

Assessment of Models and Indicators of Private and Public Organization Sustainability

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Abstract. *The main aim of the study is to build a general understanding about how organisation sustainability researchers propose evaluating organisation sustainability and how the proposed models and frameworks changed over time. The analysis is carried out from the perspective of several aspects, focusing on the methods, tools and models proposed for organisation sustainability assessment, noting the organisation level of evaluation (the organisation level, a broader industry of value chain level, or a narrower product, service or process level). Two other aspects of the research were the definition of sustainability in the proposed models with regard to sustainability dimensions, and different empirical studies conducted using the proposed theoretical models. The analysis includes 30 papers, focusing on organisation sustainability evaluation, assessments and measurement, published between 1997 and 2010.*

Keywords: *organisation sustainability, public and private sectors, sustainability assessment, sustainable development, new public administration, sustainability evaluation, sustainability measurement.*

Raktažodžiai: *organizacijos darnumas, viešas ir privatus sektoriai, darnumo vertinimas, darnus vystymas, naujasis viešasis administravimas, darnumo įvertinimas, darnumo matavimas.*

Introduction

As sustainability assessment at national level is becoming more and more common because of the government policies, appointing certain institutions to

evaluate countries' sustainable development and spreading of countries' sustainable development strategies, similarly, there were also several attempts to assess the sustainability of the corporate sector and organisations. Corporations are seen as an important participant in pursuit of sustainable development, therefore, researchers build corporate and organisation sustainability assessment frameworks and models to be used for evaluating contributions of businesses and organisations to sustainability.

The research problem of this paper can be defined as creation of various new organisation sustainability evaluation models, reflecting different approaches to define sustainable development and sustainability, and employing different mathematical procedures to draw conclusions. Most of organisation sustainability researchers try to build a unique and the best sustainability evaluation model without deeper research into what counterpart researchers have already created and how their own model differs from or is similar to the one already employed. This brings a problem of repeating the same thing many times by different people, whereas it could be beneficial to build on the models already created and try to improve on them.

Thus, the aim of this study is to build general understanding about organisation sustainability researchers' suggestions for evaluating organisation sustainability: the tools used, the models suggested, mathematical or logical procedures suggested for executing this process. The study with a historical perspective should also bring some insights on the way that the proposed sustainability evaluation models change over time. Another benefit of such a research for researchers and other readers would be building a general understanding of models that have already been created and used in empirical studies, so that the authors conducting their own research could use one or several models proposed, or create their own organisation sustainability assessment model, aware of various perspectives of other researchers.

In the contemporary global environment, in which multiplan multidimensional changes occur, organisations reflect increasing interactions among public and private sectors, and intersectoral partnerships are spreading based on hybrid organisation creation, networking principles, multidimensional organisation integration principles. Thus the aim of the authors is to analyse evolution of management models, their improvement with new decomposition elements, to present all sector type and organisation structure sustainable development tendencies and directions, by diagnosing most important dimensions of the sustainable organisation development model, determining forms, implementation methods and procedures of sustainable organisation development.

General aspects of organisation sustainability evaluation methodology

This study focuses on the organisation sustainability evaluation models presented in scientific articles. The analysis encompasses several studies of a broader and narrower scope of sustainability assessment of a product (service) (a part of an organisation), sustainability assessment of a supply chain (several integrated organisations), or certain industry perspective (several organisations active in one field).

The retrieved articles were then read with several specific questions in mind: what the article proposes for evaluating sustainability, the organisation level evaluated, from the perspective of the organisation (company, enterprise) level, and a broader level of several organisations (certain industry or supply chain), or on a level narrower than organisation level (a product, service or a process). The third concern in the analysis of the definition of sustainability as the background of the model proposed, to be more precise, whether the author includes the all three dimensions of sustainability (ecological, social and economic). The fourth concern was the type of empirical application of the models. These were the main concerns during the execution of the analysis that would build a general understanding of the various suggestions of researchers for evaluating organisation sustainability.

Analysis of private organisation sustainable development theoretical modelling

One of the first attempts to measure organisation sustainability is by Ragas *et al.* [19], where the authors present a method for measuring sustainability of a production system, and, as the authors state: ‘Because it would be very complex and time consuming to elaborate the method for a complete production system, the case study considers a relatively simple part of a production system: a paper mill in the Netherlands’ [27, p. 151]. Thus Ragas *et al.* [27] focus on a company level and present method implementation in a case study. The authors use indicators and EUS (Environmental Utility Space) to measure sustainability. In the theoretical considerations and sustainability definition, the authors acknowledge three pillars of sustainability, but mainly focus on the ecological dimension, explaining that ‘Ecological sustainability is a prerequisite for social and economic sustainability: the carrying capacity of the biosphere is limited and should not be exceeded by socioeconomic activities [27, p. 150]’. Thus sustainability is seen as a level of impact of socioeconomic activities on the environment. The authors calculate such indicators, as energy, resources, output of white paper, emissions to air and water among others, and compare them to the environmental utility space (EUS) to create a graphical representation of the paper mill’s different impacts on the environment.

In their paper, Tyteca & Callens [32] present a proposal for calculation of indicators, which would allow assessing organisation sustainability. By explaining their approach, the authors state that: ‘A fundamental standpoint adopted is to view economic social and environmental efficiency as a necessary (but not sufficient) step towards sustainability. To work out indicators, we build on both the concepts of cost-benefit analysis and the principles of production efficiency [32, p. 41]’. The authors propose their methods for the organisation, or, as they define it a ‘decision making unit (DMU)’ level. To evaluate sustainability, the authors suggest employing indicators of three sustainability dimensions: ecological, social and economic.

Bond *et al.* [4] analyse three case studies of integrated impact assessment. The three case studies highly differ, as the first case study deals with a large-scale scheme

to finance installation of a hydropower facility at the existing dam in Mali and power distribution to three countries: Mali, Senegal and Mauritania. The second case study deals with Area-Based Growth with Equity (ABGEP) Programme in Sri Lanka with a goal to integrate the activities of governmental agencies, nongovernmental organizations (NGOs) and private sector over a five-year period. The third case study dealt with Acid Waters Problem Study in Wales, UK. The case studies illustrate problems more at national level and creation and implementation of policies.

In their paper, Figge & Hahn [9] propose a concept of sustainable value added, by which corporate contributions to sustainability could be measured. Therefore, the authors focus this approach on an organisation level. As a means of measuring corporate contributions to sustainability, Figge & Hahn [9] propose a measure based on opportunity costs, which 'shows how much more value is created because a company is more efficient than a benchmark and because the resources are allocated to the company and not to benchmark companies. Sustainable Value Added is a monetary measure of corporate contributions, which shows the extra value created when environmental and social impacts are kept constant'.

Figge & Hahn [10] further develop their Figge & Hahn [9] concept of sustainable value. The authors state that 'Conceptually, the methodology is suitable for the analysis of the sustainability performance of any form of economic activity or entity such as companies, regions, national economies, processes, or products' [10, p. 52]. In the article the focus is on a company level and the presentation of a practical application of a concept calculates sustainable value of British Petroleum (BP) in 2001. All three sustainability dimensions are included in the analysis. The data to calculate BP's sustainable value, and thus contribution to sustainable development, consists of 2 economic, 6 ecological and 1 social indicator.

Krajnc & Glavic [17] propose a model for assessing sustainable development at company level, by obtaining a composite sustainable development index (I_{CSD}) in order to track information on economic, environmental and social company's performance in time. Krajnc & Glavic [17] suggest indicators to evaluate sustainable development of a company, and define a 7-step evaluation process.

According to Labuschagne, Brent & van Erck [18], the way to evaluate sustainability is to use indicators, and the authors use three sustainability dimensions (economic, social and environmental) as a basis for structuring the framework. Labuschagne, Brent & van Erck [18] present results of a survey conducted at a large petrochemical company in South Africa, 'which rated the relevance of proposed framework's different criteria for operational (project) sustainability assessment. The authors conclude, that sustainability evaluation '<...> overall procedure (and sustainability indicators) would, most probably, be company-specific', and that 'the criteria addressed in the proposed framework are particularly applicable to assess projects that are undertaken in the process industry. <...> the proposed framework can thus be used to establish the sustainability of the products as well' [18, p. 384].

Van Couwenberg *et al.* [33] propose a framework for sustainability assessment called Sustainability Assessment of Farming and Environment (SAFE). It should be noted here that acronym SAFE already has two explanations of sustainability

assessment models: that of Couwenberg *et al.* [33], and another of Phillis *et al.* [26] Sustainability Assessment by Fuzzy Evaluation (SAFE). Van Couwenberg *et al.* [33] state that ‘the framework is designed for three spatial levels: the parcel level, the farm level and a higher spatial level that can be a landscape, the region or the state [33, p. 229]’. The SAFE framework employs indicators and reference values for sustainability evaluation, though the complete hierarchical framework consists of goals, principles, criteria indicators and reference values.

Vayssieres *et al.* [36] and Vayssieres, Bocquier & Lecomte [35] present a model called GAMEDE: a global activity model for evaluating the sustainability of dairy enterprises. The model is created at an agricultural organisation or company level and can be used to model the consequences of management decisions for agricultural organisation sustainability.

In their study, Gomez-Limon & Sanchez-Fernandez [11] suggest using composite indicators for evaluating sustainability of agricultural organisations. The authors use SAFE (Sustainability Assessment of Farming and the Environment Framework) proposed by van Cauwenberg *et al.* [33] as the theoretical framework for agricultural sustainability analysis. In the paper, the authors present results of a research, comprising of 349 questionnaire responses (data on 336 rain-fed agriculture organisations and 243 irrigated agriculture organisations). The indicators selected for the study include all three sustainability dimensions: economic, social and environmental and 16 indicators are used. CIAS (composite indicators of agricultural sustainability) were calculated for all agricultural organisations included in the study, thus enabling the authors to evaluate the sustainability of each agricultural organisation.

In their review of sustainability assessment models, Phillis, Kouikoglou & Manousiouthakis [26] refer that some of the models discussed in their paper can be used to assess corporate sustainability. Phillis, Kouikoglou & Manousiouthakis [18] list a number of existing models, used to assess environmental performance of a business (Eco-compass, Eco-indicator, COMPLEMENT) as well as couple of guidelines to assess corporate sustainability (CERES, GRI) and propose SAFE (Sustainability Assessment by Fuzzy Evaluation) model and a number of indicators to assess corporate sustainability. Thus the authors suggest measuring sustainability of an organisation by using indicators or the SAFE (Sustainability Assessment by Fuzzy Evaluation) model.

Sustainable development indicators of the organisational formations of public sector and corporate nature in the context of new public administration

Keeble, Topiol & Berkeley [14] suggest measuring sustainability at organisation and project levels. In their article, the authors suggest using indicators for sustainability measurement and offer some guidance on the process of selecting indicator sets, by giving examples of two case studies – the first at corporate level and the second at project level. In the second case study, Keeble, Topiol & Berkeley [14] acknowledge

three sustainability dimensions for project management evaluation, and propose using the division into 4 pillars (economic, social, environmental quality and use of natural resources), further dividing them into 15 criteria, 37 sub-criteria and 69 indicators. Thus the proposed framework for project management sustainability evaluation encompasses all three sustainability dimensions.

After reviewing 12 case studies of sustainable tourism development, Ko [15] proposes a procedure for assessing tourism sustainability. In the paper, Ko [15] uses two terms to describe the object of interest: 'tourism sustainability' and 'tourism destination sustainability'. As the author describes: 'A tourist destination means a tourist attraction (human-made or natural), including the human system and the ecosystem, influenced by tourism activities [15, p. 436]'.

Instead of an organisation, or product, or industry perspective, de Jonge [8] focuses on a specific issue related to sustainable development. The author proposes a method for comparing corporate commitment and stakeholders' expectations, as well as corporate commitment and corporate performance. With this method, one can evaluate whether a company's actions match the expectations of the stakeholders, whether they are perceived as committing too little or as exceeding their expectations. In the article, de Jonge [8] presents four case studies from the Life Sciences industry in Basel, Switzerland, focusing on evaluation of pharmaceuticals in the water, historical landfills, GMOs and access to treatment.

Lozano [20] focused on sustainability evaluation of universities. In the paper, Lozano [20] focuses on a university (organisation) level in sustainability evaluation. After reviewing both corporate-specific and university-specific sustainability tools, Lozano [20] proposed using modified Global Reporting Initiative (GRI) guidelines adding an educational dimension. Based on the modified GRI guidelines, Lozano [20] developed a tool called Graphical Assessment of Sustainability in Universities (GASU), which can be used to compare sustainability performance of a university over time, as well as to benchmark different institutions against each other. Both the Modified GRI guidelines and the GASU employ indicators for sustainability assessment.

After discussing various aspects of cost-benefit analysis and full cost and sustainability accounting, Bebbington, Brown & Frame [2] propose using Sustainability Assessment Modelling (SAM) for corporate sustainability assessment purposes, used in UK and New Zealand in oil, energy generation, forestry, housing and other industries. SAM is applied at project level and offers a means to understand impacts of all three dimensions of sustainability. According to the model, the impacts are divided into four categories: the financial flows, usage of resources, environmental impacts and social impacts.

Hutchins & Sutherland [13] use indicators for company and supply chain sustainability measurement, and out of those indicators they calculate an index of social sustainability measurement. The authors also demonstrate how a 'supply chain sustainability index' can be calculated based on indexes of companies in the supply chain.

Tseng, Divinagracia & Divinagracia [30] focus their sustainability evaluation study on company level, a company with four production facilities in two countries:

Taiwan and Philippines. Thus the authors carry out the study on a company group level and on a factory level. For the evaluation of sustainability, the authors use SPIs (Sustainable Production Indicators). The performance of indicators is evaluated by using both fuzzy measures and ANP (Analytical Network Process). The indicators selected include all three sustainability dimensions.

Phillis & Dalis [25] suggest assessing organisation sustainability by means of fuzzy logic. The authors present a model, which can be used to assess sustainability at organisation level. To assess sustainability, the authors use indicators and calculate their overall sustainability (OSUS) value by using fuzzy logic. In their study, Bojkovic, Anic & Pejčić-Tarle [3] focus on sustainability evaluation of a single sector, namely, transport. From the perspective of an organisation, transport sector can be seen as a group of organisations working in one industry, in this case, transport. Thus the authors focus on industry and not organisation level. To evaluate sustainability of countries' transport industry, Bojkovic, Anic & Pejčić-Tarle [3] use indicators grouped according to three sustainability dimensions: economic, social and environmental. The authors use ELECTRE I method (Elimination Et Choix Traduisant la Realite; Elimination And Choice Corresponding to Reality) and authors' modification of the ELECTRE method.

Social aspects of the new public administration

When analysing the results of implementation of the new public administration doctrine, today we see the results that reveal a number of dysfunctions of this public administration pharmacy, most of which, in one way or the other, are associated with social goals of society and their implementation problems [12, 252-253].

The social dimension of public administration nowadays is defined by certain activities and circumstances in the field of public sector administration and in the entire social sphere in general, and is generally understood as a global or network society with unpredictable context, in which diversity of process participants and their activity belonging features exist.

Today, social systems, successful functioning of social networks and their interaction is one of the main conditions of public administration evolution into more ideal forms of public administration.

Social networks may be seen as a new type of administration, politic networks, less associated with conception of hierarchical, bureaucratic system, with less formalised activity features, more dynamic systems than in the classic systems theory named static systems. Therefore, social networks as systems (or subsystems) may be temporary structural formations fulfilling the functions of expert commissions, institutions, committees that act to realize both general and specific stakeholder goals. Social networks working in such conditions, pursuing on or the other general and specific social tasks or functions, develop and improve themselves as social systems

or subsystems, in other words, the tasks fulfilled enable the structures to improve institutionally and to improve performance effectiveness [19, 38-39].

Contemporary new public administration indicators, reflecting integrational and internationalising changes, formal and informal structures, societal process regulation and deregulation tendencies, these processes reflecting social stratification elements, can be identified: increased interaction of formal and informal structures in all fields of social life; intersectoral (of all three society sectors) integration; transformation of horizontal and vertical links in organisational structures in various fields of social life; changes in direct and reversible links, their multidimensional changes in various fields of social activity; changes in various system levels, oriented at development of generalised systemic links (regional and interregional, intersectoral, combined structures) [21, 254-256].

New public administration raises new requirements for implementation of organisations' social responsibility at all levels of institutions. Today, it is often called 'corporate social responsibility of organisations'. This multidimensional definition is interpreted differently, in practice, there are various models of institution social responsibility as well as alternative definitions, such as social responsibility of politicians, administrators, bureaucracy, public sector and business partnership and social responsibility etc. [16, 66- 93].

In the theoretic interpretations of corporate social responsibility a number of dimension groups and forms are found, such as instrumental (seeking more profit), political (emphasizing social rights and duties), integrated (where organisational networks bear collective-integrated social responsibility forms), ethical (conceived as organisation's moral imperatives and responsibility for pursuing them).

In particular, multiplan organisation social responsibility in the process of public administration can be successful only in all organisation levels, by using inter-organisational integration possibilities and building on constructive incremental realisation tradition. This is stated in the widely known structural functioning theories, which directly link organisation's social responsibility and its realisation possibilities with elements interaction quality of an organisation as a system [24, 821].

Public sector sustainable development is conditioned by the fact that the new public administration conception is now only in the development stage, therefore, it is impossible to carry out the full-fledged decomposition-functional analysis, however, the challenges for this public administration form are silhouetted, and today the best known public administration specialists are carrying out researches and studies aimed at grounding the new public administration theoretic aspects in the development of fast new public administration evolution into new public administration processes.

Conclusions

1. The organisation sustainability research study has shown that almost all of the articles analysed propose using indicators for organisation and company sustainability assessment. Most of the indicators represent various impacts on the environment

and the society. In order to evaluate organisations, one needs certain data that could be evaluated afterwards. Therefore, measuring and evaluating sustainability of an organisation requires calculation of indicators, and then evaluation of good or bad, satisfactory or unsatisfactory nature of the values of indicators.

2. The differences between the models proposed arise when deciding on the use of indicators: should they be grouped, normalised, divided, recalculated etc. Thus after gathering the necessary data by means of indicators, various techniques are employed to obtain certain outcomes: calculating one or several indices, using fuzzy logic, ELECTRE method, ANP (Analytical Network Process), normalizing data, calculating scores and grouping them from poorest to best performing, by using benchmarking data for comparing with company data.

3. As the study focused on the sustainability evaluation at organisation level, most of the analysed papers researched precisely this level of organisations. Nevertheless, there are different approaches and attempts to evaluate sustainability of a broader level of a group of organisations (companies in an industry or in a value chain) or narrower approaches of evaluating product, service or process sustainability.

4. In most of the analysed studies, all three sustainability dimensions (ecologic, social and economic) have been analysed or at least acknowledged, as in most studies, the sustainability dimensions are used as a theoretical framework, but the empirical studies sometimes have a narrower scope, by researching one dimension only.

5. Empirical studies could be divided into two groups: one group would consist of studies evaluating sustainability of one or several organisations (companies) and gathering the necessary information from the company sustainability reports and annual statements. These are mostly case studies. Another group of studies could be defined as ranking a large number of companies (from tens to hundreds of companies), and the data for sustainability evaluation in such studies is often collected by means of surveys.

6. From the historic perspective, the proposals for evaluating sustainability haven't changed much, as the first studies analysed have already been built on the concept of three sustainability dimensions. The first analysed study by Ragas *et al.* [27] has already used three sustainability dimensions, by defining them as the impact of socioeconomic activities on the environment. The latter studies of organisation sustainability more and more often included in the frameworks the positive and the negative impacts of all three dimensions, building a general understanding that the organisation had both positive and negative impacts in all three dimensions.

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**Privačių ir viešųjų organizacijų darnumo vertinimo
modeliai ir rodikliai**

Anotacija

Organizacijos darnumo vertinimo modelių tyrimo tikslas – apžvelgti ir apibendrinti organizacijos darnumo vertinimo tyrinėtojų pasiūlymus: kokie įrankiai yra sukurti ir naudojami, kokie modeliai, matematinės ir loginės procedūros yra siūlomos vertinant organizacijų darnumą. Istorinė apžvalga taip pat suteikia išvalgą, kaip siūlomi organizacijos darnumo vertinimo modeliai keitėsi laikui bėgant. Kitas tokios apžvalgos uždavinys – apibendrinti modelių taikymą empiriniuose tyrimuose, kad būtų galima panaudoti vieną ar keletą modelių, juos tobulinant sukurti naują organizacijos darnumo vertinimo modelį.

Tyrimas sutelkia dėmesį į privačių ir viešųjų organizacijų darnumo vertinimo modelius, publikuotus moksliniuose straipsniuose. Apžvalgai buvo atrinkta trisdešimt mokslinių straipsnių, nagrinėjančių organizacijų darnumo matavimą ir vertinimą 1997–2010 metais.

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