A Multidimensional Assessment Framework for Art Museums

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ABSTRACT

The museum sector is characterized by a series of features which make this field very challenging. One of these features is the fact that we have to look at the museum product as at the multidimensional product, since cultural goods have two-ply character, they are artistic and economic product at the same time. Moreover the measuring of the quality in art museum is difficult activity, it is hard, sometimes even impossible, to set a series of indicators and also obtain proper data. Nowadays it is almost necessary to integrate performance measurement system in organization´s strategy decision making. The museum managers feel the pressure to prove that their organization is performing well by various stakeholders and we perceive the idea that multidimensional performance measures could fill the informational gap concerning performance, quality, and the artistic value of cultural programs.

This study investigates the performance measurement and evaluation practice of art museums. The performance of museum consists of financial performance and qualitative issues, two sets of performance that are targeted by radically different measures and evaluation practice. The aim of this study is to propose a comprehensive multidimensional model to assess art museum activities. This model takes into account the scope and character of museum´s mission. This model consists of implementation of Data Envelopment Analysis into Balanced Scorecard tool. The research is based on mixed research method. I have obtained both quantitative and qualitative data by analyzing documents, annual reports of the selected art museums, and conducted interviews with some representatives of museum sector.

Key worlds: art museums, evaluation, assessment methods, performance measurement

1 Introduction

Art and culture have played essential part of human life, in the past few decades, they have also became important economic factors. This fact has tended to consequences, that art and cultural organizations are evaluated not only from an artistic point of view, but also vie economic measures (Thorsby, 2004). Therefore, performance measurement in cultural institution, have received much attention in recent years and have been subject of many studies.

Art museums are organizations that nowadays face pressure to be more transparent about their funding and spending, how they are governed, and what they have achieved with their

resources. Accountability in art museums has become an important topic and some art museums have tried to integrate performance assessment systems into their managerial activities. Performance assessments have been traditionally linked especially with financial metrics, but in 90s this topic began to be examined from a new perspective. New tendencies started to appear, that for truly useful results of performance assessment, we need to focus also on non-financial indicators. Step by step this idea began to be promoted, in particular within arts and cultural sector and various performance measurement tools have been applied.

Following questions has been appearing: How are we doing? Are we achieving our desired impact? Are we performing effectively and efficiently? But museums have not had convincing and actionable answer to these fundamental questions. Without ways to measure museums´ performance, museums will remain unaccountable in the current world, that demands accountable results (Jacobsen, 2016). Without measurement tools, museums risk being sidelined. Of course we all are conscious that museums have values and strong impact, but it is necessary to measure this value, although it may seem controversial. Studying how to measure museums´ performance is not intended only to justify their existence and funding, but it is convenient for museums themselves.

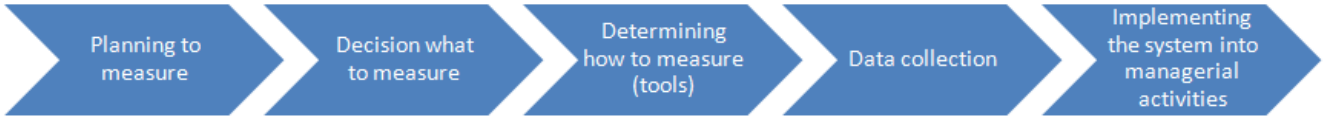
Crowther (1996) points out that performance measurement is undertaken for three main reasons, for control, for accountability, and for strategy formulation. Evaluation for control tells us if a museum is doing as expected. In this case, a museum needs to have a plan for its activities and then a museum assesses performance against this plan. I mentioned already above the power of accountability in today world, and it is this power that pushes museum managers to pay attention to the topic of performance measurement. And last but not least is evaluation for strategy formulation, which is concerned with prediction in developing strategy of a museum, is faced with a range of alternatives from which it must select those most appropriate to its future objectives. Reasons for monitoring and measuring the performance of art museums are related to their management of resources, and should provide several management tools, such as warning system if there are significant negative variances from the norm, proof of progress, if the trend is positive, proof of its commitment to excellence.

In order to monitor a measure a museums´ activities, it is necessary to adopt a multidimensional framework that is able to capture the complex mixture of inputs, outputs and outcomes that are connected with all museums activities. Prior to adaptation of the framework, we need to know which steps have to be undertaken to build a performance measurement system as described in Figure 1. First step consist of planning that art museum performance measurement, this step is followed logically by the decision what to measure, then a museum has to decide which tools will adopt and use, in function of tools and methods a organization knows which data they will need and finally the last step is the

implementation of the performance measurement system within the management of a organization.

A museum field needs to adopt a shared framework and language, because the field still lacks accepted ways to measure performance. But we have to keep in our minds that this framework does not provide on scale to judge all museums. It is not possible to set up a single system to score all museums, and perhaps that goal is neither advisable nor possible. But now is certainly time to set up and introduce a framework for each museum to measure changes in its own performance. Before we start to introduce this framework and before we start to measure museums´ performance, we need a theory to test and measure (Jacobsen, 2016). The emphasis on accountability and evaluation from public funding agencies and from private donors has resulted in considerable discussion about a nonprofit´s public value. Peter Drucker and others from the business world have proposed ways to manage organizations through the use of strategic indicators, which can be further organized using Kaplan and Norton´s balanced scorecard.

Figure 1 Process to Build a Performance Measurement System



Source: Adapted from Wolk (2009)

2 Literature review: studies dedicated to museum performance evaluation

Several studies dedicated to the topic of performance measurement in museums have been already conducted. Generally, these studies can be divided into two groups. Fist group of studies is focused on monitoring and measuring museum´s performance with a set of indicators. This group includes studies by Ames (1990), Jackson (1994) and Weil (1995), Anderson (2004), Zorloni (2010). Also, part of this group are studies exploring the implementation of the Balanced Scorecard (BSC) into museum management, these have been done by Fox (2006) and Zorloni (2012). The main goal of these studies is to select a group of indicators or ratios that would enable comparisons and that would monitor museum´s performance during the time. I do not consider this method convenient for a comparison between several museums, since each museum is really specific. As Herrero (2013) points out this first group of studies admit that set of indicators can never offer an all-inclusive and fully comprehensive description of how cultural institutions function. The second group of studies aims to measure the efficiency of certain number of decision making units by using frontier techniques. These studies allow to compare the set of decision

Table 1 Studies based on frontier techniques

Authors	Title	Year	Sample	Variables	Method
Mairesse and Eeckau	Museum Assessment and FDH Technology: Towards a Global Approach	2002	64 museums in Belgium	Preservation model **Input variable:** operational budget **Output variable:** percentage of the collection that has been inventoried Research and Communication model **Input variable:** operational budget **Output varibles:** number of termporary exhibitions, number of publications, number of communication actions Impact model **Input variable:** operational budget **Output variable:** number of opening hours, number of visitors	Free Disposal Hull
Basso and Funari	Measuring the Performance of Museums: classical and FDH DEA models	2003	15 public museums in Italy	**Input variables:** number of workers, exhibition area **Output variables:** number of visitors paying the full price, number of visitors paying either a reduce or a special price, number of temporary exhibition, number of other activities carried out by the museum	DEA CCR and BCC model and Free Disposal Hull
Basso and Funari	A Quantitaive Approach to Evaluate the Relative Efficiency of Museums	2004	15 public museums in Italy	**Input variables:** number of workers, exhibition area **Outputs variables:** number of visitors paying the full price, number of visitors paying either a reduce or a special price, number of temporary exhibition, number of other activities carried out by the museum (including seminars, conferences, research and so on)	DEA - CCR input-oriented model
Barrio et. al	Measuring the efficiency of heritage institutions: A case study of a regional systém of museums in Spain	2009	Regional system of museums in Spain (224 museums)	**Input variables:** staff, are of exhibitions, number or divisions and area of the museum, index of equipments and facilities of the museum, open hours, entry price **Output variables:** number of visitors, index of impact of activities and collections	DEA input-oriented model
Haruna et. al	Evaluation of Middle and Long Term Management Efficiency of Public Museums by Network DEA	2011	49 museum in Japan	**Input variables:** square measures, number of collection, number of staff, a curator´s rata, access distance, ambient population, exchange population, a hled expense, store items purchase cost, education spread scost, maintenance repair cost **Outputs variables:** short term income, number of outside activity, number of users, long term inocome	DEA - CCR output oriented model
Taheri and Ansari	Measuring the relative efficiency of cultural-historical museums in Tehran: DEA approach	2013	19 cultural-historical museums in Tehran	**Inputs variables:** space & accessibility index, human resource index, facility index, introduction idex **Output variable:** visitors index	DEA - CCR output oriented model
Herrero-Prieto	Is Museum Performance Affected By Location And Institution Type? Measuring Cultural Institution Efficiency Through Non-Parametric Techniques	2013	23 museums in Spain	**Input variables:** employment, equipment **Output variables:** temporary exhibitons, social impact, impact of collection	DEA CCR and BCC model
Carvalho et. al	The Economic Performance of Portuguese Museums	2014	285 museum in Portugal	**Inputs variables:** rate of efficiency (visitors), number of collaborators, number of open days, index of facilities **Output variable:** number of visitors	
Basso et al.	How well is the museum performming? A joint use of data envelopment analysis (DEA) and balanced scorecard (BSC) to measure the performance of museums	2015	11 municipla museums in Venice	Customer Perspective **Inputs variable:** insured value **Outputs variables**: visitors, webisite visitors per day, members Internal process perspective **Input variable:** total costs **Output variables**: conservation and restoration costs, visitors Innovation and learingn perspective **Input variable:** costant **Output variables:** aggreage sustainability indicator, personned training Financial perspective **Input variable:** expenditure **Output variable:** income	BSC-DEA approach

making units, since it provides a straightforward indicator. Studies using this methodology are listed in the Table 1. One of the most comprehensive approached was conducted by

Mairesse and Eeckaut (2002). In their study they used three service models (conservation, communication, and impact) and outputs corresponding to those activities for the evaluation of museums . Basso and Funari (2004) used this non-parametrical method using two inputs (work and size of exhibition rooms), and four outputs (visitors paying the full admission fee and a reduced admission fee, number of temporary exhibitions and other related activities). Del Barrio et. al (2009) used also a complex production function with three inputs (employment, size and museum facilities) and four outputs (visitors, temporary exhibitions, the museum´s social impact, and the impact of the art collection). So far there has been one research using BSC-DEA approach, conducted by Basso et. al (2015). Non-parametric models such as Data Envelopment Analysis (DEA) are usually used to measure the relative efficiency of decision making units and have often been used to assess public service (del Barrio, 2009).

One of the very first attempts to measure the performance of a group of museums was undertaken by the British Audit Commission (1991), which proposed a series of performance indicators for the analysis of museum subsidized by local government. But the collection and interpretation of these indicators seemed to be difficult, and only a few institutions used them. Later the British Department of Cultural Media and Sport decide to provide a new study in 1999, which centered on efficiency and effectiveness of museums and galleries, there were 365 indicators in this study in order to measure the performance of various museum activities.

3 Performance Assessment in the Art Museum Sector

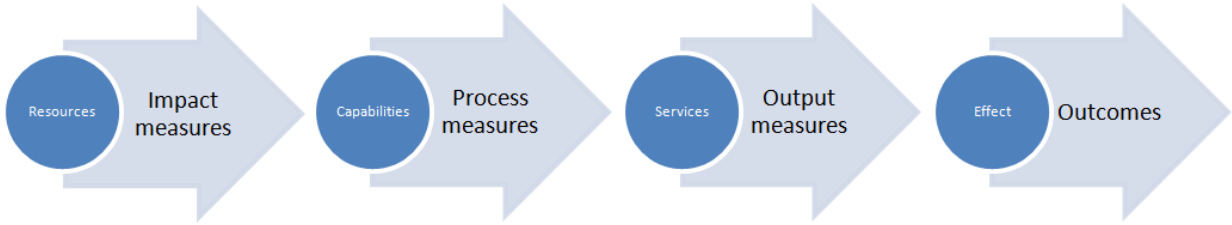
Art museums like any other organizations, use their resources to purchase inputs like labor and capital, in order to provide an output or a service which customer (visitors) demand. The way art museums use their sources and how they are transformed into services is captured in evaluation model in the Figure 2, that expresses performance measurement as a continuum reflecting the transformation of resources into services and having an impact on society (Zorloni, 2012).

In fact performance assessment in art museums has to face a number of problems. First of all, as Anderson (2004) points out, the main problem is, that there is not an-agreed upon method of measuring achievement and also the fact, that in the last decades art museums have shifted their focus away from collection-building and toward various kinds of attention to the public, without balancing these two imperatives. So first an effort should be made to reach some consensus in a given country´s museum community (Ames, 1990). In the case of the Czech Republic, there has not been any consensus so far, but the Czech Ministry of Culture tend to launch a registration system for museums based on a performance measurement and performance indicators, so art museums should pay strong attention to this topic.

The lack of agreed-upon methods is not the only one difficulty related to the performance assessment in art museums. The functions of museum activities are wider than the ones of others non-profit organizations, so museums have to deal with a wide range of resources and of course many of them is not easy to measure, since they are qualitative nature. Next difficulty is the fact, that the purpose of art museums is to provide a complex and multiple product, which is not always tangible or commercial nature (Del Barrio et. al., 2009). Zorloni (2012) sees the most fundamental and the most difficult for a museum to define the results it must deliver in order to be considered successful. Because of the diversity of goals pursued by museums, there is no single quantitative or qualitative metric against which performance can be evaluated and ranked. So the question is, what system should be used to assess quality and success in the art museums sector? The first assumption is, that this system has to be based on multiple indicators that aim to highlight both qualitative and quantitative aspects (Turbine and Laurin, 2009). In terms of performance measurement of art museums, we speak about multidimensional performance, quality, and the aesthetic dimensions could be observed trough multidimensional management tools such as the Balanced Scorecard or Data Envelopment Analysis.

When we speak about performance assessment in art museums, we have to keep in mind that the use of inappropriate performance measures carries certain risk, such as the manipulation of the evaluation data, or museum staff focusing on obtaining performance measures while neglecting the quality of the museum services that are not measured (Paulus, 2003). Also we cannot overemphasized the sense of performance measurement in art museums, since many if not most of the critical quality of good cannot be measured numerically.

Figure 2 Evaluation model



Source: Zorloni (2012)

4 Objectives, Methodology and Scope of the Study

The purpose of this paper is to evaluate the performance of local authority Czech art museums by means of BSC and DEA. Museum managers must adopt the BSC to evaluate their management performance from four perspectives. In addition, in order to evaluate the

competitive position of the firm, managers need to apply DEA to identify the efficiency frontier, benchmarking partners and inefficient slacks for the firms.

In this study I focus on the technical efficiency of the 19 Czech art museums (DMUs = decision making units), comparison between the actual performance of each DMU.

5 Multidimensional Assessment Measurement Framework

A conceptual framework developed for this study and is used as the research framework. This is based on the review of the relevant performance measurement theories and frameworks by comparing the features of current performance measurement implementation and requirements.

The process of developing a conceptual framework has been undertaken within two stages. Stage one focuses on studying the measurement and performance measurement frameworks that employed by museums and implementation of performance measurement in museums, through qualitative approaches. At this stage, a qualitative data collection method is used. 15 semi-structured interviews were conducted with museums, academics and practitioners. Before and after interviews, relevant performance measurement data and documents were studied. The documents include PM policies, procedures, annual reports, methodologies, etc. At the stage two, a questionnaire-survey was conducted. A questionnaire including some general information of museums, questions about quality and quantity of space, human resources and facilities, questions related to social impact and presentation of museum to visitors is used to gather the essential information.

Museums have to face conflicting objectives through multidimensional performance measurement systems. Performance is linked to an organization´s value and strategic orientation, and therefore that, while seeking performance solutions, mangers should define their organization´s internal values and strategic orientation to promote clear mission statement. (Turbide and Laurin, 2009). Many authors have proposed performance measurement models. Among the first to translate conflicting objectives into foundation for a comprehensive model to measure performance in arts and culture organizations was Schuster (1997).

Gilhespy (1999) also proposed a performance measurement system for cultural organizations. He points out that argues that external evaluation of a cultural institution´s performance, including evaluation by the central government, does not take into account the distinctive objectives inherent in the art sector.

5.1 Performance indicators

The use of performance indicators in the arts is quite widespread nowadays. The use of performance indicators in the arts is quite widespread nowadays. The basic reason for the development of this practice is that the scope for commercial profit-oriented activity is very

limited in most sectors of arts production, and the size of public a private contributions can be large. The different stakeholders cannot refer to any market signal, however imperfect it may be, to evaluate different aspects of arts production. Therefore there is a need to define virtual measure of arts organizations´ performance so as to provide some empirical support to the judgment on the value of arts production. (Pignataro, 2011).

Performance indicators were already mentioned in the previous chapters, it was said that they are to evaluate the performance of their organizations. Performance indicators provide museum managers information how is their organization performing. Jackson (1991) says, that it is useful to distinguish between performance measures and performance indicators. Where indicators of 3Es can be measured precisely, we usually talks about performance measures. When, as is most often the case, it is not possible to obtain a precise measure it is usual to refer to performance indicators, they are statistics, ratios, costs and other forms of information that illuminate or measure progress in achieving the aims an objectives of an organization as set out in its corporate plan.

The use of performance indicators is an aid to good judgment, but not a substitute for it. They are provocative and suggestive, and they alert managers to the need to examine the issue further. First articles dealing with the topic of museum performance indicators appear in the early 90s. Ames (1990) writes what appears to be the first article on the subject and he proposed a set of 40 ratios dealing with several aspects of the museum (finance, fundraising, human resources, and marketing). This first approach was followed by Jackson (1991), who replaced the measure system in the strategic planning process. But we have to work really carefully with performance indicators, they need to be chosen very carefully, since they can distort reality. Performance indicators can be very useful to compare a museum´s performance over time, or with a set of goals. But this principle of comparison can give a biased part of the information required, a museum can perform less efficiently than most of its peer, but show very stable indicators. Museum managers, accepting the idea of use of performance indicators, agree on their internal use, and do not think that they can lead to meaningful comparisons between museums (Weil, 1995). The whole process of comparison is not only difficult because of the specification and gathering of adequate data, but also because of their interpretation, and if the first objection can be tackled by a discussion between museum curators and mangers, the second cannot. First, the comparison has to be relative and not absolute (Mairesse and Eeckaut, 2002).

Of course, performance indicators are of little value or interest until they are compared with something. The best comparisons are with the institution´s past performance (i.e. trend analysis) and targets established or planning purposes (i.e. budget versus actual) (Chong, 2009).

The challenge when developing performance indicators is to balance the number of performance indicators against the overall ability to describe the service. The number of

indicators however, depends on what is appropriate for the target group and context in question. Organization needs to keep the overall number of indicators to a manageable number if they are not to swamped with information. Most public museums provide a variety of services, so although there may be only a handful of indicators for a single service, the overall portfolio could include over a hundred indicators. The CIPFA report, Measuring Up (1998) argues that a good working rule is a set of 10 to 20 indicators for any one reader or individual manager. The number will depend upon the position of this individual, the complexity of the area and the intended use of the performance indicators.

Performance information systems often accumulate unnecessary indicators on the assumption that it would be nice to know about. An important question that should be applied to every indicator is what action could the recipient of the information take on the basis of this information? The next important thing is that we should report only indicators that are relevant to the user.

5.2 The Balanced Scorecard

The Balanced Scorecard was developed by Robert Kaplan, an accounting professor at Harvard University, and David Norton, a consultant also from the Boston area. In 1990, Kaplan and Norton led a research study of a dozen companies exploring new methods of performance measurement. The impetus for the study was a growing belief that financial measures of performance were ineffective for the modern business enterprise. The study companies, along with Kaplan and Norton, were convinced that a reliance on financial measures of performance was affecting their ability to create value. The group discussed a number of possible alternatives but settled on the idea of a Scorecard featuring performance measures capturing activities from throughout the organization — customer issues, internal business processes, employee activities, and of course shareholder concerns. Kaplan and Norton labeled the new tool the Balanced Scorecard and later summarized the concept in the first of several *Harvard Business Review* articles, " The Balanced Scorecard — Measures that Drive Performance".

The Balanced Scorecard has emerged as a proven tool in meeting the many challenges faced by the modern organization. BSC was developed by Robert Kaplan, an accounting professor at Harvard University, and David Norton, a consultant also from the Boston area. In 1990, Kaplan and Norton led a research study of a dozen companies exploring new methods of performance measurement. The impetus for the study was a growing belief that financial measures of performance were ineffective for the modern business enterprise. The group discussed a number of possible alternatives but settled the idea of Scorecard featuring performance measures capturing activities from throughout the organization – customer issues, internal business processes, employee activities, and of course shareholder concerns.

BSC has proved to be a suitable tool for performance measurement in museums, because it can make multidimensional performance, quality, and aesthetic dimensions of performance visible with a couple of key figures. BSC is the tool, that convert intangible assets that usually form a competitive advantage to tangible outcomes is the BSC. As Zorloni (2012) points out, the BSC provide a framework for considering museum performance in a holistic way and seems to be a potentially useful managerial tool for achieving strategic alignment. It suggests that we view the organization from four perspectives and then develop metrics and collect and analyze data relative to each perspectives. A museum might be interested in implementing BSC for a variety of reasons:

- to better identify performance measures,
- to demonstrate accountability and communicate the value of the museum,
- to focus the museum staff on the importance of achieving the museum´s goals.

5.3 The Data Envelopment Analysis

The Data Envelopment Analysis is a methodology based upon an interesting application of linear programming. It was originally developed for performance measurement. DEA is a linear programming-based technique for measuring the performance efficiency of DMUs. This technique aims to measure how efficiently a DMU uses the resources available to generate a set of outputs. The performance of DMUs is assessed in DEA using the concept of efficiency or productivity, which is the ratio of total outputs to total inputs. Efficiencies estimated using DEA are relative, that is, relative to the best performing DM. The best-performing DMU is assigned an efficiency score of unity or 100 per cent, and the performance of other DMUs vary, between 0 and 100 per cent relative to this best performance.

DEA is an operational research technique that allows to obtain efficiency measures, which are computed by solving special mathematical programming problems. DEA was invented by Charnes, Cooper and Rhodes (1978). DEA has proved to be a useful tool for evaluating the efficiency of organizations, which have a multiple intput and multiple output structure. And that it is why DEA is appropriate tool for evaluating the efficiency of art museum. But there are also some disadvantages of DEA method:

- DEA measures relative efficiency, not absolute efficiency,
- it is non-parametric and it is difficult to perform statistical tests,
- adding a new unit to set up in previous units alters the efficiency of total units.

Nowadays DEA approach is a widely used tool in efficiency evaluation for public institutions such as universities, hospitals, but it has rarely been developed in the case of cultural

institutions. Basso and Funari (2004) implemented an empirical analysis on data from Italien municipal museums by DEA approach based on a set of two inputs: work and size of exhibition room, and four outputs: visitors paying the full admission fee and a reduced admission fee, number of temporary exhibitions and other related activities. Del Barrio and Herrero (2013) also used DEA approach involving three inputs: employment, size, and museums facilities, and four outputs: visitors, temporary exhibitions, the musem´s social impact, and the impact of the art collection. Probably the most complex evaluation approach adopted for museum is the one proposed by Mairesse and Vanden Eeckaut (2002), who used the inputs like employment, various budgetary items and infrastructure, evaluate three service models (conservation, communication, and impact), with their corresponding outputs, the models evidencing increasingly higher levels of efficiency.

In DEA methodology, the tasks of building a global efficiency index is based on a weighting process of inputs and outputs, where the weights should reflect the relative importance given by the decision maker. A weighted-sum of inputs and outputs is obtained by multiplying each input and output by a strictly positive scalar weight and then summing the weighted quantities to form a composite input and output. A global efficiency indicator can be defined by computing the ratio between the composite output and the composite input, as follows:

$$\frac{weighted\ sum\ of\ outputs}{weighted\ sum\ of\ inputs} = \frac{u_1 y_1 + u_2 y_2 + \cdots + u_r y_r + \cdots + u_t y_t}{v_1 x_1 + v_2 x_2 + \cdots + v_r x_r + \cdots + v_m x_m},$$

where y_r and u_r denote the amount of output r (r = 1, ..., t) provided by the organization and the weight assigned to it, respectively, whereas x_i and v_i represent the amount of input i (i = 1, ..., m) that the weight associated with it. Of course, different weighting vectors may lead to different values of the global indicator and to different final judgments about efficiency. There are often difficulties in defining a common set of weights, as different decision makers may have different preferences and thus different sets of weights could be considered. The DEA approach overcomes the difficulty in seeking a common set of weights by suggesting that each museum chooses the most favourable weights.

5.4 The Integration of DEA and BSC

Rouse et al. (2002) were the first who concentrated on the existing potential in integration of DEA in performance evaluation framework of BSC. Richard (2003) used DEA in four perspectives of BSC. In this study I have tried to synthesis the indicators of each perspective in a comprehensive indicator and propose model that combine these two managerial tools. I consider that the combination of BSC and DEA is an appropriate approach to evaluate performance of art museums and help museum managers to manage museum´s activities more efficiently and effectively.

6 An Empirical Analysis

In order to compare the efficiency of homogenous set of decision-making units we have collected the data from the 19 local authority public art museums in the Czech Republic. The data has been collected via questionnaire and from annual reports of the selected art museums . The questionnaire includes some general information of museum, questions about quality and quantity of space, human resources, facilities, visitors and also question related to fundraising and measuring the performance. This questionnaire was based on the study of literature, and the several interviews with museum experts and academics.

The purpose of this analysis is to test the applicability of the DEA-BSC museum efficiency model. The aim of the study is to compare the relative efficiency of the four perspective of BSC of 19 local art museums in the Czech Republic via DEA technique. CCR output-oriented approach is applied in this study. In order to implement this model I have collected the data.

In the Czech Republic, museums rely upon the grant from their governing body. In this empirical analysis I consider 19 local authority art museums that are located around the whole country. These museums have similar administrative structures, and operate in similar environments.

First of all I defined the inputs and outputs for the each perspective of BSC that are captured in the Table 2.

Table 2 BSC-DEA model

Perspective	Variables
Public Perspective	**Input:** Operational budget **Outputs:** Number of visitors Number of exhibitions
Internal Perspective	**Input:** Operational budget **Outputs:** Number of purchased artworks Number of visitors
Learning and Growth Perspective	**Input:** Budget dedicated to the training and personal development **Outputs:** Personal training Number of curators with PhD
Financial Perspective	**Input:** Operational budget **Outputs:** Admission income Fundraising income

After, I analyze the efficiency of the set of art museums within each perspective. Table 3 shows the efficiency value of each perspective and the ranking of the set of museums in each perspective of BSC.

Table 3 Efficiency and ranking of the set of art museums for each perspective of BSC

Museum	Public Perspective		Internal Perspective		Learning and Growth Perspective		Financial Perspective	
	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking
M1	47,6	11	48,6	7	14,4	5	44,8	16
M2	53,2	9	54,0	6	5,7	18	100,0	1
M3	32,0	14	29,4	13	5,4	19	69,0	8
M4	23,4	16	22,3	15	7,2	16	82,3	5
M5	63,7	7	58,5	4	17,3	2	66,7	10
M6	20,1	17	12,2	18	100,0	1	54,6	13
M7	50,2	10	34,6	11	8,7	12	60,4	11
M8	93,4	2	100,0	1	9,6	9	72,6	7
M9	58,3	8	18,9	17	10,0	7	49,5	14
M10	65,2	6	25,2	16	14,4	4	22,2	17
M11	81,6	4	29,2	14	14,9	3	81,1	4
M12	100,0	1	100,0	1	8,8	11	12,7	18
M13	100,0	1	92,8	2	8,0	13	83,7	2
M14	43,5	12	41,6	9	7,2	15	59,0	12
M15	88,4	3	55,2	5	9,0	10	100,0	1
M16	100,0	1	45,5	8	9,8	8	78,4	6
M17	31,7	15	36,0	10	12,7	6	67,0	9
M18	78,6	5	68,4	3	5,9	17	82,5	3
M19	34,2	13	32,7	12	8,0	14	47,2	15

The last step of this analysis is use efficiencies from the each perspective and use them as outputs and operational budget as a input as shown in the Table 4.

Table 4 The last step of BSC-DEA analysis

Museum	Input	Output			
	Operational budget	Public Perspective	Internal Perspective	Learning and Growth Perspective	Financial Perspective
M1	26 268	47,6	48,6	14,4	44,8
M2	117 751	53,2	54,0	5,7	100,0
M3	17 881	32,0	29,4	5,4	69,0
M4	12 869	23,4	22,3	7,2	82,3
M5	6 934	63,7	58,5	17,3	66,7
M6	43 849	20,1	12,2	100,0	54,6
M7	16 125	50,2	34,6	8,7	60,4
M8	5602	93,4	100,0	9,6	72,6
M9	6 891	58,3	18,9	10,0	49,5
M10	9 852	65,2	25,2	14,4	22,2
M11	4 594	81,6	29,2	14,9	81,1
M12	23 928	100,0	100,0	8,8	12,7
M13	7 565	100,0	92,8	8,0	83,7
M14	24 759	43,5	41,6	7,2	59,0
M15	6 580	88,4	55,2	9,0	100,0
M16	5 356	100,0	45,5	9,8	78,4
M17	13 171	31,7	36,0	12,7	67,0
M18	7 938	78,6	68,4	5,9	82,5
M19	21 830	34,2	32,7	8,0	47,2

After doing this step we have the final relative efficiency and ranking of the set of the art museums, shown in the Table 5.

Table 5 The final efficiency and ranking

Museum	Score	Ranking
M1	19,5	14
M2	5,1	17
M3	22,4	13
M4	36,2	9
M5	88,7	3
M6	70,5	5
M7	22,8	12
M8	100,0	1
M9	47,3	7
M10	45,3	8
M11	100,0	1
M12	24,8	11
M13	79,3	4
M14	15,2	15
M15	92,0	2
M16	100,0	1
M17	32,6	10
M18	68,7	6
M19	13,8	16

7 Concluding remark

In this paper I have proposed a BSC-DEA model to evaluate the relative efficiency of the set of art museums. As stated in the previous chapter, there have been already several studies

dedicated to the performance measurement in museums, but they have been focused either on performance indicators and BSC or on the DEA method. I have tried to combine this approaches, and create a comprehensive multidimensional assessment framework for art museums. This method can help museum managers to compare their institution with the peer, discover the gap in their activities and can work as a warning that shows that the art museums is not performing as it should. Nevertheless, from my point of view, we have to keep in mind, that performance measurement in cultural institutions should not be overemphasized.

As a future works for this research, I want to focus more on the inputs and outputs and create indexes that would cover the wide range of activities. But along my research I have been struggling with the data that are, in many cases, not published, does not exist, and art museums have not wanted to collaborate with me.

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