

APPLYING THE PRINCIPLES OF NEW PUBLIC MANAGEMENT TO MEASURE THE PERFORMANCE IN EDUCATION – VALUE FOR MONEY

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Abstract: *Education is a key area, the results of which play an important role in the development of each society. The role of education focused on the inclusion of children into school groups, to prepare students to enter the labour market or continue their studies in the context of tertiary education is a sufficient argument to enable beginning to look for answers and possible solutions to the difficult question of the quality of schools. Constant pressure from the public forces them to monitor and improve the provision of public services, and continually enhance their own performance in order to achieve long-term existential security. These facts consequently require a comprehensive measurement of their performance. This opens up opportunities for applying the concept of Value For Money based on the principles of New Public Management. The purpose of the scientific study is to show the potential uses of Value for Money on the example of education. The suggestion of methodology of VFM to measure the performance in education presented in this study shows possibilities to measure, evaluate, monitor and achieve necessary and especially relevant information about the situation of education and subsequent decision-making not only for public forces, but also, it can be the suitable tool for public grammar schools themselves. The article is co-financed by the project VEGA 1/0651/17.*

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1. INTRODUCTION

The concept of New Public Management represents innovation stemming from the private sector in the functioning of public sector organizations. According to Lane (2000), New Public Management expresses the application of methods and techniques of the private sector in the provision of public services in order to increase the efficiency and quality of their provision. Brignal and Modell (2000) also perceives the New Public Management definition, according to which New Public Management can be characterized as the implementation of methods and techniques used in the private sector in the field of public service provision.

Applying the principles of New Public Management as principles of the commercial sector to measure the performance of public expenditure at the micro level has been addressed by scientists and researchers, as well as those organizations providing public services. The key features of New Public Management are transitions from policy to management based on economic cost-benefit analysis, from the pyramid organizational structure to staffing, from classical planning to strategic activities, from process-oriented management to results-oriented management, from uniform public service delivery to their individualization, property ownership to asset management, and what is the most important pressure to reduce costs while preserving the quality and possible quantity of outputs - Value For Money (Keraudren, Mierlo, 1997). Constant pressure from the public forces them to monitor and improve the provision of public services, and continually enhance their own performance in order to achieve long-term existential security. These facts consequently require a comprehensive measurement of their performance. The pressure on the producers of public services to measure their performance comes from the founders, donors, volunteers, employees, clients and especially public authorities providing funds for their operation. The requirement to behave as commercial producers in their operation puts demands on comprehensive performance measurement. With the necessity to maintain a general social necessity, organizations are reliant on performance measurement and seeking opportunities for continuous improvement of their services and operations.

Achieving „Value for Money” (VFM) has become synonymous with the optimal combination of organization costs and quality assurance to meet the needs of clients, while such an offer may not be automatic and the cheapest. VFM is a method to assess whether the organization receives the maximum benefit from the services provided with those resources at its disposal. This is not just about the cost of production services, 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 areas, whether higher education (Coates, 2009), education systems (Dolton et al., 2014) but also healthcare (Smith, 2009), health spending (Ariste, Di Matteo, 2017) or Public-Private Partnership (Zwalf et al., 2017) etc.

2. THE SUGGESTION OF METHODOLOGY OF VALUE FOR MONEY

The study deals with the presentation and the possible suggestion of methodology of Value For Money for measurement and evaluation of public organizations in education (in our case public grammar schools) on the basis of their economy, efficiency and effectiveness as one of the indicators of performance assessment. The essence of the research and methodology is based on New Public Management.

Our application process „Value-for-Money” originated in the USA and is based on an analysis of three key performance indicators, the so-called „3E” (Nemec & Wright, 1997): economy - achiev-

ing 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, i.e. using funds for their intended purpose.

The central element of the VFM concept in public sector organizations is the principle of the best use of public funds, with public sector organizations being responsible for economic, efficient and effective management of the resources entrusted to them. 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 for value for money (Kalubanga, Kakwezi, 2013). This is illustrated by the figure 1.

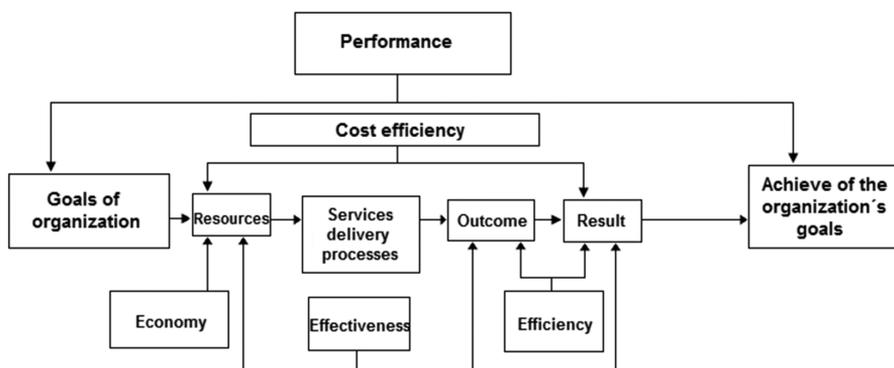


Figure 1: Relationship between concepts related to performance

It should be emphasized that different authors interpret the concept of performance, economy, efficiency and effectiveness in different ways. This conceptual mismatch was subsequently transferred to the use of methodology and evaluation methods. Those authors centered on performance management (Hudson et al., 2001; Ittner, Larcker, 2003; Johnston, Pongatchat, 2008; Keraudren, Mierlo, 1997; Neely, Austin, 2002; Wouters, Sportel, 2005) etc., are focused on creating relevant, integrated, balanced and strategic performance management systems. Over the last three decades a variety of systems have been developed to ensure balanced growth of an organization, but there is still no uniform way to clearly measure the performance of the organization. The approach „value-for-money” 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.

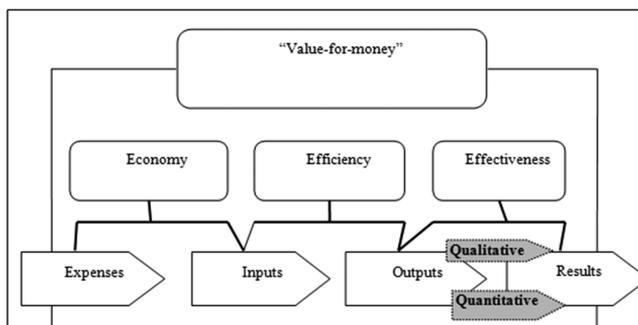


Figure 2: The concept of methodology “Value for money”

The approach used for overall assessment of „value-for-money” is benchmarking (peer comparison) of the individual areas (economy, efficiency, effectiveness) of the researched providers of public services. A disadvantage of the VFM method is that performance evaluation is possible only between homogeneous services. For this reason, we have chosen particular public grammar schools from all schools. Mathematical representation of the overall economy, efficiency and effectiveness through features has the following formula (Stankovičová & Vojtková, 2007):

$$\begin{aligned} H_{ij} &= \prod_{z=1}^n h_{ij}^z \\ E_{ij} &= \prod_{z=1}^n e_{ij}^z \\ U_{ij} &= \prod_{z=1}^n u_{ij}^z \end{aligned} \quad (1)$$

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 value for money. The subsequent overall value of the indicator VFM has the formula (Stankovičová & Vojtková, 2007):

$$VFM_{ij} = \frac{1}{\log_{\frac{1}{(H_{ij}E_{ij}U_{ij})}} 1}} \quad (2)$$

Due to the need for the assessment of a number of criteria, the heterogeneous nature values of the indicators examined and 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. 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):

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

In the event that the indicator has a maximizable character we use the illustrated correlation:

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

A significant problem that we can meet 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 is 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 are applied to the so-called standardized data (i.e. the modified data using the worst value).

In an attempt to eliminate subjective determination of weighting, multi-criteria evaluation in the study is 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, i.e. economy, efficiency and effectiveness. Weighting defined by analyzing the structure of the correlation matrix is 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 () we calculate as the weighted arithmetical average standard value according to the equation (Stankovičová & Vojtková, 2007):

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

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

Achieving a good placement of the evaluated object depends on the good results in all the researched variables, i.e. it is not sufficient to achieve an excellent result in only one or respectively 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 is realized by means of evaluation of three areas, namely economy, efficiency and effectiveness. Each of the three mentioned areas is represented by selected partial indicators, while accepting the character of the relevant area. Indicators for Value-for-Money in the school system must be divided into groups according to those fields of activity of the organizations concerned. If we want to establish performance indicators of a school system we have to comprehensively inspect the process from the perspective

of an organization that has its personnel, material-technical, economic and educational content. 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 on hobby groups, the ratio of pupil intake to 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). 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, respectively the extent to which invested inputs and created outputs fulfill the expected goals of the organization (University of Cambridge, 2010).

Table 1: The suggestion of performance indicators in education

Economy
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
Efficiency
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

Effectiveness

the average number of pupils on hobby groups
ratio of pupil intake to 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

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. For all three indicators, 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.

3. CONCLUSION

The suggestion of methodology of VFM to measure the performance in education presented in our study shows possibilities to measure, evaluate, monitor and achieve necessary and especially relevant information about the situation of education and subsequent decision-making not only for public forces. But also, it can be the suitable tool for public grammar schools themselves. With this tool, individual schools can monitor their situation and gain a deeper insight into their strengths as well as reserves in which 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 organization. A disadvantage of the VFM method is that performance evaluation is possible only between homogeneous services. The suggestion of methodology of Value For Money presented in this study is also the component of research which is realized by Faculty of Economics at Matej Bel University in Banská Bystrica and the subject of the pilot project that focus on the measurement and evaluation of performance in regional education with cooperation of self-governing regions of Slovakia. The methodology of Value For Money is further developed and adapted to the needs of practice. Refilling other adequate indicators may allow opportunity to use neural networks in the future to provide further relevant information on the future development of public grammar schools.

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