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# Value for Money in Organizations Providing Public Education Services and How to Measure It

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## Abstract

The public has put increased pressure on organizations providing public services to demonstrate the most productive use of resources, with due regard for value received. Education is no exception. This study focus on the presentation and evaluation of public organizations (public grammar schools in our case) in education on the basis of their economy, efficiency and effectiveness as one of the indicators of performance assessment. The methodology of Value For Money presented in this study can provide useful information about the situation of education for public forces and for public grammar schools themselves. Also, this methodology may help to gain a deeper insight into strengths of individual schools, as well as in which they can improve. A limitation of the concept of VFM is that performance evaluation is possible only between homogeneous services. The originality and value of the study are reflected in its focus on such topics as monitoring and measuring of performance for public service organizations (i.e., education services ). It also provides a tool for districts and individual schools to gain information using indicators employed here for identifying and solving the performance problems that occur in education system of Slovakia.

**Keywords:** performance, value for money, economy, efficiency, effectiveness, organizations providing public services, education

## Introduction

Efficiency and performance are central at all levels of corporations (Šebo & Vaceková, 2011). Performance management is the process through which an organization guides its performance according to defined organizational and functional strategies and goals. The goal is to create an integrated management system in which these strategies are involved in all processes in the organization, its activities and tasks. The ultimate goal of the process is to increase the performance of the organization. Feedback is obtained through a performance-measurement system that can provide the information needed for management decision-making (Bititci, Carrie & McDevitt, 1997). Performance management takes advantage of the synergistic effect of system components in the organizations that fulfill their partial functions and goals aligned to one common goal (Kaplan

& Norton, 2001). Based on the research of several scholars (e. g., Armstrong & Baron, 2004; Dransfield, 2000; Gillen, 2007; Neely & Austin, 2002; Varma, Budhwar-Pawan & Denisi, 2008; West & Blackmann, 2015), we can say that strategic performance, integrity and systematicity are important features of performance management. Performance management is not just a philosophy but has a clear goal and tools to achieve it. Therefore it is necessary to examine performance management from a comprehensive perspective.

Performance and quality are also frequently-discussed topics in the public sector, not only because of public budget deficits, but also because of increased interest in the quality of services provided by public sector organizations. Applying the business sector principles of performance management to measure the performance of public expenditures at the micro level has been addressed by scientists and researchers, as well as those organizations providing public services (e. g., Boyne, 2002; Brignal & Modell, 2000; Cavalluzzo & Ittner, 2004; Coombes & Verheijen, 1997; Emery, Wyser, Martin, & Sanchez, 2008; Gray & Jenkins, 1995; Hood, 1991; Osborne & Gaebler, 1992; Pollitt, 2006; Propper & Wilson, 2003; Radnor & McGuire, 2004; Smith, 1993; West & Blackmann, 2015). Constant pressure from the public forces these organizations to monitor and improve the provision of public services in order to achieve long-term existential security. These facts consequently require a comprehensive measurement of their performance.

However, it is necessary to have the relevant amount of information. Disposing of qualified information is, in addition to knowing what needs to be measured, and what kind of data is important in making decisions can be difficult, even with measuring methods.

The study focus on the presentation of methodology of Value For Money for measurement and evaluation of public grammar schools on the basis of their economy, efficiency and effectiveness. The research tasks are focused on answering 2 research questions:

- (1) How can the Value For Money concept be used to measure performance for organizations providing public education services?
- (2) What performance indicators can be used to measure performance for organizations providing public education services?

We will answer the first research question by suggestion our own methodology, based on the underlying concept of VFM. The second research question will be answered by compiling suitable indicators based on the underlying concept of VFM in cooperation with the education department of the Banská Bystrica self-governing region.

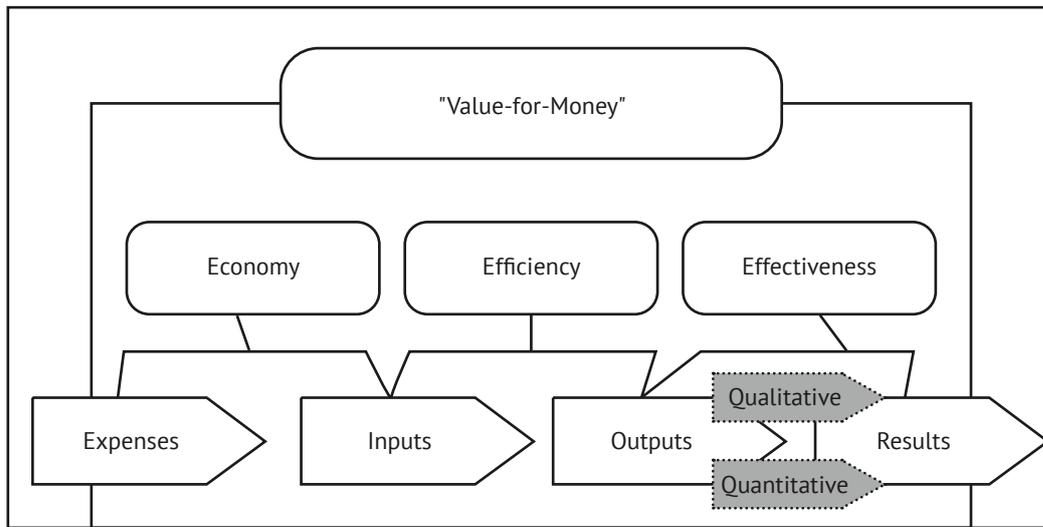
## **The Concept of Value For Money and Performance Parameters of Public Services**

Performance measurement is the implementation of procedures used to demonstrate the economy, efficiency and effectiveness of an organization in its pursuit of objectives. The principles of the concept of Value For Money (VFM) (Smith, 2009) have been implemented through the efforts of different countries. Based on the work of Barnett, Barr, Christie, Duff & Hext (2010), using the concept of VFM can ensure greater transparency and accountability when spending public funds. The very term of VFM is generally used to describe the explicit commitment to ensure the best possible results obtained from spending (Department for International development [DFID], 2011).

Achieving VFM has become synonymous with the optimal combination of organization costs and quality assurance to meet the needs of clients. VFM is used to assess whether the organization receives the maximum benefit from the services provided. This is not just about cost; a combination of quality, cost, resource use, the suitability of the equipment, as well as their topicality, must be taken into account. Studies about VFM show that this approach can be used in various public services, including education (e. g., Amaratunga & Baldry, 2000; Bradley & Durbin, 2013; Coates, 2009; Dolton, Marcenaro Gutiérrez & Still, 2014; Garnett, Roos & Pike, 2008; Mante & O'Brien, 2002), healthcare (e. g., Ariste & Di Matteo, 2017; Hollander, Kadlec, Hamdi & Tessaro, 2009; Leigh-Hunt et al., 2018; Lorenzoni et al., 2018; Mawani, 2011; McGrail, Zierler & Ip, 2009; Severens, 2003; Smith, 2009; Tuffaha et al., 2019; Young, Chatwood & Marchildon, 2016) and many others.

The central element of VFM in public sector organizations is the principle of the best use of public funds. Public sector managers are required to demonstrate the most productive use of resources, i.e., money, goods and people, to achieve the desired results, with due regard of value for money (Kalubanga & Kakwezi, 2013). Different authors interpret the terms performance, economy, efficiency and effectiveness in various ways. This conceptual mismatch was subsequently transferred to the use of methodology and evaluation methods. Those authors centered on performance management (e. g., Armstrong & Baron, 2004; Armstrong, 2015; Bacal, 1999; Ingram & McDonnell, 1996; Ittner & Larcker, 2003; Johnston & Pongatichat, 2008; Kaplan & Norton, 1996; Kaplan & Norton, 2000; Kuwaiti, 2004; Neely & Austin, 2002; Stevers & Joyce, 2000; Wouters & Sportel, 2005), are focused on creating relevant, integrated, balanced and strategic performance management systems. Over the last three decades, a variety of systems has been developed to ensure balanced growth of an organization, but there is still no uniform way to clearly measure performance.

Figure 1. The concept of value for money



Source: Mikušová Meričková, Šebo & Štrangfeldová, 2011.

However, several authors suggest that it is necessary in identifying goals and measuring whether they are achieved, that organizations reduce ambiguity and confusion about objectives and gain coherence and focus in pursuit of their mission (Verbeeten, 2008).

The concept of VFM is a broadly conceived methodology able to express wholly the value of not only the organization but also the programme, project or the widest public expenditure programme.

Similarly, we can say that while an activity, projector program can be very cheap and work efficiently, if it does not reach the expected results it does not represent value for money (Jackson, 2012). Figure 1 illustrates the relationship between economy, efficiency and effectiveness. Economy is related to procurement, efficiency with efficient delivery of outputs and effectiveness with achievement of intended results. This definition contains both a quantitative and a qualitative aspect.

The underlying concept of VFM used in our study is originated in the USA and is based on an analysis of three key performance indicators, the so-called "3E" (Nemec & Wright, 1997): economy – achieving the stated objectives at minimum cost, efficiency – the pursuit of the best possible relationship between inputs and outputs and effectiveness – the degree of success in achieving the objectives set, the merits of the objectives set, such as using funds for their intended purpose. The approach used for overall assessment of VFM is benchmarking (peer comparison) of the individual areas (economy, efficiency, effectiveness) of the

providers of public services. Mathematical representation of the overall economy, efficiency and effectiveness features has the following formula (Šebo & Vaceková, 2011):

$$H_{ij} = \prod_{z=1}^n h_{ij}^z \tag{1}$$

$$E_{ij} = \prod_{z=1}^n e_{ij}^z$$

$$U_{ij} = \prod_{z=1}^n u_{ij}^z$$

where:

$H_{ij}$  - overall economy indicator for organization  $i$  in year  $j$ ,

$h_{ij}^z$  - partial economy indicator for organization  $i$  in year  $j$ ,

$E_{ij}$  - overall efficiency indicator for organization  $i$  in year  $j$ ,

$e_{ij}^z$  - partial efficiency indicator for organization  $i$  in year  $j$ ,

$U_{ij}$  - overall effectiveness indicator for organization  $i$  in year  $j$ ,

$u_{ij}^z$  - partial effectiveness indicator for organization  $i$  in year  $j$ .

When testing performance in the area of economy, efficiency and effectiveness, standardized values of partial indicators are used. Accepting the multiplier effect of three areas can be expressed as an overall indicator of VFM. The subsequent overall value of the indicator VFM has the formula (Šebo & Vaceková, 2011):

$$VFM_{ij} = \frac{1}{\log \left( \frac{1}{H_{ij}E_{ij}U_{ij}} \right)} \tag{2}$$

A disadvantage of the concept of VFM is that performance evaluation is possible only between homogeneous services.

## Research Methodology

The study used secondary information from scientific papers as well as literature related to performance management for the suggestion of methodology of Value For Money for organizations providing public education services. Also, the study used the underlying concept of VFM, which is based on an analysis of three key performance indicators, "3E" – economy, efficiency and effectiveness. This approach used for overall assessment of VFM is benchmarking (peer comparison) of the individual areas (economy, efficiency, effectiveness) of the providers of public services.

However, the use of VFM is possible only between homogeneous services. For this reason, we have chosen particular public grammar schools from all schools in our study and adapted the possible performance indicators to the nature of these institutions.

The primary information used in the suggestion of performance indicators for organizations providing public education services was based on cooperation with the education department of the Banská Bystrica self-governing region.

Through this information, we suggest the methodology of Value For Money, which is potentially suitable for organizations providing public education services. Also, we suggest the possible performance indicators, which will be suitable for organizations providing public education services.

## Discussion

### The suggestion of methodology of value for money in organizations providing public education services

Due to the need for the assessment of several criteria, the heterogeneous nature values of the indicators examined and the necessity for expression of the integral indicator, we decided to use the standardized variable method. Its advantage is that it respects the relative variability of individual indicators, and the results obtained through the application of this method are less sensitive to extreme values of the parameters in the sample.

The essence of the standard variable method is a transformation of various parametric values for comparable shape, i.e., a standard variable which is a dimensionless number. Application of this method consists of the initial arithmetical average ( $\bar{x}_j$ ) and standard deviations ( $s_{xj}$ ) for individual indicators and the subsequent transformation of the original values of variables ( $x_{ij}$ ) on a standardized form

( $z_{ij}$ ), while in the event that the indicator has a maximizable character we use the illustrated relationship (Stankovičová & Vojtková, 2007):

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{s_{xj}} \quad (3)$$

If the indicator has a minimizable character, we use the illustrated correlation:

$$z_{ij} = \frac{\bar{x}_j - x_{ij}}{s_{xj}} \quad (4)$$

A significant problem that can develop during implementation of VFM assessment is incomplete and partially unavailable data. The problem can be solved by filling in the gaps of data with the worst value, i. e., if the variable is missing, make up the worst value from a given set of data transmitted for the indicator in a given year. The assigned value was either the minimum or maximum value, depending on the nature of the indicator. In order to allow construction of a model evaluating the quality of public grammar schools, the aforementioned data adjustment to so-called normalized data was necessary, even though it could possibly lead to disparagement of the schools that did not supply the necessary data. The relevant element can be removed only by supplementing the required data. However, the relevant element should at the same time act as an incentive for individual public grammar schools. In accordance with the principle of the method of standard variables, those relationships for the maximisation and minimisation of the character of indicators were applied to the so-called standardized data (i.e., the modified data using the worst value).

To eliminate subjective determination of weighting, multi-criteria evaluation in the study was supplemented by the analysis of the interrelationships between indicators. For individual partial indicators of economy, efficiency and effectiveness there is defined weighting, using correlation relations between individual partial indicators in all three monitored areas: economy, efficiency and effectiveness. Weighting defined by analysing the structure of the correlation matrix was determined according to the equation (Stankovičová & Vojtková, 2007):

$$v_j = \frac{|\sum_{i=1}^k r_{ij}|}{\sum_{j=1}^k |\sum_{i=1}^k r_{ij}|} \quad (5)$$

for  $j = 1, 2, \dots, k$ ,

where  $r_{ij}$  = pair (Pearson) correlation coefficient for each individual indicator.

The subsequent characteristic, i.e., integral indicator ( $d_{ii}$ ) we calculated as the weighted arithmetical average standard value according to the equation (Stankovičová & Vojtková, 2007):

$$d_{ii} = \frac{1}{k} \sum_{j=1}^k z_{ij} * v_j \quad (6)$$

where  $i = 1, 2, \dots, n$ ;  $v_j$  = weighting  $j$ -th indicator.

Achieving a good placement of the evaluated object depends on good results in all the researched variables; it is not sufficient to achieve an excellent result in only one or a small number of variables (the higher the value, the better the evaluation) (Stankovičová & Vojtková, 2007).

The evaluation of the performance of the public grammar schools was realized by evaluation of three areas, namely economy, efficiency and effectiveness. Each of the three mentioned areas was represented by selected partial indicators, while accepting the character of the relevant area. Indicators for these three areas of the concept of VFM in the school system were divided into groups according to those fields of activity of the organizations concerned. For all three areas, we cannot neglect the defined objectives of the organization achieved, meeting the needs of consumers of public services (quality of service) and compliance with financial policies and relevant laws.

### The suggestion of performance indicators for organizations providing public education services

As we mentioned, if we want to establish performance indicators of organizations providing public education services, we must comprehensively inspect the process from the perspective of an organization that has its personnel, material-technical, economic and pedagogical content. For this reason, we cooperated with the education department of the Banská Bystrica self-governing region and proposed the following indicators.

For the personnel area of an organization, we can establish indicators such as the length of teaching experience, length of professional experience, length of the head teacher's experience, the average age of the teaching staff, the average number of pupils per teacher, the average number of pupils per class, the number of courses for teachers, and so on.

Indicators for the material-technical area of an organization may be presented as availability of textbooks, teaching aids, information and communication technologies, the number of classical classrooms, the number of specialized classrooms, the share of the school's own funds, the share of external funds, the number of equity investments in tangible and intangible assets of the school, and so on.

For the economic area of the organization, we can determine the type of indicators of total staff costs, total cost per pupil, total cost per class, total cost of maintenance of buildings belonging to the school complex, and so on.

In the pedagogical field, indicators such as attendance, number of observed lessons, the average number of pupils in hobby groups, the ratio of pupil intake to those enrolled in secondary schools, entrance exam success to universities, number of complaints per teacher, number of provided consultations per teacher, number of specialized classes for gifted children, average results per pupil in school leaving examinations, average grade of the school report in the third year of study, number of awards per student, graduate unemployment, and so on, can be defined.

Based on this, we divided the indicators from the personnel area, the material-technical area, the economic area and the pedagogical area into three areas – economy, efficiency and effectiveness (Table 1). The assignment of indicators from the personnel, material-technical, economic and pedagogical

**Table 1.** Performance indicators in education

<b>Economy</b>
– share of the school's own funds
– share of external funds
– number of equity investments in tangible and intangible – assets of the school
– total staff costs
– total cost per pupil
– total cost per class
– total cost of maintenance of buildings belonging to the – school complex
<b>Efficiency</b>
– length of teaching experience
– length of professional experience
– length of the head teacher's experience
– average age of the teaching staff
– average number of pupils per teacher
– average number of pupils per class
– number of courses for teachers
– availability of textbooks
– teaching aids
– information and communication technologies
<b>Effectiveness</b>
– the average number of pupils in hobby groups
– ratio of pupil intake to those enrolled in secondary schools
– entrance exam success to universities
– number of complaints per teacher
– number of provided consultations per teacher
– number of specialized classes for gifted children
– average results per pupil in school leaving examinations
– attendance
– number of observed lessons
– average grade of the school report in the third year of study
– number of awards per student
– graduate unemployment

Source: Author's work

areas into three areas (economy, efficiency and effectiveness) was realized based on the character of the given indicator and logical link to the area of economy, efficiency and effectiveness.

In terms of economy, the organization seeks to achieve the set objectives at minimum cost (cost, time, effort). In terms of efficiency, the organization follows the relationship between inputs and outputs, i.e., the efforts of the organization to achieve the best possible relationship between inputs and outputs. Effectiveness for the organization is monitoring the degree of success in achieving its objectives (University of Cambridge, 2010). Whereas the fields of economy, efficiency and effectiveness are interrelated, linking all three of the defined areas, the organization should seek to achieve a kind of optimum whereby the overall performance evaluation achieves the best possible success.

Of course, even for the concept of VFM, there are differences in measurement methodology and value for money, varying in different dimensions, such as ability to measure results, impacts, ability to measure value for money across sectors, projects, countries and organizations, the ability to include beneficiaries and other stakeholders in the measurement process and, of course, the cost of implementing each technique.

## Conclusion

The study focused on the presentation and the possible suggestion of methodology of Value For Money for measurement and evaluation of public organizations (public grammar schools in our case) in education on the basis of their economy, efficiency and effectiveness as one of the indicators of performance assessment. The essence of the research and methodology was based on performance management. The presented study answered two research questions:

- (1) How can the Value For Money concept be used to measure performance for organizations providing public education services?
- (2) What performance indicators can be used to measure performance for organizations providing public education services?

We answered the first research question by suggestion our own methodology for measuring the performance of organizations providing public education services, based on the underlying concept of VFM. The selection of VFM to measure the performance in education shows possibilities to measure, evaluate, monitor and obtain relevant information about the situation of education and subsequent

decision-making, not only for public forces. Also, it can be a suitable tool for public grammar schools themselves. Individual schools can monitor their situation and gain a deeper insight into their strengths as well as areas where they can improve. The advantage of this methodology is the ability to supplement and modify indicators according to the nature of the particular type of school (primary schools, grammar schools, etc.) or other public service organizations. The limitation of the concept of VFM is that evaluation is possible only between homogeneous services.

The second research question we answered by compiling suitable indicators in cooperation with the education department of the Banská Bystrica self-governing region. For establishing performance indicators, we had to comprehensively inspect the process from the perspective of an organization that has its personnel, material-technical, economic and pedagogical content. Based on this, we suggested the indicators for the personnel area, the material-technical area, the economic area and the pedagogical area. Then we divided the indicators from the personnel area, the material-technical area, the economic area and the pedagogical area into three areas – economy, efficiency and effectiveness in accordance with the concept of VFM. The assignment of indicators from the personnel, material-technical, economic and pedagogical areas into three areas (economy, efficiency and effectiveness) was realized based on the character of the given indicator and logical link to the area of economy, efficiency and effectiveness.

Practically, this research contributes to the body of knowledge by suggesting a framework to monitor and measure of performance for organizations providing public services (education services in our case) and by providing a tool for the self-governing regions and individual schools to gain adequate information for identifying and solving the performance problems that occur in Slovakia's education system.

The presentation of the suggestion of methodology of VFM in this study is the part of research which is realized by Faculty of Economics at Matej Bel University in Banská Bystrica (since 2014) and also the subject of the pilot project aiming at the creation of the measurement and evaluation system of performance in regional education with cooperation of self-governing regions of Slovakia. We are strongly aware that the research needs substantial development and adaptation to the needs of practice. For this reason, the authors are constantly working on this research and are currently verifying the relevance of the proposed indicators in a study with education professionals and school leaders from other self-governing regions. Further development of the present study could lead to software processing and the use of neural networks, in case of refilling other adequate indicators from education

professionals and school leaders. Potential use of neural networks in the future may provide further relevant information on the future development of public grammar schools. Within public policies it could be helpful in the rationalization process of the number of schools needed at the regional level.

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## Stroškovna učinkovitost v organizacijah, ki zagotavljajo storitve javnega izobraževanja – kako jo meriti?

### Izvleček

Organizacije, ki zagotavljajo javne storitve, so pod večjim pritiskom, da prikažejo najbolj produktivno uporabo virov za doseganje zelenih rezultatov – ob ustreznem upoštevanju stroškovne učinkovitosti –, pri čemer pa tega pritiska nanje ne vršijo samo javni organi, temveč tudi državljani. Izobraževanje ni izjema. Študija se osredotoča na predstavitev in možni predlog metodologije stroškovne učinkovitosti kot enega od kazalnikov ocene uspešnosti za merjenje in vrednotenje javnih organizacij v izobraževanju (v naših primerih javnih gimnazij) na podlagi njihove ekonomičnosti, učinkovitosti in uspešnosti. Predlog metodologije stroškovne učinkovitosti, predstavljen v tej študiji, lahko zagotovi ustrezne informacije o stanju izobraževanja za javne akterje in javne gimnazije same. Ta metodologija je lahko primerno orodje tudi za globlji vpogled v prednosti posameznih šol in področja, ki bi jih lahko šole izboljšale. Vendar je koncept stroškovne učinkovitosti, ker je ocenjevanje uspešnosti mogoče le med homogenimi storitvami. Izvirnost in vrednost študije se odražata v obravnavi tematik, kot sta spremljanje in merjenje uspešnosti organizacij, ki zagotavljajo javne storitve (v našem primeru izobraževalne storitve), in zagotavljanju orodja za samoupravne regije in posamezne šole, da pridobijo ustrezne informacije po vrstah izbranih kazalnikov za prepoznavanje in reševanje težav glede uspešnosti, ki se pojavljajo v izobraževalnem sistemu Slovaške.

**Ključne besede:** uspešnost, stroškovna učinkovitost, gospodarnost, učinkovitost, organizacije, ki zagotavljajo javne storitve, izobraževanje