

PERFORMANCE MANAGEMENT IN PUBLIC EDUCATION SYSTEM

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1. Introduction

During the last decade an almost world-wide public sector reform has taken place. In response to increasing concerns with the legitimacy and efficiency of public spending, New Public Management (NPM) has become the leading philosophy of these reforms in most countries. NPM will encourage the public sector to adapt private sector management techniques (Hood, 1995) as well as develop assessing performance measurement in order to monitor the degree of efficiency and effectiveness with which the public services are delivered. Nowadays most of the OECD countries are using performance assessment of public programs and services (Carristine, 2005). Therefore, a much stronger commitment on public sector efficiency and effectiveness will be required from both central and local governments in the near future. Motivated from this, the education systems' management has been restructured – much more authority is given to schools and local governments. With a view to motivate the autonomous local education providers to act in pupils' and parents' interests, competition is heightened between schools via pupil based funding. To survive, every autonomous school should work with a quality improving management system. Also the schools accountability to local community and other stakeholders is increasing. All these aspects are considered to contribute the bigger efforts of schools in the interests of the pupils. There are several empirical analyses, suggesting that different facets of accountability, autonomy and choice (or competition) are strongly associated with pupil better achievement.

The changes in the management of education system need to be reflected in the schools' management information systems. For successful school management, an evolution of school management accounting and performance management issues is needed. There are several essential evident in the literature revealing a significant positive effect of management accounting systems information on organisations' performance. Despite the importance of performance management, several authors have argued, that a majority of research examines a very limited part of overall school performance management process, concentrating mainly on academic performance. There seems to be a lack of depth of coverage of particular performance elements and of interconnections between them. Therefore, it is important to clarify the relationship between the three main levels of the school performance management: strategic, operational and individual level. If there is synergy occurred between all these levels, the individuals' performance contributes to the whole organisations' performance.

The purpose of our paper is to investigate, how the different performance management levels contribute to the schools' performance in Estonian general schools. With its highly decentralised education system, Estonia is an interesting example to investigate the performance management in schools and in the whole education system. Because of the fact that the Estonian educational system is strongly based on the approaches that have proven to be performance-enhancing, the analysis gives an overview and information to those countries that have not reached so far with the restructuring of the educational system. The schools' performance is considered from one side, as pupils' academic results, as well the overall satisfaction of pupils and parents and from another side, as schools' financial performance

measures. If there are significant correlations between any levels of performance management and pupils' performance found, it is important to analyse the interconnections, or correlations between these levels as well. This gives us a wide understanding, what contributes most to the pupils' and schools' performance and what are the secondary affecting forces, which contribute to these primary factors.

The remainder of the paper is organized as follows. The second section sets a theoretical framework for analyses, drawing on the integrated strategic performance management approach. The third section is devoted to a discussion of the methodological issues concerning the empirical study. Subsequently legal regulatory environment influencing the operations of Estonian schools will be described and analyzed. In the fifth section we analyse the main strategic, operational and individual level variables influencing the school performance. To conclude the paper, a number of key issues of the study are presented.

2. Theoretical framework of the study

Public sector performance management is a multi-dimensional research area basing on different theoretical concepts and approaches (Greiling 2006). Since the early 1980s, public sector has been under constant pressure to improve its performance in pursuit of more efficiency and effectiveness, and to revive the shrinking trust in public institutions. According to Osborne and Gaebler (1992) the bureaucratic government should turn into an entrepreneurial government, both competitive and customer-driven. This paradigm shift was accompanied by the rise of techniques used by market-oriented managers to lead the organization and control the use of resources.

The NPM with its "economic rationalism" and "managerialism" became an international trend (Bogt, 2001). Mussari (2001) has pointed out, that emphasis on decentralized managerial and financial control in the public sector, as well as the fostering of "performance culture" or "performance orientation" has resulted in a growing use of performance management tools. Performance management is the process by which the organization integrates its performance with its corporate and functional strategies and objectives (Bititci *et al.*, 1997). The performance measurement is essential part of organisations management helping to reflect the desired objectives and the actual outcome. The combination of financial and non- financial operational measures provides the favourable insight into the organisations strategic performance management and enables to reflect the expectations and requirements of different stakeholders inherent to the public organisations. The idea, that a desired outcome serve as a goal or objective and progress is measured towards reaching this goal or objective, is a "corner stone" for the Management by Objectives (MBO) model.

Proceeding from the MBO approach, Deming (2000) argue that PDCA (Plan, Do, Check, and Act) cycle as management cycle can be used for continuous improvement and learning in public organizations. The PDCA cycle proposes to plan, measure and analyze business processes in continuous feedback loop and to form a cycle. Also OECD (2005) definition of performance management as management cycle reflects the PDCA cycle idea – objectives and targets are determined, managers have flexibility to achieve them, actual performance is measured and reported, and this information feeds into decisions about program funding, design and operations. Berry and Wechsler (1995) describe strategic planning as a systematic process for managing the organization and its future direction in relation to its environment and the demands of external stakeholders.

Motivated from the MBO approach, also the education systems' management has been restructured – much more authority is given to schools and local governments. For example, The Business and Industry Advisory Committee to the OECD (2007) suggests that school headmasters should be given extensive authority, which leads to better school performance. According to Webb and Vulliamy (1998), organised performance monitoring and evaluation evidence are more important in a decentralised than in a centralised system. Therefore, the school performance measurement and management serves as an important issue to improve the quality and efficiency of education system. According to Levacic (2008) the school efficiency measurement is a complex matter. She argues that using simple indicators of efficiency, such as per student (pupil) costs, can be very misleading. With a view to motivate the autonomous local education providers to act in pupils' and parents' interests, the competition is heightened between schools via pupil based funding. Therefore, to survive, every autonomous school should work with a quality improving management system. According to the MBO and PDCA concepts the key issues to quality improving are a cycle of performance evaluation, feedback, improvement and learning. Consequently, the schools accountability to local community and other stakeholders is increased.

An empirical analysis conducted by Wößmann et al. (2007), based on PISA 2003 results, suggests that different facets of accountability, autonomy and choice are strongly associated with pupil achievement. Dempster, *et al.* (2001) emphasizes, that where NPM has colonized government decision making, it has resulted in the restructuring of public schooling with the several impacts, like decentralisation, competition between schools, increasing customer control over schools operations etc.

Therefore we can conclude that motivated from the NPM principles, there is a tendency to decentralize the education systems and to give a high authority to the schools. With the extensive authority, the responsibility, or the accountability to society and to central government has been heightened, all in favour of a better quality of education system.

In these circumstances the schools must be ready to meet responsibilities for development planning, resource allocation, personnel and motivation management, performance measurement and management, and communication with parents and other stakeholders etc. Leithwood *et al* (2004) stress, that there is few research done to investigate how the policies and regulations are implemented at school level and how they ought to be put into force in order to gain the benefits considering the schools' and pupils' better performance.

The survey carried out by the Organization for Economic Co-operation and Development (OECD) (2008) among 25 OECD member states and candidate countries (including Estonia), shows that Estonian general schools have relatively high authority of decision concerning the matters of school curricular, human resource management, development planning and budgeting. The schools' accountability systems most important elements are schools' internal and external evaluation. A survey carried out in 2007 (*ibid*) showed that school self- and external evaluation system are employed only in half of the surveyed countries (in 14 countries out of 29). Thus the external and self-evaluation of schools' activities is not so wide spread in educational policies and that this area field is relatively poorly studied as well. In Estonia the both, the external and self-evaluation are applied and also legally required. Therefore, with its highly decentralised education system, Estonia is an interesting example to investigate the implementation of NPM principles in schools.

According to Brudan (2010), the performance management in an organisational context has been divided into three levels: strategic, operational and individual performance management.

One of the key trend in recent years was the integration between strategic performance management and individual performance management. Organisational goals became reflected in individual goals and individual measures became aligned with organisational performance measures, in an effort to increase the accountability of all employees to the execution of the organisational strategy (*ibid*).

Performance management at operational level is linked to operational management, as its focus is the achievement of departmental or group objectives. Although it is aligned with corporate strategy, its focus is more functional. Therefore, as operational performance is traditionally evaluated in terms of efficiency and effectiveness, the evolution of operational performance management is linked to the evolution of accounting and management.

At strategic level, performance management deals with the achievement of organisational objectives. The key processes related to strategic performance management systems are strategy formulation and execution, both subsets of strategic management (*ibid*).

Among several requirements on PMS a number of authors have defined it as a dynamic (Bitici *et al.*, 2000; Neely *et al.*, 2000; Garengo *et al.*, 2005; Stringer, 2007) and a balanced (Kaplan and Norton, 1992; Garengo *et al.*, 2005; Stringer, 2007) system. According to Bitici *et al.* (2000), a dynamic PMS is defined as a system monitoring the developments and changes in external and internal environments. As business environments and organizations themselves change, also PMSs need to change in order to sustain their relevance and usefulness to adapt their performance management practices to survive. According to Ferreira and Otley (2009) the change in PMSs applies to the PM methods and key performance indicators used and also to the way performance management information is used.

Balanced PMS (also called a multidimensional one) is defined as a system that adopts different perspectives of analysis and manages these in a coordinated way (Garengo *et al.*, 2005, p. 32). Kaplan and Norton (1992) propose balancing four different perspectives based on both the nature of measures (financial and non-financial) and the object of the measures (internal and external). Horvath *et al.*, (2006) argue that advanced PM practices consider a broad range of measures and include, for example, financial indicators as well as indicators with regard to customer satisfaction and human resources. In the light of NPM approach it is reasonable to assume that also performance management at schools could be balanced and have a dynamic character. Irs and Ploom (2009) point out that in Estonian educational institutions the performance is measured mainly by academic performance or how well a pupil meets standards set out by the local government and the educational institution itself. In the current paper we are investigating the linkages between strategic, operational and individual performance management issues in Estonian upper secondary schools.

3. Research method and sample description

The purpose of our paper is to investigate, how the different performance management levels contribute to the schools' performance in Estonian general schools. To investigate this, two main research objectives were posed:

1. Defining the school performance measures and variables associated with it.

2. Measuring the characteristics of school operational and strategic management, and their contribution to the school's performance.

The study relies on both, primary and secondary sources. Therefore, in order to prepare the study, authors have studied documents such as governmental publications, legal acts and regulations related to the issues in discussion, also strategic documents of the schools and statistical data available through Estonian Education Information System (EEIS). EEIS is an individual based database consisting of the relevant data of Estonian schools – data on all the teachers, pupils, school curricula and the schools' physical environment. In addition, also the schools' expenditure data from local governments, gathered by the researchers, were analysed. The local governments in Estonia are obligated to submit their aggregated financial data to the Ministry of Finance and these data are based on same accounting regulations and guidelines. This enabled us to get comparable detailed schools' expenditure data. But there was also a restriction – the expenditure data was not available for private general schools. Therefore those schools were dropped from the analyses. As the number of private schools is rather small it will not influence the general picture.

A substantial part of the empirical data of this paper, in addition to EEIS and the schools' expenditure data, were collected by a questionnaire survey. The questionnaire based on the EFQM Excellence models' theoretical framework and consisted of five main sections concerning the implementation of the following areas of school management:

- 1) strategic management;
- 2) resource management and collaboration with stakeholders;
- 3) personal management;
- 4) learning processes and quality management, and
- 5) financial performance evaluation.

The questionnaire consisted of 103 questions; because several of them had several underling assertions and criteria to measure. In total there were 176 assertions in the questionnaire. The answers to the questions were given in a 5-point Likert scale (1 – do not agree at all; 2 – rather do not agree; 3 – hard to evaluate; 4 – rather agree; 5 – totally agree). There was also a possibility to answer 0 which stood for having no information or ineptitude to answer.

The target groups of the questionnaire were all Estonian general schools providing secondary and/or upper secondary education. The survey was addressed to all most important stakeholders of the school: the school principals, teachers, pupils, their parents and the members of school board of trustees. The board of trustees consists of the parents, representatives of teachers, a representative of the local government, a representative of pupils, representatives of graduates and of other organisations supporting the school. Regarding the teachers, pupils and parents, the target groups were limited to the pupils and teachers studying or teaching in 9th or 12th grade and to the parents of those pupils. Before the main study, the questionnaire was tested among some headmasters and teachers. After testing, the pilot study was implemented in 11 randomly selected schools (in total 11 headmasters, 51 teachers, 121 pupils, 49 parents and 10 members of school board filled the questionnaire). Based on the pilot study results analysis, the questionnaire was improved. The improvement consisted of reformulating some assertions and improving the structure of the questionnaire.

The inquiry was held electronically and in written form. As all the schools in Estonia have access to Internet, most of the respondents had an opportunity to fill out the questionnaire online. For the current research, an electronic solution called eFormular was used. This is an

unique tool providing a possibility to create electronic forms (eFormulars) and conducting surveys via the Internet. To schools which required responding by letter, were sent questionnaires via regular mail in envelopes which could be returned without any additional fee (prepaid by the research team). As a result, the questionnaire was filled by 303 school principal, 2165 teachers, 5482 pupils, 1922 parents and 546 school board' members. In order to maintain comparability, the schools providing only lower secondary education and the schools for children with special educational needs, were dropped out. That left us with responses from 119 headmasters (principals), 1251 teachers, 4118 pupils, 1244 parents and 266 members of school councils from 164 different schools. The total number of the target schools in the school year 2009/2010 in Estonia was 209; there were all together 9614 pupils studding in 12th grade. Consequently, the responses were received and analysed from 56% of target schools.

The collected data was analysed using SPSS version 18.0. On the basis of the returned surveys a statistical analysis was carried out, using one-way analysis, two-way analysis, factor analysis to achieve the goal of the study. Principal axis factor analysis by varimax factor rotation was used to clarify which variables, or assertions in each section mentioned above (ie. strategic management and others) most belong to each factors. As a result, there were 32 factors identified and labeled to investigate the different management levels contribution to the schools performance.

4. Legal regulatory environment

Having regained independence in 1991, Estonia has undergone fundamental political and structural changes over the last decade, which has also affected the operation of its governmental units on the State as well as on the local level.

The main set of legal acts, having impact on the regulation of financial management, accounting and performance management issues in public schools are following:

- ◆ Estonian Act on Accounting (EAOA, adopted in 1995, amended in 2003)
- ◆ Estonian Basic School and Upper Secondary School Act (adopted in 2008)
- ◆ Rural Municipality and City Budgets Act (adopted in 1994);
- ◆ Decree of the Estonian Government on the Types of Strategic Development Plans and System to their Compilation, Implementation, Evaluation and Reporting (adopted in 2005);
- ◆ Concept of the development of Estonian governmental financial management (adopted in 2008)

According to the EAOA, adopted in 1995, the Act was applied among other institutions also to central and local government entities. More detailed accounting guidelines for local governments were issued by the Decrees of the Estonian Ministry of Finance, the first accounting guidelines for central and local government entities having been adopted in 1995. Up to 1998 the operating transactions were allowed to record with a mixed system, including both cash-basis and accrual basis principles (see Haldma, 2006). In 1998 this mixed system was replaced by solely accrual-basis accounting through the amended guidelines. The budgeting systems still remained to operate on cash-bases principles. However, for the governmental institution officials changing and different principles of accounting and budgeting posed a lot of problems and confusion.

The new, amended version of the EAOA, which came into force in 2003, expanded the scope of the Act, involving in accordance with sections 2 and 35-40 also central governmental institutions (the Act has applied to them since January 2004). The Ministry of Finance is responsible for the organisation of state accounting and financial reporting pursuant to the EAOA. This is specified by the general rules for organisation of the accounting and financial reporting of the state and the state accounting entities (*riigi raamatupidamise üldeeskiri*) which are based on and are in compliance with the accounting principles generally accepted in Estonia and the international public sector accounting standards, and in accordance with which the state accounting entities are required to organise their accounting and financial reporting. Also local government institutions are required to follow these rules.

Therefore it can be concluded that beginning from 2004, the EAOA has covered the regulation of the accounting principles of all types of institution. The business entities and public legal persons have followed the EAL and the accounting standards for years and are accustomed to doing so. But our observations revealed that for the governmental institutions the switch from cash-basis to accrual-basis accounting in January 2004 posed a lot of problems and confusion. There is also still a discussion on the museum collection valuation principles and methods.

Thus the public sector has adopted the main principles and rules of private sector accounting and as a general observation, the transfer of the Estonian public sector from cash-basis to accrual accounting can be regarded, in the light of the New Public Financial Management Framework, as an attempt to adopt the accounting principles that apply in the private sector. However, the budgeting systems still remained to operate on cash-bases principles. Haldma and Lääts (2002), and Virtanen et al. (1996) argue that the evolution of financial accounting has influenced the development of cost accounting and management accounting. Therefore, also linking financial aspects of an organization with its non-financial aspects presume that financial accounting is operating in stable way.

According to the Local Government Organization Act and Rural Municipality and City Budgets Act and to the Decree on the Types of Strategic Development Plans and System to their Compilation, Implementation, Evaluation and Reporting the local governments and state agencies are obliged to prepare a strategic development plan for at least a three-year period for the municipality and agencies, which will serve as a base document for annual planning and budgeting later on. The laws and other legal acts neither prescribe any structure nor give methodical advice on composing the strategic development plans. Although Local Government Organization Act states that the development plans must include analyses of current economic, social and environmental situation and present directions and preferences of long-term planning in the municipality. The Decree also requires to compile a report on the succeeded objectives and effectiveness of actions concerning the implementation of strategic development plan. Section 13 of the Decree even states, that abovementioned report is a basis to update the strategic development plan. But the abovementioned legal regulation does not give any methodical advice on planning, budgeting and reporting issues.

Proceeding from the decree mentioned above, the Estonian Basic School and Upper Secondary School Act stipulates some principles for the strategic planning of schools. In order to ensure the consistent development of a school, the school shall prepare a development plan in co-operation with the board of trustees (council) and teachers' council. Therefore, the strategic planning can be seen as a systematic process for organization management. A school development plan shall set out the main objectives and areas of

development of the school, an activity plan for three years and the procedure for renewal of the development plan.

Concept of the development of Estonian governmental financial management (2008), which was adopted by the Ministry of Finance in January 2008, stipulates NPM and PDCA cycle as underlying concepts for governmental financial management. This concept is pointing activity based budgeting and activity based management out as important tools of governmental strategic financial management.

During the interviews with public sector officials we analyzed the impact of legal framework on the development of performance management systems. One staff member described the situation as following:

The main driving force for the development or implementation is a legal act. If the issue is required by legal act, then it serves for further implementation. If not, we are not mainly taking our own initiative. We are basing on public sector legal acts and regulations in our activities.

This view is supported by Pallot (2001, p. 657), who pointed out that central legislation may play an important role in driving change in public sector. From the other side, the statement of the interviewee refers to the bureaucratic framework and attitude. Consequently, although there is formally legal framework for Estonian public schools, which enables to design an integrated performance management system, the legal acts and regulations promote the performance management and accounting change in an unharmonious way.

5. The main findings and discussion

The school performance measures and variables influencing it

In order to define school performance measures and variables influencing the performance, we ran the correlation analysis between the main pupil performance variables, stakeholder satisfaction variables, characteristics of the school and school expenditure data. Table 1 shows the bivariate Pearson's correlation coefficients between the selected variables. All the correlations presented are significant at level $p \leq 0.01$. The table 1 includes only correlation coefficients presenting moderate and high statistical relationship ($r \geq 0.30$).

Our analysis revealed, that the pupils' academic performance i.e. the results of state examinations are strongly correlated to pupils' further choices after completing the upper secondary education. The correlation between these two variables – the school's average score of state examinations and the share of pupils continuing their studies at a university next year after graduation of upper secondary education reaches to 0.76. Presumptive strong negative correlation is also found between the share of pupils not continuing their studies at all, and the share of pupils continuing their studies at a university next year after the completion of the upper secondary education ($r = 0.72$). The conducted correlation analysis also revealed, that the schools, where the average score of state examinations is higher, present smaller share of pupils not continuing their studies after the completion of upper secondary education at all. Because the upper secondary schools in Estonia provide usually only basic education and not any qualification, continuing studies after the completion of upper secondary education is highly important to achieve the education needed for successful

participation in labor market, and fulfilling the duties of a dutiful citizen. The latter may also be defined as the main objective of public education system and therefore, the indicators introduced have an important role to play in determining the schools' performance.

When investigating the stakeholders' satisfaction with the schools' teaching and education quality, statistically significant ($p \leq 0.01$) correlations ($r = 0.33 - 0.39$) were found only with variable measuring of the results of state examinations. This result could be explained by the fact that in Estonia the state exams are accepted by the universities as admission criteria, which also reflects the reliability of those exams. Additionally, the results of state examinations are widely presented in media and different rankings of schools providing upper secondary education are published. Therefore, the public interest and knowledge on the state examinations is quite high and often the school's performance is evaluated by the results of the state examinations. This statement support Irs and Ploom (2009) who point out that in Estonian educational institutions the performance is measured mainly by academic performance.

Table 1. Results of correlation analysis between pupil performance variables, school characteristics and school expenditure data****.

Variable group	Variable	Correlation coefficients		
		(1)*	(2)**	(3)***
Pupil performance variables	(1) The results of state examinations (average score of years 2006-2009)	1	-0.53	0.76
	(2) The share of pupils not continuing their studies next year after graduation of upper secondary education (average of years 2006-2009)	-0.53	1	-0.72
	(3) The share of pupils continuing their studies in the university next year after graduation of upper secondary education (average of years 2006-2009)	0.76	-0.72	1
Stakeholder satisfaction	Parents' satisfaction with teaching and education quality in school	0.39		
	Pupils' satisfaction with teaching and education quality in school	0.33		
	Teachers' satisfaction with teaching and education quality in school	0.36		
Characteristics of school	Number of pupils in school	0.61	-0.34	0.56
	Number of pupils per class	0.49		0.50
	Number of pupils per teacher	0.50		0.54
	The classroom area per pupil	-0.32		
Expenditure data	Teacher's average salary in school	0.42		
	Headmaster's average salary in school	0.31		0.33
	Schools teaching expenditure (including teacher salary and teaching materials) per pupil			-0.42

*(1) The results of state examinations (average score of years 2006-2009)

** (2) The share of pupils not continuing their studies next year after graduation of upper secondary education (average of years 2006-2009)

*** (3) The share of pupils continuing their studies in the university next year after graduation of upper secondary education (average of years 2006-2009)

**** Only correlations statistically significant at 0.01 level and only correlation coefficients $r > 0.3$ are presented.

Also several other school characteristics and school expenditure variables' correlations with pupils' performance indicators were tested. Table 1 shows, that there were quite strong

positive correlations found between pupils' performance and school size (variables "number of pupils in school", "number of pupils per class"), school efficiency (variables "number of pupils per teacher" and negative correlation with "classroom area per pupil"). When considering expenditure data, positive correlations were observed between pupil performance and teachers' and headmasters' average salaries (accordingly, $r = 0.31$ and $r = 0.42$). At the same time, the analysis of the whole correlation matrix, which was produced to estimate the interactions between all the variables introduced, revealed that there were also significant correlations found between teachers' and headmasters' average salary and 1) number of pupils in school (accordingly $r = 0.31$ and $r = 0.45$); and 2) number of pupils in upper secondary stage in a school (accordingly $r = 0.37$ and $r = 0.32$). Also, the teaching expenditure per pupil is strongly correlated with the size of a school ($r = 0.61$). This is also confirmed through the relation analysis between the variables "teaching expenditure per pupil" and "classroom area per pupil" ($r = -0.59$).

Therefore, it can be concluded, that bigger schools (according to number of pupils) tend to be more efficient and effective, ensuring better pupil performance, and are able to provide teachers and headmasters with higher salaries. Also, the expenditures per pupil are lower in bigger schools, because of higher efficiency and less (presumably not fully utilised) classroom area per pupil. All these variables can be connected to the school size.

As a result of correlation analysis between pupil performance characteristics and stakeholder satisfaction with quality of teaching and education, it can be concluded, that the most significant variables indicating school performance, are following:

- Firstly, the results of state examinations. This variable is strongly correlated with pupils' further decisions in their further educational choices and therefore also with personal development;
- Secondly, the main stakeholders' (parents, pupils, and teachers) satisfaction with education and teaching quality in a school. These indicators are affected by the variable measuring the average result of state examinations.

Therefore, it can be concluded, that individual goals, like satisfaction with the education and teaching quality in a school are influenced by the pupil's academic performance and the latter also affects the pupil's further choices in education.

It is also important to mention, that only weak correlations were found between the headmaster's satisfaction with the school's education and teaching quality and pupils' performance variables; none of the correlations were significant at level $p \leq 0,01$; only the correlation with state examination results turned out to be statistically significant at level $p \leq 0,05$, producing relatively weak correlation at level $r = 0.21$.

Analysis of operational and strategic performance management variables influencing the school performance

In the previous part of the current paper we concluded that the most important factors explaining the school's performance are the following: 1) the results of state examinations, 2) pupils', parents' and teachers' satisfaction with teaching and education quality in school and 3) school characteristics, as school size (number of pupils) as well as efficiency characteristics (number of pupils per teacher).

As it was described in the part 3, a wide set of questions were included into the questionnaire, which was oriented to the main groups of school stakeholders - teachers, headmasters, pupils, parents and the members of school board of trustees. The questions were divided into five general areas of school management: 1) strategic management, 2) resource management and collaboration with stakeholders, 3) personal management, 4) quality management and learning processes and 5) financial performance evaluation. Based on the responses to the questionnaire, 32 factor variables were calculated. The factors were aggregated to single schools for every subgroup of stakeholders (headmasters, teachers, pupils etc.). This approach allows to compare the opinions of different parties within the same school. In fact, we also tested three pupils' performance indicators presented in table 1 correlations with all the factors, that characterize the school management. But no significant correlations ($r \geq .3$) were found except for the satisfaction variables, mentioned above. Therefore, in further analysis we were testing only the correlations between the 31 factors described and the variables of the parents', teachers', pupils', and also headmasters' satisfaction with teaching and education quality. As it was mentioned above, the satisfaction variables are significantly correlated with the pupils' performance and therefore these variables are the most important, reflecting also the schools performance.

In order to determine the main characteristics of school management influencing a school performance most of all, a corresponding correlation analysis was carried out. The Pearson's correlations between satisfaction variable and all other 31 factors were estimated. As a result, eight main factor groups, defining significant (at level $p \leq .01$) and strong correlations with satisfaction variables in all stakeholders' responses, were distinguished. The list of factor variables and corresponding assertions from the initial questionnaire are given in Appendix 1. To investigate the influence of these factors to the schools performance, all the variables were classified into three main performance management level indicator groups, introduced in the chapter 2 of the current paper - individual, operational and strategic indicators. This classification gives us an opportunity to involve the different performance management level indicator groups into the further analysis in a balanced way. As a result the following school performance indicators were distinguished.

Individual performance measures:

- Parents' satisfaction with teaching and education quality in school;
- Pupils' satisfaction with teaching and education quality in school;
- Teachers' satisfaction with teaching and education quality in school;
- Headmasters' satisfaction with teaching and education quality in school (although this variable was not strongly correlated with the pupils' academic performance, it is still interesting to analyse, which factors contribute the headmasters' satisfaction with education and teaching quality).

Operational performance measures:

- Ethics, open communication in school;
- Pupils interests emphasised;
- Good academic performance expected;
- Supporting culture in school.

Strategic performance measures:

- Systematic evaluation of pupil performance;
- Dynamic strategic planning;
- Financial performance management;

- Communication with stakeholders.

Subsequently we analysed the most important factor variables identified as factors that contribute most of all the schools' performance in relation with satisfaction measures. All the variables were calculated for every single stakeholder group. This gave us a chance to analyse, whether the opinions about school performance and other factors, influencing the performance, are consistent in the answers of teachers, parents, pupils and also headmasters. The analysis involved also headmasters, despite the fact, that the satisfaction of headmasters turned out to be not significantly correlated with pupil performance in school. Summarizing, it was analysed, how the satisfaction with school education and teaching quality were influenced by their own and other stakeholders' opinions on the following eight operational and strategic performance areas of their school: 1) supportive culture, 2) ethics and open communication in school, 3) financial performance management, 4) communication with stakeholders, 5) emphasis on pupils interests and 6) good academic results, 7) evaluation of pupils' performance and 8) dynamic strategic planning.

The schools performance measures, characterizing teachers', parents', pupils' and headmasters' satisfaction with school education and teaching, were defined as individual level performance objectives. The factors, characterizing school management, contributing the schools' performance, reflect the operational and strategic performance management levels. The operational and strategic performance management levels are the responsibility areas of school management.

Subsequently, we analyse the relations between school stakeholders' satisfaction with school education and, operational and strategic performance management indicators. As a result of the analysis, the most evident pattern of correlations was found from teachers' opinions. Figure 2 (left graph) shows that all significant factors, identified as school operational and strategic performance contributors, are quite strongly correlated with teacher satisfaction with education and teaching quality in the school ($r = 0.42 - 0.55$, all correlations are significant at $p \leq 0.01$). On the left side of the graph there are the school operational performance indicators, and on the right the school strategic performance indicators. Basing on the analysis, we can conclude, that teachers individual satisfaction with teaching and education quality is quite evenly related with both, operational and strategic management components. Although, the operational management measures tend to be for teachers more important (average correlation with teacher satisfaction $r = 0.50$) than strategic ones (average correlation with teacher satisfaction $r = 0.46$).

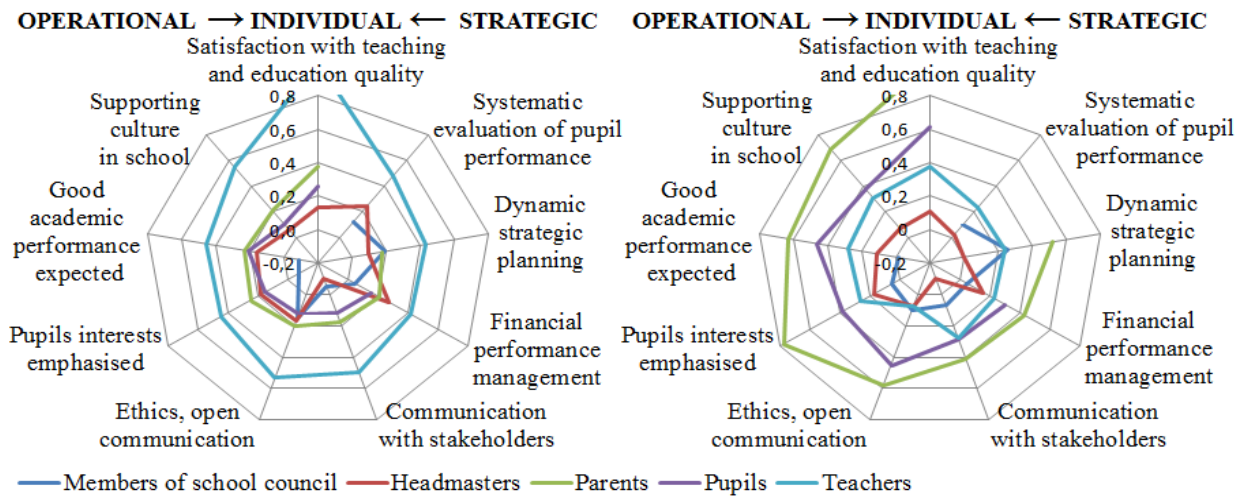


Figure 2. Correlations of teachers' (graph on the left) and parents' (graph on the right) satisfaction with teaching and education quality and other, operational and strategic management measures.

The pattern of parents' opinions (figure 2, graph on the right) has some similar features with teachers' opinions. The factors' correlations with parents' satisfaction indicator introduce even stronger correlations ($r = 0.41 - r = 0.77$, all correlations significant at $p \leq 0.01$). It is also important to mention, that the questions on the systematic evaluation of pupil performance at school were not asked from parents, because it was assumed by the researchers, that they would not have enough knowledge to answer to those questions. Similarly to teachers' opinion, it can be concluded also about the parents, that their individual satisfaction with teaching and education quality is also related with operational and strategic management components. Although, for parents, the operational management features tend to be more important (average correlation with teacher satisfaction $r = 0.66$), than the strategic management measures (average correlation with teacher satisfaction $r = 0.45$).

The pupils' opinions (figure 3, graph on the left) are also quite consistent with teachers' and parents' opinions. The correlation coefficients in the case of pupils are in a range $r = 0.30 - r = 0.75$. Again, there were some questions, which were not asked from the pupils, for example questions on systematic evaluation of pupil performance and on dynamic strategic planning. It was assumed by the researchers, that they would not have enough knowledge to answer to those questions. Still, there are two factors remaining to enable the evaluation of the strategic management measures' contribution to pupils' satisfaction with teaching. The average correlation between strategic management measures and pupils' satisfaction with teaching in schools is much weaker ($r = 0.38$) than with operational management measures ($r = 0.71$).

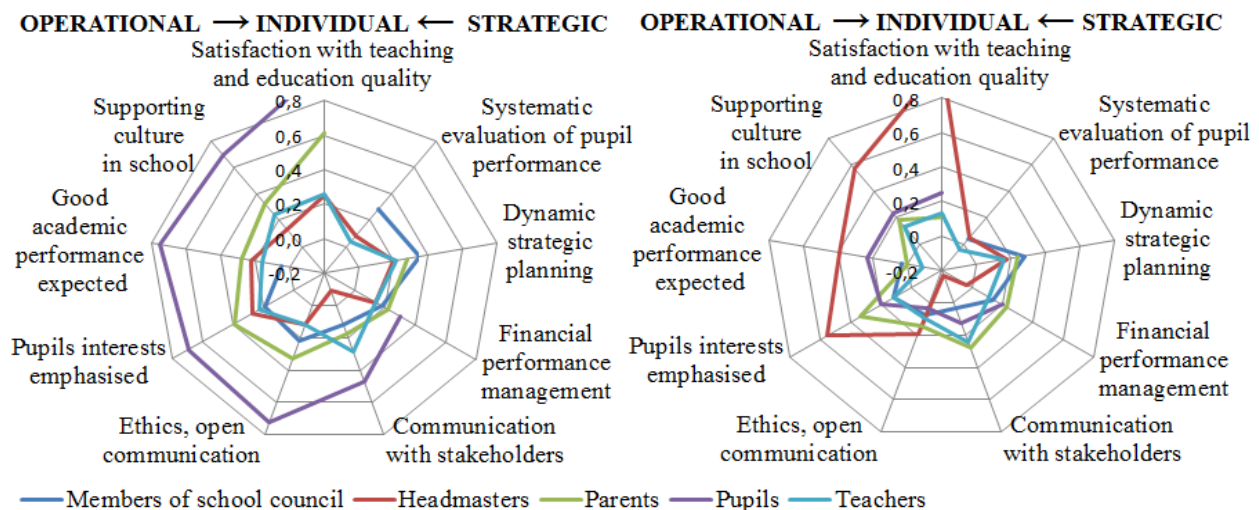


Figure 3. Correlations of pupils’ (graph on the left) and headmasters’ (graph on the right) satisfaction with teaching and education quality and other, operational and strategic management measures.

The headmasters’ satisfaction introduces the weakest correlations with the operational and strategic management measures (figure 3, graph on the right), although these relations are much more significant in the cases of analysis of variables of the satisfaction of teachers, parents and pupils. The operational management measures’ average correlation with headmasters’ satisfaction with teaching and education quality in school is only 0.42. It is evident, that the most important operational management measures for the headmasters, correlated with their satisfaction, are the presence of supporting culture in a school ($r = 0.57$, $p \leq 0.01$), emphasis of the pupils’ interests in a school ($r = 0.55$, $p \leq 0.01$) and the expected good academic performance of the pupils ($r = 0.39$, $p \leq 0.01$). All these indicators reflect operational performance management level. As our analysis revealed, any strategic management measure don’t introduce statistically significant (neither at $p \leq 0.01$, nor $p \leq 0.05$) correlation with headmasters’ satisfaction with education and teaching quality in a school. At the same time the analysis showed that 92% of the headmasters declared that the financial resources of the school are used efficiently and in 71% of the cases the headmasters pointed out that the school development plan serves as a basis for the school budget compilation. All these aspects can be connected with school strategic performance management level. In some strategic issues the headmasters’ opinions were closed to the opinions of teachers. For example, 93% of the headmasters (87% of teachers) estimated that the school development plan includes key performance indicators and there have been meetings to sum up the implementation of the school development plan during the last years (87% of the headmasters, 85% of teachers). This reflects a certain dynamic character of the planning and performance management process. At the same time, as our analysis revealed the headmasters are much more oriented to operational performance management indicators than to strategic performance ones, in particular, comparing their opinions with teacher opinions. The analysis also revealed that 36% of the headmasters have no any position concerning the sufficiency of financial resources for the school development plan implementation. Furthermore, the correlation between headmasters’ satisfaction and two strategic management measures, “financial performance management” and “communication with stakeholders” have negative character. Therefore we argue that the headmasters are not sufficiently aware and do not give a certain importance to the financial performance and

financial management issues within the school performance management. Although these areas are their primary responsibility areas.

6. Concluding remarks

This paper responds to a call for the study of the performance management development in public schools. The present research investigated, using the PDCA (Plan, Do, Check, and Act) cycle model and statistical analysis, how Estonian general schools use the elements of performance management and are there certain linkages between individual, operational and strategic levels of performance management. Such an approach is interesting as different levels play different roles in the performance management process in education practice. Recognizing different contingencies influencing on this cycle the paper explored how various drivers have interfered in the implementation of performance management in public schools. Thus it is a concept of linking the development of school performance management system and its influencing drivers. The empirical findings using this conceptual framework lead us to a number of observations.

First, the most significant variables indicating the school performance, are the results of state examinations and pupils' further decisions in their further educational choices, which are correlated with the main stakeholders' (parents, pupils, and teachers) satisfaction with education and teaching quality in a school. Therefore, individual goals, like satisfaction with the education and teaching quality in a school are influenced by the pupil's academic performance and the latter also affects the pupil's further choices in education.

Second, the individual goals, like satisfaction with the education and teaching quality in the school is influenced by school strategic as well as operational performance indicators. Therefore the school performance management system needs to be balanced between individual, operational and strategic performance management levels of the school.

Third, the individual goals are more connected with operational performance measures as the stakeholder without of management responsibilities are not able to follow the strategic objectives of the school.

Fourth, the headmasters' satisfaction introduces the weakest connection (correlations) with the operational and strategic management measures, although these relations are much more significant in the analysis of variables of the satisfaction of teachers, parents and pupils. The most important performance management measures influencing the headmasters' satisfaction, are the operational indicators as supporting culture in a school, emphasis of the pupils' interests in a school and the expected good academic performance of the pupils. Any strategic management measure doesn't introduce statistically significant correlation with headmasters' satisfaction with education and teaching quality in a school. The correlation between headmasters' satisfaction and two strategic management measures, "financial performance management" and "communication with stakeholders" have even negative character.

Finally, we would like to admit that this exploratory study has certain limitations. First, it has a static character. It would be useful to expand the survey on more longitudinal aspects of performance management in the schools. Secondly, there is a need to further explore in wider variety of individual, operational and strategic performance management indicators and their interconnections in the implementation of performance management in public schools.

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The factor variables and corresponding assertions in the initial questionnaire.

Factor variable	Assertion in the initial questionnaire
Satisfaction with teaching and education quality	) I am satisfied with our school's quality of education.
	) I am satisfied with the quality of teaching in our school.
Supporting culture in school	) Our pupils like to go to school.
	) Our pupils follow the rules established in our school.
	) Teachers in our school care about pupils.
	) Teachers in our school are fair to pupils.
	) In our school pupils can always talk about their problems with teachers.
Good academic performance expected	) Pupils in our school treat each other well.
	) Our school is supporting the pupils' participation in different pupils contests, pupils' olympiades etc.
Pupils interests emphasised	) Pupils in our school are encouraged to give their best in their study work.
	) Pupils in our school understand what the teachers expect from them.
	) In our school the pupils study what they need for successful subsistence in their future life.
	) Our school is supportive enough in developing pupils' interests and talents.
	) In our school, non-compulsory subjects are provided in accordance to pupils' interests and wishes.
	) When planning the school's timetable and activities, there are taken into account pupils' preferences and proposals.
	) Teachers in our school use enough contemporary teaching methods (ie. computer-based, identity-centric).
Financial performance management	) The school management has enough authority to use the school's own revenues (i.e. rental payments for using the pool or gymnasium).
	) The school's collaboration with the local government in the school's financial management is very good.
	) The delegates of local government participate in combining the schools budget.
	) We compare the amount of financial support allocated for the school from the state budget funds to the local government with the amount of finances allocated to the school from the local government budget.
	) The school's premises and buildings can be used by other interest groups outside the school's working-hours.
	) The school's premises and buildings can be used by other interest groups outside the school's working-hours.
Dynamic strategic planning	) In the past year we have analyzed putting the school's development plans into force.
	) During last 2 school-years we have introduced the school's development plan enforcement to different interest groups (parents, local government).
	) We have defined the school's key result indicators in the development plan.
	) We have adjusted the school's development plan during the past year
	) Changes in our school's everyday life are based on analyzing previous activities.
	) In the planning of our activities we take into account developments in society (number of children in the region, expectations of the school, economic environment, region's development plans etc.).
Communication with stakeholders	) When requested, our school has open information to local government.
	) When requested, our school has open information to parents.
	) When requested, our school has open information to pupils.

	) When requested, our school has open information to teachers.
	) When requested, our school has open information to members of school council.
Ethics, open communication	) Our school's management follows ethical norms and principles.
	) Our school's teachers follow ethical norms and principles.
	) Communicating to our school's management is easy.
Systematic evaluation of pupil performance	) In our school, the following indicator is systematically analyzed: the supporting facilities impact on pupils' learning success.
	) In our school, the following indicator is systematically analyzed: the share of pupils continuing their studies after the graduation of our school.