environmental and social aspects are only partially reflected in the strategic plan of development.

The most questionable point can be therefore seen in implementation phase, especially in definition of the key performance indicators of sustainable development. Environmental and social issues are managed by means of specific management systems not linked to the mission and vision of the region. Thus, the contribution of the environmental and social management remains unclear [27]. As a solution to this lack, many

research works have been carried out in the field of sustainability management by means of a Balanced Scorecard (BSC). BSC was created by Kaplan and Norton as a reaction to the empirical findings that a number of strategic intentions have not been reached [16]. Novelty of this method was utilization of three new non-financial factors (and one financial factor). Overall there are used four nowadays well known perspectives: financial perspective, customers, internal processes and learning & growth.

These perspectives can be further divided into partial goals which are set by individual companies according to their business situation, strategy and needs. Fulfillment of these goals leads to incidence of causal relationships ("action - reaction") between four basic perspectives and gradual activation of the main goal (usually financial character). Long-term goals in BSC are usually set for a time period of 3 - 5 years; short-term goals are mostly set for a time period of one year. This method has been generally acknowledged as an effective tool for management and strategic planning and it has been successfully implemented in many companies around the world. Its greatest benefits can be summed up into several points [16]:

- effective tool for communication and promotion of vision and strategy of a company,
- creates clear model with defined key factors of success and relationships among them,
- gives complex view on partial and main goals fulfillment,
- simplifies communication and orientation within strategy of a company,
- helps with data collection.

## 2 Balanced Scorecard for Strategic Development of Regions

The growing requirements for the quality and the efficiency of strategic management in the local government are calling for a change in the philosophy and the management tools. However, the implementation of the new management tools that originally come from private sector is on the level of the local government accompanied by considerable doubts. This distrust is valid only if these tools and the approaches can be transferred without any necessary modification and adaptation to the conditions of the public management.

Therefore if we want to introduce the BSC model as a strategic management tool in the local government, first thing we need to do is to identify the key differences between company BSC and the BSC for the local government. The following key differences between company BSC and BSC for local government could be identified [20], [31]:

- *The purpose of the BSC use* - the communicative function of the BSC is much more emphasizes in the local government environment. The BSC is more understood as effective tool for external performance reporting as well as strong incentive for external accountability.
- *The relevance of the traditional BSC perspectives* – the original BSC was developed to change traditional focus of performance measurement on financial measures only. Therefore the question of the relevance of these four perspectives rises.
- *The logical perspective hierarchy* - private sector model is not relevant for local government environment. The mission of local government is usually defined by the act and the customer perspective becomes at least one of the ultimate objectives.
- *The dilemma of measures* - the main problem here is that the effects of interventions by a local government are often difficult to measure.
- *Different aspects of BSC implementation need to be highlighted* - when introducing the BSC system in local government different aspects need to be accentuated according to individual needs (e.g. greater emphasis on change management).
- *Cascaded BSC is much more complicated* - developing and using BSC across an organization such as a local government involving a variety of complex services is more difficult than in a private sector company.

All these differences must be taken into account during the process of BSC creation and implementation in local government. Building BSC system in local government is not easy process. Public sector executives face more hurdles in implementation of the Balanced Scorecard than their private sector counterparts [14]. The processes of BSC framework development requires considerable

time and effort, demonstrable commitment from elected representation and managers, and in addition change in thinking of all employees.

### 3 Sustainability and Balanced Scorecard

The issue of sustainable development has been for the previous 40 years, done a lot of activities and achieved many results [26]. With the growing importance of sustainability issues many regions have implemented specific environmental and social management systems during last few years. However, these systems were not usually integrated with the general management system of an organization. First crucial important is to state the generic definition of sustainable development. According to Beiman the sustainability is, in its most basic sense, the capacity to endure [4]. The most commonly used definition of sustainable development is given by the World Commission on Environment and Development as a “development that meets the needs of the present generation without comprising the ability of future generations to meet their own needs” [33]. The Danchev states the organisation’s performance is coupled with its sustainable growth and behaviours, and in this context, corporate sustainability are the terms used to refer to sustainable development [8].

Several scholars have already highlighted the opportunity to develop Balanced Scorecard that enables organizations to integrate corporate sustainability or social responsibility into their strategy [5], [10], [32], [9].

Some of them discuss the issue only in theory [15], [25] other focus on examples of environmental and social issues integration in the corporate BSC [9]. Figge et al. for example sees BSC as promising starting-point to incorporate environmental and social aspects into the management system of a company [10]. Zingales et al. presented and discussed the examples of integration of environmental and social indicators in the BSC in large companies [34]. As he states, if companies had already “digested” the importance of environmental and social issues for their business the BSC seemed to provide a good implementation mechanism to corporate-relevant issues through to the various layers of the organisation.

Literature dealing with the topic has identified four possible approaches of integrating sustainability into the Balanced Scorecard:

- The environmental and social aspects are *reflected in the traditional fours BSC perspectives* - sustainable indicators are build in the four perspectives through respective strategic core elements or performance drives for which lagging and leading indicators as well as targets and measures are formulated [17].
- The sustainability aspects *are integrated into one of the BSC perspectives* – one perspective could be adopted in order to support the sustainability initiatives. For example the customer perspective could be change to stakeholder perspective.
- *New perspective* related to sustainability *is added to existing BSC* - the reasoning behind this approach is that environmental and social aspects are still not integrated into the market coordination mechanisms and often represents external factors [10]. Woerd and Brink (2004) propose a five perspective format for a Responsive Business Scorecard that creates a space for People and Planet topics. Figge adds Non-Market perspective in order to integrate strategically relevant but not market-integrated environmental and social aspects [10].
- *A specific environmental and social scorecard is developed* – is an extension of the variants discussed above. Specific scorecard draws its content from an existing BSC system and is predominantly used in order to coordinate, organise and further differentiate the sustainability aspects [10].

In addition some authors develop a new global framework for the sphere of local government. Beiman [3] proposes a comprehensive framework for description, measurement, action, analysis, and subsequent learning and adjustment based on key perspectives, strategic themes, and objective areas. His Balanced Scorecard for Humanity (BSC4H) consists of five perspectives: sustainability outcomes, stakeholders outcomes, sustainability drivers, learning and growth enablers and financial and governmental adjustments with five stakeholders levels for design and deployment: global, regional and national, organizational, cities and communities and individuals and families.

Even the authors of the concept, Kaplan and Norton claim that the typical perspectives of BSC should be seen as a template, not a straitjacket [18]. The decision on which approach is appropriate for

an organisation depends on the nature of the strategically relevant environmental and social issues that are identified during the process of building BSC.

#### 4 Dynamic Balanced Scorecard

Every new method is going through development during time. Though BSC is very effective and has many benefits [14], some disadvantages were found, which create space for further improvement.

From these disadvantages there are three major [6], [12]:

- *causal relationships "action - reaction"* - positive effects achieved by fulfillment of partial goals are conditioned by causal relationships. But determination of real impact of these relationships is almost impossible [24]. According to the principle of bounded rationality by Herbert A. Simon, human intuition is insufficient of confident mental simulation of situation, when there exist more dependent causal events (see BSC strategic map). Further to this aspect, there exist many side effects, which influence causal relationships both ex ante and ex post. Fulfillment of certain goal may lead to whole chain of effects and skillful manager must count with all of them to achieve success;
- *effect uncertainty and time delay* - when spoken about effect uncertainty, in question is above all its size. Thanks to modern probability methods, it is relatively possible to assess the effect of individual processes, but it is not possible to identify any crucial information about impact on main goal. Time delay represents other kind of problem, which can create uncertainty. With some processes it is not possible to identify, when exactly will some effect come. It can often happen that expected effect is delayed;
- *absence of relationships quantification* - focusing on relationships among individual goals or perspectives can lead to conclusion that they inform only about development trend. Some authors consider this fact deficient and propose that individual relationships should be displayed with as much relevant information as possible [19], [7]. In this manner could be

achieved significant minimization of overall risk within first two disadvantages of BSC.

According to many authors could disadvantages of BSC concept be exceeded by **dynamization process**. This process can also help in achieving results which are more precise. Dynamic Balanced Scorecard (hereinafter as "DBSC") should be adapted to every individual company and its parameters. It should be able to answer questions "What if...?", appropriately react according to changing environment and conditions, minimize time delay, offer complex view on strategic map, remain transparent and easy-handle management tool [29]. Though development of DBSC is still at the very beginning, scientific studies describe first cases and models [29], [22], [19]:

- Ghangi General hospital (Singapore);
- BSC and System Dynamics;
- BSC and Fuzzy Cognitive Maps.

With knowledge of above mentioned facts it is necessary to continue with a question, if effective measurement of company's competitiveness is not outweighed by high implementation and operation requirements of DBSC method. Crucial positive and negative aspects of both models are shown below.

**Balanced Scorecard** has positive and negative aspects [22]:

**Positive aspects:**

- easier implementation;
- faster application;
- positive experience;
- well-known method.

**Negative aspects:**

- causal relationships "action - reaction";
- effect uncertainty;
- time delay;
- no relationships' quantification;
- possible mistakes in results.

**Dynamic Balanced Scorecard** has positive and negative aspects [22]:

**Positive aspects:**

- complex conception of indicators and relationships;
- weighted evaluation;
- more precise results;
- flexible to company's vision and strategy.

**Negative aspects:**

- new method (not tested);
- high implementation requirements (knowledge, etc.);
- more abstract;
- correct selection of goals and indicators;
- correct evaluation of relationships.

## 5 SBSC Framework for Strategic Development of Region

Using strategic management in local government is aimed at helping municipalities and regions to fulfil its priority mission and achieve new approaches which make the facing the pressure exerted by the users of public services and other stakeholders possible. On the base of literature review and analyses of selected case study the proposal of sustainable BSC framework for region was developed.

The core of the whole model is the strategic system based on Balanced Scorecard method. However the architecture of BSC model was modified to strongly considering sustainability and better suits the tasks and duties that regional government has to perform<sup>1</sup>. The framework is made up of five perspectives called sustainability development, stakeholders, structure, expertise and regeneration and financial sources, all of them interlinked by causal links. The sustainable development perspective contains the final objectives derived from mission, classified according to the three main components of sustainability: economical, environmental and social. Here are the strategic objectives formulated in the first place, and then they are distributed in other objectives in the following perspectives.

The stakeholder approach has been selected for the purpose of a comprehensive proposal of improved process of strategic management. By means of the stakeholder concept, which was originally suggested by Freeman in 1984, it is possible to identify the most important groups influenced by the chosen strategy or those groups that influence the strategy.

This change carried out in BSC architecture is based on the criticism of the original concept that, according to some authors, does not express the interests of all involved parties explicitly (In

<sup>1</sup> The BSC architecture for local government is based on the research conducted among municipalities and regions that have already implemented BSC method (more Striteska, 2010).

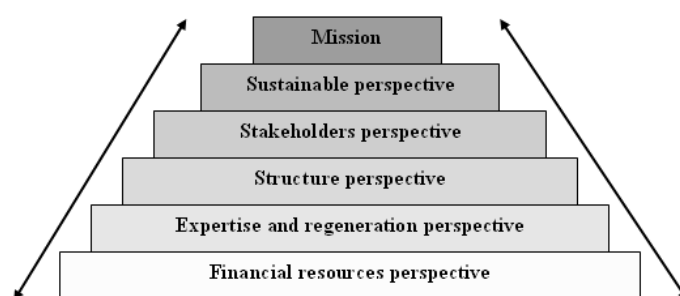
Kaplan, Norton, p. 40). In a company model, these interests (e.g. of staff, suppliers, community) are usually hidden in some of original perspectives. The BSC model for local government, however, has to "reflect" these interests much more explicitly [28].

For this reason the perspective of citizens/customers was renamed to the perspective of stakeholders. Next important difference is perception of the financial perspective as the perspective of financial resources, thus from the point of inputs. The last changes are tiny modification of the perspectives of internal process to structure perspective and learning and growth to the perspective of expertise and regeneration. Here so the necessity of increasing qualification of all entities involved in strategic process could be accentuated. All these modifications are summarized by the help of following figure.

The implementation of proposed framework based on BSC must be approached as a process. The first step of the process is to identify the viewpoint of key stakeholders regarding strategic development of the region. However, not all the stakeholders should be included in BSC automatically because BSC indicators should measure only the factors that create competitive advantage of a region and a chance of improving quality and performance.

From this point of view it is necessary to set up the hierarchy of identified stakeholders and then, according to this determined hierarchy, to aim the formulation of strategic goals. Strategic goals have to be formulated the way so that they could be SMART.

**Figure 1: Sustainability Balanced Scorecard for Strategic Development of Regions**



*Resource: the authors*

Principal improvement for strategy implementation lies in creation of strategy map. Strategy map provides a brief, visual articulation of strategy. Creating strategy map enables organization to graphically link strategic themes (or objectives), and illustrating the cause-and-effect relationship between them. All changes carried out in the

architecture of BSC must be reflected in strategic map. On the base of disadvantages identification of traditional BSC mentioned above the dynamic strategic model was developed.

Dynamic strategic model of the region is based on the knowledge representation called a causal loop diagram [30]. This is one possible form of knowledge representation, which allows visualize causal relationships "action – reaction" among elements of socio-economic reality.

The dynamic model can be (the same as classical BSC) compiled on the basis of expert assessment but it can be also enhanced by using mathematical-statistical apparatus. Our proposed model is based on both ways – due to that was created correlation analysis of 55 indicators of Pardubice Region measured annually for the period 1998-2007. 20 indicators belong to economic (e.g. GDP, unemployment rate), 20 belong to social (such as population, number of students etc.) and 15 belong to the environmental (CO<sub>x</sub> and NO<sub>x</sub> emission, total waste production etc.) pillar of sustainable development. For the correlation analysis was used Spearman's correlation coefficient (due to a small number of data) [21].

In order to analyzing the indicators and their linkages, it was necessary to select relevant indicators appropriate to creating dynamic BSC model of Pardubice Region. When constructing a regional model, there are problems of lack of information and a possible delay in their publication. For statistical analysis of time data is needed longer time horizon.

Currently, the Czech Statistical Office does not provide all the information needed to assemble a complete set of necessary indicators. It is therefore necessary to proceed to alternative solutions, and use existing administrative data sources in the context of the information system of central government, local authorities and other commercial and non-commercial entities. Selection of indicators also reflects recommended set of indicators of sustainable development [1]. As source of information needed for correlation analysis were used data from different institutions.<sup>2</sup>

<sup>2</sup> Czech Statistical Office, the sectoral ministries (particularly the Ministry of Environment, Ministry for Regional Development, Ministry of Labour and Social Affairs, Ministry of Industry and Trade, Ministry of Transport, etc.). Other sources of data for a selection of relevant indicators, data warehouses are operated by the following institutions: the Labour Office of the Pardubice Region, Czech National Bank, OECD, Nipos, Institute

To find the key elements and linkages of the model were used the following methods:

- expert assessment of the relevance of the relationship between indicators (based on expert discretion to determine whether among the indicators there is a direct relationship),
- correlation analysis of relationships between indicators (Spearman coefficient of a matrix to determine the relationships between indicators and test of significance for the Spearman correlation coefficient).

Overall, it was done 1485 expert assessments. Only around 200 links was theoretically significant. Correlation analysis confirmed or excluded any of them. Dynamic strategic model of Pardubice Region was made from indicators and relations that satisfy the condition:  $S > 0.75$ , where  $S$  is the Spearman correlation coefficients calculated for the relationship between indicators and currently belong to among about 200 experts selected relationship. Some other elements and links were added only on the basis of expert assessment, due to absent of reliable and easy interpreted indicators.

### 5.1. Description of the Strategic Dynamic Model

The strategic model of the Pardubice Region (Figure No.2) is designed to reflect the characteristics of the dynamic BSC. Symbols + and – reflect positive and negative relationship among elements. The dynamic model consists of 32 elements and 54 links and can be split into upper and lower part. It is important to know, that model doesn't reflect all of existing relations, but only the most significant of them. Due to clarity are some elements merged into one element and on the other hand some are separated, although they could be merged into one.

The upper part is devoted more to the role of local government and direct impact on stakeholders. The lower part is more focused on economic core of region, which affects both the environment and socio-economic characteristics of the region. When reading the strategic model, we can start from the top right corner, where is displayed External Standards and Specifications. External Standards and Specifications are primarily legislative requirements of the government and also

for Information in Education, The Road and Motorway Directorate, Railway Infrastructure Administration, etc.



attractiveness of the region. The increasing of living standards is associated with the growth of purchasing power, which is represented in the model by increasing of demand for goods and services in all sectors. Growth of region GDP has positive effect on the budget of the region. This mechanism is expressed through the collection of taxes.

It is necessary to mention that the relationship between GDP and taxes is not as trivial as it might seem. This relationship can be negative under certain circumstances. This is a situation when the tax rate decreasing and so that GDP is growing. In this situation depends on the position of the economy on the Laffer curve. Increasing of regional tax revenue has the effect not only on the state budget, but also on the budget of EU funds. Tax revenue affects the amount of approved projects through the use of Structural Funds as well as state subsidies. The amount of approved projects increased the budget of the region. It is important to keep in mind that the tax rate is set by the national government rather than regional government.

The lower part of the model represents the link between employment, education, research, standard of living and market demand. Development of high-tech and ICT sectors stimulate the growth of whole region.

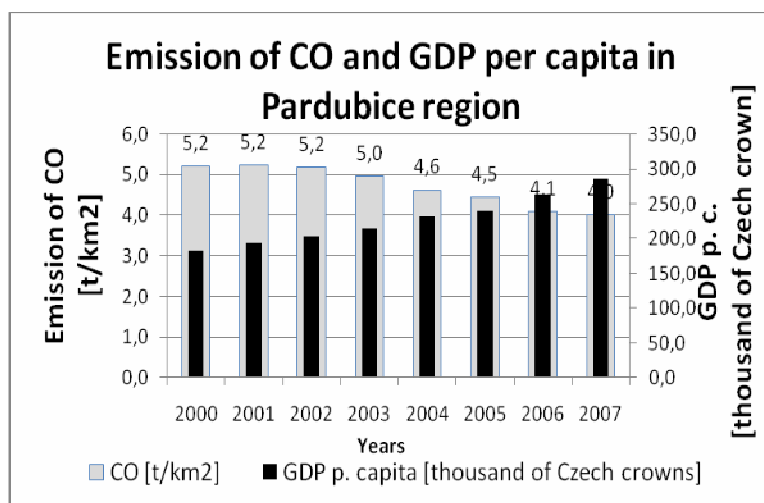
Education, research and development of high-tech industries with high added value are mentioned in synergy relationship. It has a positive impact on the recovery of other sectors in the region. Recovering economy has several impacts: primarily the increase of GDP generated by the region. Second, it can increase employment. And last but

not least, it is possible to expect increasing of competition, which has direct impact to decreasing the costs of living and thus indirect effect on the growth of living standards.

Another part of the model is devoted to environmental issues. Pardubice Region is largely focused on the chemical industry therefore the question of environmental pollution is more than topical. Higher volume of production mostly leads to enhancement of environmental pollution. Therefore the model, in the right bottom, shows the connection with the legislative requirements for the use of environmentally friendly technology. At this point is used one of the five negative links in the model. The more environmental damage and non-renewable resources consumed, the more there is legislative requirements applying to friendly technologies. The more these technologies are applied, the less environmental damage and declining consumption of nonrenewable resources.

GDP growth probably leads to an increase of capital inflows. Capital has an effect on developing sectors, which increase employment and also the living standards of residents. Higher living standards have a positive impact on increasing demand for products and services. Growth in demand will stimulate all sectors, which in turn increase the GDP of the region - thus the cycle repeats.

**Figure 3: Emission of CO and GDP per capita in Pardubice region**



*Resources: Czech Statistical Office*



## 6 Limitation

The model naturally does not fully contain all potential links between regional's factors. It is not possible to say that there aren't some other significant relationships that are involved in the situation of the region. Statistically, however, were not significant enough.

One of the limiting factors is abstracting from the influence of other regions within the state, and also abstracting from the influence of imports.

A significant simplification in the model was also approached for recovering ability of developing industry and growing demand with a secondary impact on capital inflows. It is conceivable that recovering economy of the region will not have much effect on declining industries in the region; the greater impact could be probably recorded in the developing sectors. This effect will naturally lead to the restructuring of the sector in the region.

There is also very simplified relationship between the increase of production and pollution. The authors are aware that this may not be valid for environmental friendly technologies. The situation is also far more complex when we focus on the individual components of pollution. For example, as shown in Figure No. 3 - Emission of CO and GDP per capita in Pardubice region - here could be recognized significant long-term decreasing of CO emissions, despite the fact that the region's GDP grows. This can be explained by applying of environmental friendly technology.

## 7 Conclusion

The proposed framework presented in this paper describes one way how environmental and social aspects can be integrated with the general strategic management system of local government. BSC is an open concept, which each organisation allows to choose way of sustainability issues integration based on their unique and specific conditions.

An innovative architecture of SBSC needs to be developed into particular methodology that describes all steps of strategic management process. The formulation of vision, selection of best fittings perspectives and creation of dynamic model are initial phases of the SBSC. The main benefit lies in the dynamic BSC model which easily and clearly explains the whole strategy of the region and the connections between economic, environmental and social aspects. Furthermore is necessary to develop sustainable scorecard measures and determine strategic initiatives for each objective.

The approach featured in this paper represents inspiration for further discussions about sustainable performance management and strategy development of local government. Looking at the limitations of the paper, the proposed framework is mainly based on theoretical findings and case study analysis. In order to implement such a sustainable strategic framework in practice, further research is necessary to carry out.

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