

Education spending review

Final report

July 2017

Updated version approved by the Government of the Slovak Republic on 11th of October 2017

This project is supported by the European Social Fund



The education public spending review was created during the cooperation of the Ministry of Finance SR and the Ministry of Education, Science, Research and Sport SR as part of the Value for money project.

Responsible entities for the development of the report: the Value for Money Committee (VMC) of the MoF SR and the Educational Policy Institute (EPI) of the MoESRS SR. The VMC team was led by Štefan Kišš and Martina Erdélyiová, Martin Kmeňko, Matej Kurian, Samuel Škoda, Miroslav Škriečka and Zuzana Laffersová participated in the preparation (Financial Policy Institute of the MoF SR). The EPI was led by Matej Šiškovič and the report was prepared by Ján Toman and Michal Rehúš. Analytical calculations were performed by Daniela Zápražná. Expert outputs were provided by Pavol Galáš, Dávid Martinák and Samo Varsik. Valuable proposals and remarks during the preparation of the interim report were provided by the Regional Education Division, Higher Education Institutions Division, Science and Technology Division, EU Structural Funds Division, Finance and Budgeting Division, Division of Informatics, Private Office and the Minister's Office of the MoESRS SR and the Slovak Centre of Scientific and Technical Information.

Valuable remarks provided by experts such as Peter Dráľ, Renáta Králiková, Martina Kubánová, Juraj Vantuch and Emil Višňovský and the members of the project's advisory committee Gabriel Machlica, Martin Kahanec, Juraj Kotian and Ferdinand Varga as well as the members of the joint mission of the International Monetary Fund and the European Commission David Coady, Jason Harris, Claude Wendling, Tom Boland and Andrew Westwood contributed to the interim version.

Errors and omissions remain the responsibility of the authors.

Table of contents

| | |
|--|----|
| Introduction and summary | 6 |
| Measures and action plan..... | 8 |
| 1 Results and outputs | 11 |
| 2 Expenditure | 20 |
| 2.1 Expenditure on education | 20 |
| 3 Regional education..... | 28 |
| 3.1 Teachers' salaries and the remuneration system | 29 |
| 3.2 The funding system of elementary and secondary schools | 34 |
| 3.3 Rationalization of the elementary school network..... | 37 |
| 4 Higher education institutions and tertiary education research..... | 46 |
| 4.1 Research and development at higher education institutions | 48 |
| 5 Expenditures of MoESRS SR organisations | 52 |
| 5.1 Operational expenditure..... | 52 |
| 5.2 Capital expenditure..... | 60 |
| 5.3 IT expenditure and investments | 62 |
| 6 Bibliography..... | 67 |
| 7 List of abbreviations..... | 68 |

List of graphs

| | |
|---|----|
| Graph 1: Average results of pupils in the 2015 PISA Assessment | 12 |
| Graph 2: The share of pupils in respective performance categories (2015, a higher level indicates a better result) | 13 |
| Graph 3: Youth (20–24) with completed secondary school education (2016) | 15 |
| Graph 4: The share of early school leavers (18–24) | 15 |
| Graph 5: Percentage of pupils repeating a school year in elementary school, the best and worst districts | 15 |
| Graph 6: Unemployment rate according to attained education. Population 25–64 (2015) | 17 |
| Graph 7: Unemployment rate of graduates according to higher education institutions (2015) | 18 |
| Graph 8: The share of the population 25–34 according to the highest attained tertiary education (2015) | 18 |
| Graph 9: The share of the population 30–34 with tertiary education (2005 and 2016) | 19 |
| Graph 10: The expected share of persons with tertiary education from the current youth (2014) | 19 |
| Graph 11: Public expenditure on education in % of GDP (2006–2015 and the prognosis until 2020, COFOG methodology)..... | 21 |
| Graph 12: Public expenditure on education in % from total public expenditure (2006–2015 and the prognosis until 2020, COFOG methodology)..... | 21 |
| Graph 13: Annual expenditure per student (in USD, PPP recalculated, 2014)..... | 24 |
| Graph 14: Public and private funds ratio on education (2014) | 25 |
| Graph 15: Distribution of expenditure on education (from public and private funds, 2015) | 25 |
| Graph 16: Expenditure on research and development in tertiary education, 2015 (in % of GDP) | 26 |
| Graph 17: Expenditure on education and the average PISA score (2015)..... | 27 |
| Graph 18: The share of teachers who certainly do not agree with the claim that their work is appreciated within society (%)..... | 29 |
| Graph 19: The relative score of teachers in comparison to employed peers with tertiary education | 29 |
| Graph 20: The share of average salaries of pedagogical staff in lower secondary education in salaries of employees with tertiary education (% , 2015) | 30 |
| Graph 21: The salary ratio of pedagogical staff and employees with tertiary education according to age (% , 2014) | 30 |
| Graph 22: The salary grade – an illustration of the pay grade 10 and the impact on the increase of salary grade | 31 |

| | |
|---|----|
| Graph 23: Pedagogical staff at respective career levels (% , 2016)..... | 33 |
| Graph 24: The share of pedagogical staff receiving credit premiums (% , 2016)..... | 33 |
| Graph 25: Quantity of schools according to the teachers' average number of years of professional experience . | 36 |
| Graph 26: The standards and the standardised envelope of funds according to SVS categories (2016) | 36 |
| Graph 27: Elementary school and pupil distribution according to school size (2000–2016)..... | 40 |
| Graph 28: The share of classes with the number of pupils below the currently set minimum limit (in %)..... | 42 |
| Graph 29: Direct transfers to PHEI according to respective areas (in EUR mil.) and the share in GDP (right axis) | 47 |
| Graph 30: Tertiary education research funds from the government budget, 2017 (EUR mil.)..... | 49 |
| Graph 31: The share of research output types according to HEI..... | 51 |
| Graph 32: The share of research output types in transfers for publications for HEI ¹⁰⁸ | 51 |
| Graph 33: Transfers for publications according to research output types (EUR mil.) and transfer per researcher (EUR thous.)..... | 51 |
| Graph 34: Main categories of operational expenditure (%) 2010–2016 | 52 |
| Graph 35: Chapter's operational expenditure structure without transfers (in EUR mil.), 2010–2016 | 52 |
| Graph 36: Chapter's operational expenditure structure without transfers (2010–2016), % | 53 |
| Graph 37: Chapter's personnel expenditure – selected indicators (2010–2016), %..... | 53 |
| Graph 38: Chapter's expenditure related to IT services – selected indicators (2017–2020) | 53 |
| Graph 39: Distribution of MoESRS SR expenditure (2013–2020)..... | 60 |
| Graph 40: Investment costs of the MoESRS SR according to the source of funding (2013–2020)..... | 60 |
| Graph 41: IT expenditure of MoE chapter 2010–2020 (EUR mil.), share of EU funds (% , right axis) | 62 |
| Graph 42: SCoSTI budget for IT expenditure (EUR mil.) | 65 |

List of tables

| | |
|--|----|
| Table 1: Result and output indicators of quality in education | 11 |
| Table 2: PISA – supplementary indicators..... | 13 |
| Table 3: The base scenario of expenditures on education, research and sport | 22 |
| Table 4: Identified measures – savings | 22 |
| Table 5: Identified measures – value..... | 23 |
| Table 6: Distribution of expenditure on education, research and development according to source (2007 – 2016, % or EUR mil.) | 24 |
| Table 7: Estimation of the financial impact related to the change within the consideration of years of professional experience (EUR mil.) | 31 |
| Table 8: Basic parameters of standardised funding | 35 |
| Table 9: Basic indicators of the elementary school network (2000, 2016)..... | 38 |
| Table 10: Basic indicators of the secondary school network (2000, 2016)..... | 38 |
| Table 11: The average class size and the number of pupils per teacher – international comparison (2015) | 39 |
| Table 12: School distribution of primary and lower secondary education according to the number of pupils | 39 |
| Table 13: Impact analysis of the compensatory mechanism defined according to municipality area (2016)..... | 41 |
| Table 14: Value for money indicators | 45 |
| Table 15: Office's expenditure with a significantly higher share in operational expenditure (2010–2016)..... | 53 |
| Table 16: List of subordinate DMO within the Ministry of Education..... | 54 |
| Table 17: Expenditure of subordinate DMO for 2013–2015, on average per year | 55 |
| Table 18: Development of personnel costs related to organisations of the Ministry of Education (2012–2016).... | 56 |
| Table 19: Development of personnel costs related to organisations of the Ministry of Education, funded from the GB (2012–2016) | 57 |
| Table 20: Development of the number of employees in organisations of the Ministry of Education (2012–2016) | 57 |

| | |
|---|----|
| Table 21: Development of average wages in organisations of the Ministry of Education (2012–2016)..... | 58 |
| Table 22: Expenditure on goods and services, all funds | 59 |
| Table 23: Expenditure on goods and services, funded from the government budget..... | 59 |
| Table 24: The largest investment actions of the Ministry of Education, EUR mil. (2013–2020) | 61 |
| Table 25: IT expenditure of MoE organisations (EUR mil.)..... | 63 |
| Table 26: The largest cost items (EUR mil.)..... | 63 |
| Table 27: Number of SCoSTI IS users and costs related to their construction..... | 65 |

List of boxes

| | |
|---|----|
| Box 1: Is it worth studying?..... | 17 |
| Box 2: BS calculation methodology for 2017–2020 | 23 |
| Box 3: The more money, the better results?..... | 27 |
| Box 4: Alternatives of salary increase of pedagogical and expert staff at the beginning of their career. | 31 |
| Box 5: The average size of classes and the number of pupils per teacher in international comparison..... | 38 |
| Box 6: Free bus transport services for pupils of regional education | 43 |
| Box 7: Case study on the introduction of school buses | 45 |
| Box 8: The process of investment selection and evaluation | 61 |

Introduction and summary

The spending review is part of the government project Value for Money under which it reforms the rules, sets processes and strengthens institutions, which will support the adoption of good decisions in the public interest and significantly increase the value for money in Slovakia's public sector.

In the second year of the spending review, education, labour market policy and social policy and environmental expenditures are reviewed, which together account for 7.2% of GDP. The interim report identified areas with the largest scope for the improvement of efficiency. The final report subsequently designates particular measures with an action plan for their execution. The government approved the review together with the public administration budget until 15 October.

The spending review will re-evaluate the majority of public expenditure in the course of the parliamentary term. It will evaluate the effectiveness and efficiency of expenditure and identify measures which will increase the value for money of public finances thus enabling fiscal savings, better public services for citizens (results) and/or transfer of funds to the priorities of the government. It proposes measures in a long-term sustainable manner.

In developed countries the spending review represents a standard tool to help governments search for scope in public policies, use public funds more efficiently as well as find savings which are inevitable to meet national and European fiscal commitments.

Slovak education achieves below-average, and in recent years deteriorating, results in comparison to more developed countries. OECD's PISA International Assessment indicates below-average and deteriorating results in case of 15-year-old pupils. The share of pupils with poor results is one of the highest among OECD countries and rises. On the contrary, the availability of education is high, up to 90% of peer population completes at least their secondary school. Substitute indicators measuring the quality of tertiary education research also indicate poor results at higher education institutions. The share of the population with tertiary education is in comparison to the EU still relatively lower, however, the difference decreases. Every seventh student of a higher education institution studies abroad.

Pupils' results are significantly influenced by their socio-economical background. Pupils from poor families significantly lag behind others in comparison to other OECD countries. Every other pupil from the poorest quarter of population achieves poor results, pupils with excellent results practically do not exist among them. At the same time we have a low share of socially disadvantaged pupils who can achieve good results even when taking into account socio-economic factors.

In the long-term, expenditure on education has been lower in comparison to more developed countries, while in recent years it has been approaching the EU average. In 2017 Slovakia provides 4% of GDP¹ (EUR 3.4 bil., which accounts for approximately 10% of total public expenditure) on education. It still represents approximately 1% of GDP less than the average of EU countries. According to the public administration budget in proportion to total public expenditure Slovakia will reach the EU average in 2020.

The education spending review assesses expenditure in the yearly volume of 3% of GDP. In addition to the increase of expenditures, other reforms are necessary to achieve the desired improvement in the quality of education. The review focuses on short-term and expenditure measures. In addition to the universal increase of teachers' salaries, the priorities should include, the status of young teachers, link between teachers' quality and remuneration, including a bigger share of remuneration within the wage, the reform of higher education institutions' accreditation process and the improvement of the quality and availability of the data regarding pupils' and graduates' results. At the same time the review identifies potential for savings in the form of the rationalization of the regional education network, cancellation of credit premiums, increased share of students

¹ According to the COFOG methodology which classifies every public expenditure according to its intended use.

who do not continue with their Master's degree (master's or equivalent degree) studies and operation of associated organisations together in the volume of EUR 88 mil. (0.1% of GDP). Therefore, it provides the scope for funding the measures increasing the value for money which require additional funding. Other key documents defining reforms in education are the National Programme for Education Development SR – Learning Slovakia document, which is being prepared, and the National Reform Programme SR.

A key element for the quality of education will be the improvement of teachers' status. The increase of teachers' salaries in regional as well as tertiary education represents one of the expenditure priorities of the government of SR. According to international research, it is the teacher who influences the quality of education the most. Whereas in comparison to OECD countries we do not have relatively more teachers in regional education, the workload of Slovak teachers is comparable to their colleagues abroad, however, they earn significantly less. The salary on average accounts for 62% of an average employee with tertiary education, the OECD average is 88%. Financial remuneration, however, represents one of the key factors with regards to a profession's attractiveness. The increase of salaries should until 2020 increase the share of teachers' wages in regional education to 67% of the average wage ascribed to an employee with tertiary education.

The emphasis should be put on teachers at the beginning of their career and on a more significant remuneration for verifiable quality. The proposition is to replace the current system of formalised, theory-focused, attestations by a certification based on demonstrated pedagogical skills and developed portfolio. It is recommended to terminate the system of credit premiums for the benefit of a higher share of a non-grade part of salary. According to the report, current teachers should receive an enhanced offer of professional development courses and pedagogical faculty students should participate in a significantly higher number of practical training hours directly in the school environment.

There is scope for a more targeted and accurate redistribution of funds among individual schools. Funding creates basic conditions for the effective spending of funds and takes into consideration the structural differences in terms of costs. However, there is scope for a more accurate redistribution of funds among schools within the system (e.g. taking into consideration the teachers' years of professional experience) as well as a more targeted spending of funds.

Slovakia has a similar structure of elementary schools in terms of their size in comparison to other countries, although due to the negative demographic development the network is less efficient than in the past. As far as rationalization is concerned, it is necessary to consider not only financial savings, but also potential impacts on the quality, inclusion and availability of education for all children in their mother tongue. The funding system, for example, protects smaller elementary schools in order to ensure access to education for all pupils in their mother tongue. The spending review points to the low effectiveness of limits concerning the minimal size of elementary schools in the process of integration into the network and the minimum number of pupils in class. It is necessary to support the rationalization by measures such as broader reimbursement of transport costs or provision of school buses.

In order to improve results, it is necessary to have a sufficient amount of relevant information and evaluate them regularly. It is necessary to perform long-term research and assessment on samples which would be focused on the evaluation of trends, systemic changes and other aspects related to the functioning of the educational system. As well as to increase the emphasis on external assessment in order to verify the capacity of knowledge and skills application in actual situations and ensure their objectiveness. In case of higher education institutions regular feedback from graduates and the labour market is missing. The mismatch between the education system and the labour market can be reduced by a career tracking system of graduates (*graduate tracking*) by using administrative data and data from graduate and employer surveys.

Supporting quality represents a fundamental motif in tertiary education and research as well. Although tertiary education acquires a comparable number of young people as in other countries, its quality based on indirect indicators is below-average. One seventh of young people, the second highest share within the EU, chooses to study abroad.

The quality of tertiary education is not sufficiently guarded by the Accreditation Committee which does not meet international transparency requirements for evaluation and control mechanisms. The review recommends to establish a new, improved operating Accreditation Agency that certifies institutions based on internationally accepted standards. Complex accreditation should be replaced by a system focused on the audit of an internal quality assurance system for higher education institutions in accordance with trends in this area in Europe. The emphasis should be put, to a larger extent, on the evaluation of educational results.

The structure of graduates is significantly different from other OECD countries – Slovakia has twice as much students who continue with their Master’s degree (master’s or equivalent degree) studies and few Bachelor’s degree students studying vocationally oriented programmes. At the same time the share of the population of young people who are expected to complete their tertiary education is similar. Therefore, it is necessary to support conditions for the creation of vocationally oriented Bachelor’s degree programmes or improve the signalisation of Bachelor’s degree acceptance on the labour market from the government.

Slovak research, including tertiary education research, lags behind in comparison to other developed countries, including domains with a strong representation in terms of researchers. As far as tertiary education research is concerned, it is recommended to introduce an element of expert assessment of its outputs in accordance with international standards and increase the share of grant funding related to its funding.

Measures and action plan

In addition to the recommendations within the text, the education spending review identified the following main measures. Each measure features a calculation of potential savings. The value improvement potential is expressed by additional expenditures for the implementation of a measure, if they are inevitable. The action plan also defines measurable indicators, responsibility and period. Tasks and their indicators will be developed in the implementation plan, similarly to other spending reviews.

Savings

| <i>Task n°/area</i> | <i>Task</i> | <i>Savings (EUR mil.)</i> | <i>Measurable indicator</i> | <i>Responsibility</i> | <i>Period</i> |
|---|--|---------------------------|---|-----------------------|---------------|
| Regional education | Adopt measures to support the rationalization of the elementary school network. | 14 | The share of small elementary schools The share of pupils attending small elementary schools | MoESRS SR | 2018-2020 |
| Regional education | Cancel the possibility to acquire credits for a credit premium. | 46 | The termination of the credit premium scheme | MoESRS SR | 6/2018 |
| Higher education institutions and tertiary education research | Adopt measures to increase the share of Bachelor’s degree students who do not continue to Master’s degree (master’s or equivalent degree) studies. | 28 | The share of Bachelor’s degree students who continue to Master’s degree (master’s or equivalent degree) studies | MoESRS SR | 12/2018 |

Value

| <i>Task n°/area</i> | <i>Task</i> | <i>Value (EUR mil.)</i> | <i>Measurable indicator</i> | <i>Responsibility</i> | <i>Period</i> |
|---------------------|---|-------------------------|--|-----------------------|---------------|
| Regional education | More significant increase of teachers’ salaries at the beginning of their carrier by adjusting the consideration of years of professional experience. | 28 | The difference in the share of teachers’ salaries at the beginning of their careers to the salaries of employees with tertiary education | MoESRS SR | 01/2018 |

Value

| <i>Task n°/area</i> | <i>Task</i> | <i>Value (EUR mil.)</i> | <i>Measurable indicator</i> | <i>Responsibility</i> | <i>Period</i> |
|---|--|-----------------------------|---|-----------------------|--------------------------------|
| | | | before and after the change (percentage point) | | |
| Regional and tertiary education | Increase average salaries of pedagogical and expert staff or tertiary education teachers. | 1,102 | The share of teachers' salaries to average wages of employees with tertiary education. | MoESRS SR | 1/2021 |
| Regional education | Improve the link between teachers' quality and remuneration by adjusting the attestation procedure. | - | Adjustment of the attestation procedure (yes/no) | MoESRS SR | 6/2018 |
| Regional education | Increase the share of remunerations and personal premiums within the overall salary of teachers. | 46 | The share of remunerations in overall wages | MoESRS SR | 6/2018 |
| Regional education | Adopt measures to increase the share of practice in the preparation of future teachers. | 2 | The share of practice in pedagogical courses. | MoESRS SR | 1/2019 |
| Regional education | Increase the relevance and objectiveness of external testing and evaluate the education system through sample testing. | 2 | Performed research (yes/no) Refocus of external testing (yes/no) | MoESRS SR | 1/2019 |
| Regional education | Strengthen and enhance the offer of educational activities for teachers. | 2 | Ensured objectiveness (yes/no) The number of participants of professional development activities | MoESRS SR | 1/2019 |
| Higher education institutions and tertiary education research | Adjust conditions for the implementation of vocationally oriented Bachelor's degree programmes. | - | The number of vocationally oriented Bachelor's degree programmes. The share of students who study these programmes | MoESRS SR MoF SR | 01/2019 |
| Higher education institutions and tertiary education research | Reform the accreditation process and the accreditation authority in accordance with ESG 2015. | 1 | Adjusted accreditation process (yes/no) Full ENQA membership (yes/no) | MoESRS SR | 1/2018 (membership 01/2021) |
| Higher education institutions and tertiary education research | Introduce the so-called "informed peer review" – evaluation of higher education institutions' creative activity | 1 | Developed new binding rules for the evaluation of research (yes/no) | MoESRS SR | 1/2021 |
| Higher education institutions and tertiary education research | Increase the share of competitive grants (particularly SRDA and SGA) in public expenditure on research. | - | The share of competitive grants in the government transfers to public HEI | MoESRS SR | 2018 |

Management

| <i>Task n°/area</i> | <i>Task</i> | <i>Measurable indicator</i> | <i>Responsibility</i> | <i>Period</i> |
|--|---|---|---|---|
| Regional education | Render the personnel and operational demands of respective school types more real. | Adjusting the calculation of the qualification structure coefficient (yes/no) | MoESRS SR | 2018 |
| Regional education | Take into consideration the years of professional experience of pedagogical staff when allocating funding to schools. | Adjusted coefficients (yes/no) | MoESRS SR | 2019 |
| Investments | Develop and publish the investment plan of the Ministry of Education, regardless of the source of funding. | Published investment plan (yes/no) | MoESRS SR | 10/2017 |
| Investments | Develop and publish a feasibility study and analysis of costs and benefits for investments pursuant to the Resolution of the Government n°300/2017. | yes/no | MoESRS SR | 6/2018 |
| Investments | Evaluate the Accord project. | | MoESRS SR (submission) MoF SR (evaluation) | Within the JASPERS consultation process, not later than 30 days before the submission of a large project to IQR |
| Operation | Optimise the structure and activities of directly managed organisations. | Operating costs savings | MoESRS SR | 2018 |
| Information and communication technologies | Define and monitor costs and efficiency of information systems, including the Ministry's subordinate organisations. | Defined costs and efficiency indicators of information systems (yes/no) | MoESRS SR | 01/2019 |
| Information and communication technologies | Develop a migration plan for the IS to the government cloud. | Developed migration plan (yes/no) | MoESRS SR | 1/2018 |

Data and methodology

| <i>Task n°/area</i> | <i>Task</i> | <i>Measurable indicator</i> | <i>Responsibility</i> | <i>Period</i> |
|-------------------------|--|--|---|---------------|
| Expenditure and results | Ensure the link between administrative databases about secondary school and tertiary education graduates and prepare and conduct graduate and employer surveys. | Conducted graduate survey (yes/no) Conducted employer survey (yes/no) | MoESRS SR, Social Insurance Agency, Central Office of Labour, Social Affairs and Family | 1/2019 |
| Investments | Budgeting and subsequent update of all planned investments at the level of investment actions. | yes/no | MoESRS SR | 10/2017 |
| Investments | Develop a department methodology for cost and benefit analyses which will be based on the Public Investment Evaluation Framework and specifies parameters for the Ministry of Education. | yes/no | MoESRS SR | 01/2018 |

Analytical tasks

| <i>Task n°/area</i> | <i>Task</i> | <i>Responsibility</i> | <i>Period</i> |
|---------------------|--|-----------------------|---------------|
| Regional education | Implement a pilot survey on the attractiveness of the teaching profession. | MoESRS SR MoF SR | 1/2018 |
| Operation | Update the analysis of centralisation connected to supporting services and the optimization of space and the Ministry's subordinate organisations. | MoESRS SR | 1/2018 |

1 Results and outputs

- The results of 15-year-old pupils are in terms of an international comparison relatively low. The PISA International Assessment shows below-average and deteriorating results of Slovak pupils and a strong influence of the socio-economic background.
- It is difficult to measure the quality of higher education institutions, the substitute indicators indicate an internationally below-average result.
- Over a long period of time Slovakia has been registering a high share of youth with secondary education. The share of population with tertiary education is still relatively lower in comparison to the EU, within the category of young adults the difference decreases.
- The structure of graduates in comparison to OECD is significantly different, it features a high number of tertiary second degree education graduates and a low number of Bachelor's degree graduates.

The results of elementary school pupils (lower secondary education) are provided in the international comparison of the PISA Assessment of 15-year-old pupils. International testing of secondary school students' skills does not exist, national measurements do not enable to monitor trends. Outputs in regional education are measured by the share of pupils who successfully complete higher secondary education, but also by the share of pupils who become early school leavers.

A good result indicator of quality does not exist in tertiary education². The quality of tertiary education is approximated by substitute indicators such as the quality of their research output, which is measured by various citation indices, but also by the interest of students in studies abroad. The output indicator is the share of population with respective degrees of tertiary education.

Table 1: Result and output indicators of quality in education

| Type of indicator | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Objective 2020 | |
|--|---|------|------|------|------|------|------|------|------|----------------|-----|
| Regional education | | | | | | | | | | | |
| Result | PISA (average of achieved scores) | SK | 488 | | 472 | | | 463 | | 505 | |
| | | OECD | 497 | | 497 | | | 492 | | - | |
| Output | Population with secondary education (% within the age group of 20–24) | SK | 93 | 93 | 93 | 91 | 91 | 91 | 90 | | |
| | | EU | 79 | 80 | 80 | 81 | 82 | 83 | 83 | | |
| Output | Early school leavers (% within the age group of 18–24) | SK | 4.9 | 4.7 | 5.1 | 5.3 | 6.4 | 6.7 | 6.9 | 7.4 | 6 |
| | | EU | 14.2 | 13.9 | 13.4 | 12.7 | 11.9 | 11.2 | 11.0 | 10.7 | 10 |
| Tertiary education and research | | | | | | | | | | | |
| Result | Citations per researcher (%, 100 = EU average) | SK | 35 | 34 | 35 | 45 | 47 | 44 | 50 | | 70 |
| | | EU | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | 100 |
| Result | Success rate of HEI in acquiring foreign research grants (in EUR mil.) | SK | 6 | 6.2 | 6.1 | 5 | 5.9 | 5.7 | 6.5 | | |
| Output | The rate of the population with tertiary education (% within the age group of 30–34) | SK | 17.6 | 22.1 | 23.2 | 23.7 | 26.9 | 27 | 28.4 | 31.5 | 40 |
| | | EU | 32.3 | 33.8 | 34.8 | 36.0 | 37.1 | 37.9 | 38.7 | 39.1 | 40 |

Source: MoF SR, MoESRS SR, OECD, Eurostat

An indirect measurement of education's quality is represented by the employability of graduates, which is measured by the employment or unemployment rate, level of income or by monitoring the mismatch between graduates' education and employment. Secondary school graduates show a higher unemployment rate and a low mismatch

² OECD pilot tested the AHELO project (*Assessment of Higher Education Learning Outcomes*) which could bring such assessment, but its continuation remains unclear. The first data from the PIAAC Assessment of Adult Competencies is also available, however, recent tertiary education graduates represent only a small part of the sample.

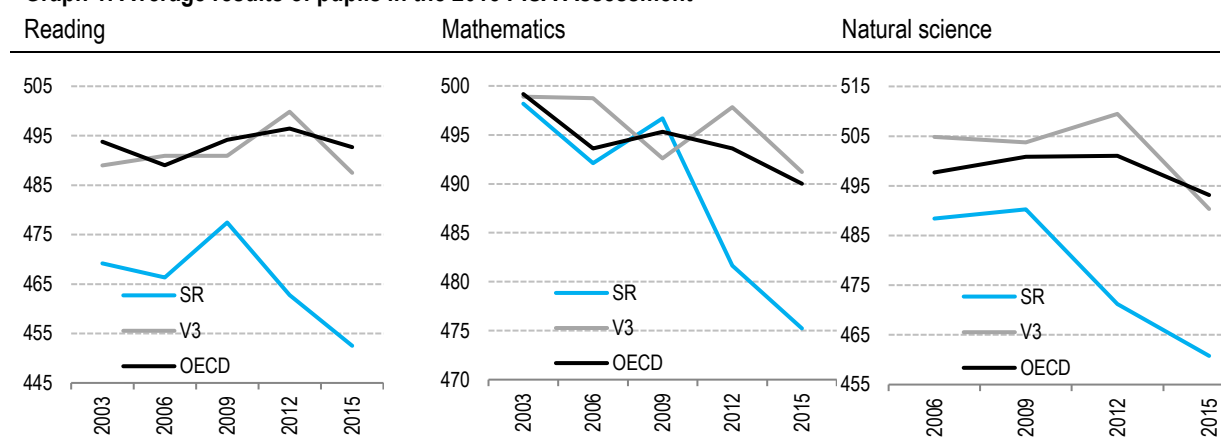
between education and employability. Whereas tertiary education graduates show a relatively higher mismatch and a lower unemployment rate.

The career tracking system of graduates is normally used to decrease the mismatch between labour supply and demand. Administrative data and survey data are used for this purpose abroad. The acquired information is used to decrease information asymmetry and regulate the system of education. In Slovakia administrative data are currently available in a limited capacity only at the level of higher education institution graduates. Therefore, it will be necessary to expand the link between administrative databases about secondary school and higher education institution graduates and also conduct systematic and periodic graduate and employer surveys.

Regional education

The 2015 PISA International Assessment of 15-year-old pupils shows below-average and deteriorating results of Slovak pupils and a strong influence of the socio-economic background. Average results of Slovak pupils (463 points) are significantly below the OECD average (492 points) and the target of 505 points. They have significantly deteriorated in all measured areas since 2009³. Since 2009, in reading they have fallen from the 25th – 29th position to the 32nd – 33rd position among 35 OECD countries, in terms of mathematics from the 13th – 22nd position to the 28th – 30th position and in terms of natural science from the 23rd – 29th position to the 30th – 32nd position.

Graph 1: Average results of pupils in the 2015 PISA Assessment

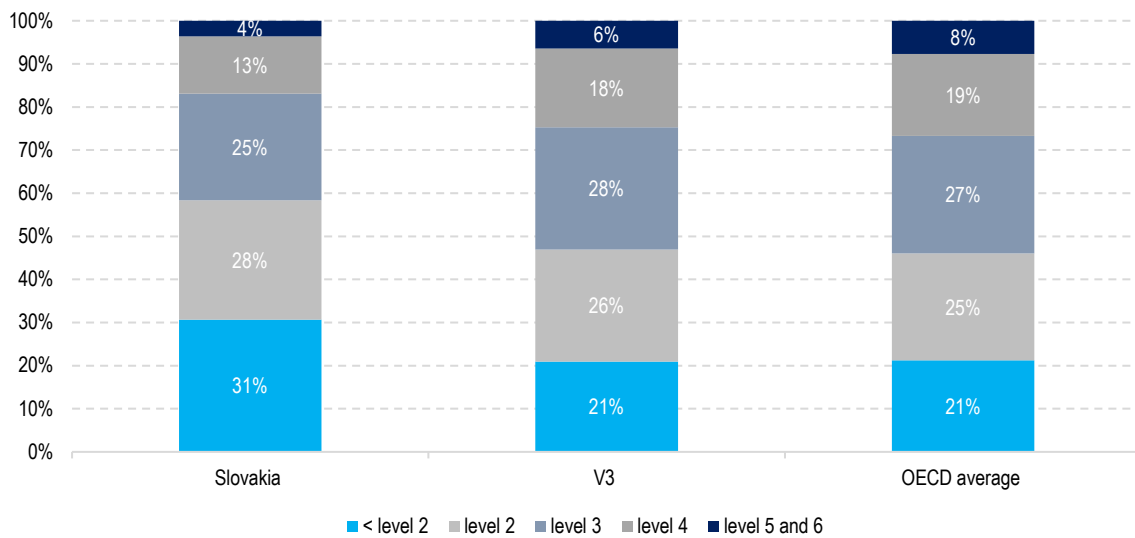


Note: PISA Assessment results are scaled as follows, the average of OECD countries in the first assessment was set to 500 points and the standard deviation to 100 points. The score within the following assessments is recalculated so the comparison in time can be monitored. Source: PISA, OECD

The share of pupils with excellent results has decreased and the share of pupils with poor results is high and rises. In terms of natural science, the share of pupils with the lowest performance increased from 26.9% in 2012 to 30.7% in 2015, the situation in mathematics and reading was similar. On the contrary, there are fewer and fewer excellent pupils, in terms of natural science their share decreased from 4.9% in 2012 to 3.6% in 2015. In total the share of poorest pupils in Slovakia accounts for more than 31%, which is 10 percentage points more than in the V3 and OECD countries. On the contrary, the best pupils account only for 4%, in the V3 countries it is 6% and in OECD countries 8%.

³ PISA 2009 and PISA 2015 results, available online at http://www.oecd-ilibrary.org/education/pisa_19963777.

Graph 2: The share of pupils in respective performance categories (2015, a higher level indicates a better result)



Source: OECD PISA 2015

Fourth graders lag behind in mathematics, natural science and they achieve internationally comparable results in reading. Slovak fourth graders achieved comparable results to the average of participating EU and OECD countries in the PIRLS⁴ assessment of reading literacy in 2011, the performance between 2007 and 2011 has not changed significantly. In the course of ten years Slovakia has moved by 17 points on the PIRLS scale. Fourth graders achieved a significantly worse result in mathematics than the average of participating countries in the TIMSS competency assessment in 2015. They have achieved a comparable result with EU pupils in natural science, however, a significantly worse one in comparison to OECD. There was a decrease in both areas in terms of score in comparison to 2011, in mathematics by 9 points and in case of natural science by 12.

The socio-economic situation of pupils affects their results more than in case of the OECD average. Every other pupil from the lowest socio-economic quartile achieves poor results, pupils with excellent results practically do not exist among them. As far as the group of pupils with the lowest socio-economic decile is concerned, Slovak pupils achieved the lowest score from all OECD countries in all assessed areas. Slovakia is among the worst OECD countries also in the category of so-called resilient⁵ students. While the OECD average represents 29% of resilient students of all pupils from the lowest quartile, and for example Finland has more than 40% of these students, in Slovakia only 17% of disadvantaged students is resilient. Therefore, it is important to monitor not only the average score, but supplementary indicators as well, which are provided by the PISA Assessment – particularly the share of pupils in the poorest risk group, or the influence of social environment on the result.

Table 2: PISA – supplementary indicators

| Type of indicator | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|-------------------|--|-------------|------|------|------|------|------|------|
| Result | PISA – basic skills | SK | 21 | | 27.5 | | | 31 |
| | % of pupils not achieving basic skills | OECD | 20 | | 20 | | | 21 |
| Result | PISA – influence of social environment | SK | 14.6 | | 24.6 | | | 16.2 |
| | % of the result clarified by social environment ⁶ | OECD | 14.0 | | 14.8 | | | 12.6 |

Source: OECD PISA

⁴ PIRLS and TIMSS at the NUCEM website (National Institute for Certified Educational Measurements), available online at http://www.nucem.sk/sk/medzinarodne_merania/project/7.

⁵ Resilient, <https://www.oecd.org/pisa/> – a pupil from the lowest social quartile who globally ends up in the best group after taking into consideration the socio-economic factors.

⁶ ESCS – index of economic, social and cultural status, more details at <https://stats.oecd.org/glossary/detail.asp?ID=5401>.

With regards to the complex nature of the topic and its overlap to other ministries, groups of persons at risk of social exclusion will be the subject of a separate spending review. The review will contain an analysis of groups' situation which emerged from the topics of the education, healthcare and social policy spending reviews. From the perspective of education, it will contain an analysis of disadvantaged groups' participation in education and educational results of disadvantaged groups.

National measurements do not enable to monitor quality trends, annual testing of 5th and 9th graders and the written part of the upper secondary school leaving exam (maturita) are designed as discriminatory tests. Their objective is to arrange students according to their performance, they do not enable a comprehensive comparison between years or the quality of schools⁷. **A frequently used tool for quantitative evaluation of educational institutions and pedagogical staff abroad is the measurement of the so-called value-added in education.** It is represented by the increase in knowledge, capacities, skills and other attributes which occurred by pupils as a result of the educational system's impact. Since June 2015, secondary school principals in Slovakia also have the results acquired by measuring the value-added at their disposal⁸. However, there are multiple restrictions – there is only one tested subject, not all pupils are included, and particularly it is not possible to separate the school's influence on pupil's results from other – social or economic – influences⁹.

Therefore, it would be appropriate to perform long-term research and assessment on samples which would be focused on the evaluation of trends, systemic changes and other aspects of the education system's operation. At the same time it is necessary to increase the emphasis on external testing to verify the capacity to apply knowledge and skills in actual situations and ensure their objectiveness as well.

Slovakia has an internationally high share of youth with secondary education. A big portion of them – up to two thirds – studies in vocational education, the EU average is approximately one half¹⁰. Secondary school graduates who do not continue their studies have a higher unemployment rate¹¹ in comparison to EU countries' average. Employed graduates have one of the lowest mismatch rates among education and employability¹².

The share of early school leavers is low in international comparison (7.4% in 2016), however, it has been increasing in recent years and is geographically concentrated¹³.

⁷ Since NUCEM annually publishes all test questions, they cannot be reused and used as a basis to re-scale the evaluation of tests in a way that would be annually comparable. More information on tests at <http://www.ucn.sk/skoly/subjektivne-alebo-objektivne-o-narodnych-testovaniach/>.

⁸ The results of the Testovanie 9 served as input data and output data were represented by the results of the external part of the upper secondary school leaving exam (maturita).

⁹ Available online at <https://www.minedu.sk/data/att/8594.pdf>.

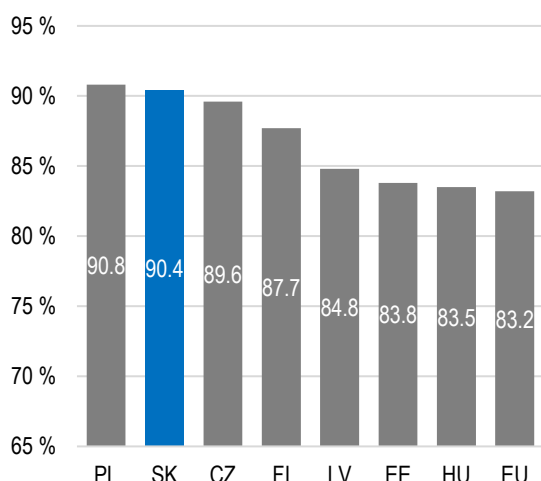
¹⁰ Available online at http://ec.europa.eu/eurostat/web/products-datasets/-/educ_uae_enrs04.

¹¹ The results of Slovak secondary school graduates' unemployment rate according to schools as well as courses is prepared twice per year by the Slovak Centre of Scientific and Technical Information (SCoSTI) in cooperation with the Central Office of Labour, Social Affairs and Family (COoLSaF). We can, therefore, state what percentage of graduates from a given school or field of study is unemployed, however, we do not know how many are employed and for what wage.

¹² PIAAC Assessment of Adult Competencies.

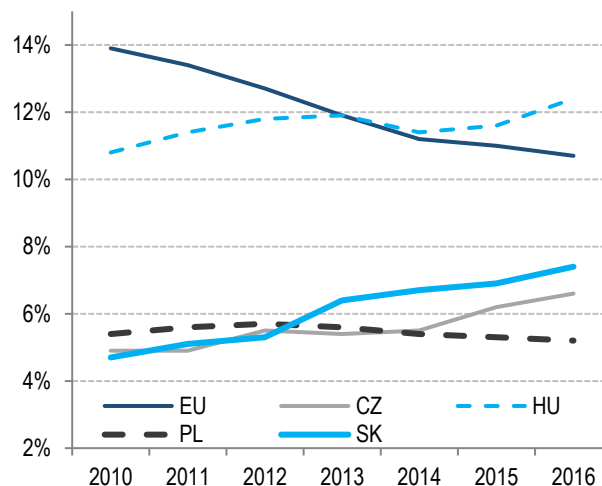
¹³ See the statistics on pupils leaving elementary schools and school year repetitions at http://www.cvtisr.sk/cvti-sr-vedecka-kniznica/informacie-o-skolstve/statistiky/statisticka-rocenka-publikacia/statisticka-rocenka-zakladne-skoly.html?page_id=9601.

Graph 3: Youth (20–24) with completed secondary school education (2016)



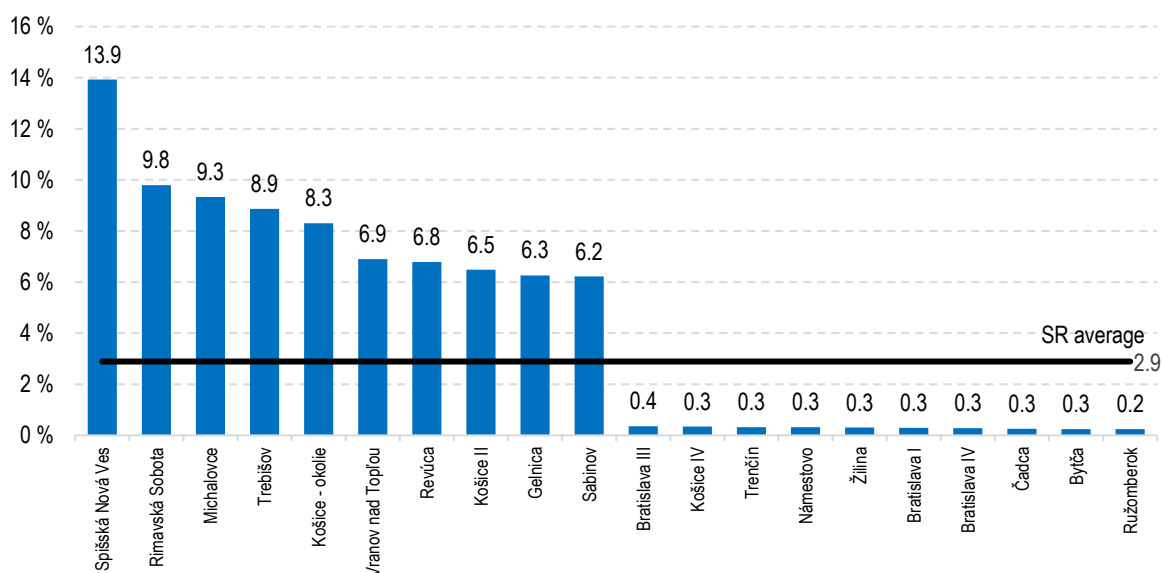
Source: Eurostat

Graph 4: The share of early school leavers (18–24)¹⁴



Source: Eurostat

Graph 5. Percentage of pupils repeating a school year in elementary school, the best and worst districts



Source: SCoSTI

Higher education institutions and tertiary education research and development

A standardised international quality measurement in tertiary education does not exist.¹⁵ A relatively lower quality of tertiary education is jointly indicated by several substitute indicators.

¹⁴ Youth, 18–24, who did not attain higher secondary education and do not continue their education.

¹⁵ A substitute indicator can be represented by rankings of higher education institutions as well. Their explanatory power is limited. See <https://www.minedu.sk/data/att/7887.pdf>. The quality at the tertiary education level is assessed by *The Ranking of National Higher Education* according to which Slovakia was 38th out of the total of 50 assessed countries, CR was 24th, Hungary 31st and Poland 32nd. <http://www.universitas21.com/article/projects/details/152/u21-ranking-of-national-higher-education-systems-2017>

The performance of Slovak research (including the SAS) significantly lags behind in comparison to other developed countries.¹⁶ The citation rate per researcher increases, however, it still reaches only half of the EU countries' average. The gap regarding the number of publications per capita concerns almost all scientific disciplines, including those with a strong representation in terms of the number of researchers. The contrast further intensifies if only publications in top-class scientific journals are assessed.

The success rate of higher education institutions in acquiring foreign grants has not significantly changed since 2009. An indicator of a low developed excellency in Slovak research is represented by the poor usage of European Research Council (ERC) grants. Since 2007 there has only been one Slovak project (specifically from the Institute of Chemistry of the SAS) among more than 7,000 funded projects from one of the most prestigious grant schemes in the world the ERC¹⁷. In the course of the same period, the ERC funded 25 project from the CR, 56 projects from Hungary or 680 projects from the Netherlands.

The decision to study abroad also represents an indirect indicator of higher education institutions' quality. Every seventh tertiary education student (14.2%) has in 2014 chosen to study at a higher education institution abroad. This accounts for the second highest share among OECD countries after the specific case of Luxembourg, up to 77% of them studied in the CR in 2014. Reasons can vary, within the survey of the SCIO agency¹⁸ in selected schools, students have in particular mentioned the higher quality of education.

A portion of people with tertiary education suffers from skill mismatch which generates social and individual costs, e.g. in the form of sunk costs of education. More than a fifth of people with tertiary education works at positions that do not require tertiary education qualification. However, the situation is different from the point of view of the respective degrees of education. Whereas in the case of employees with a tertiary second degree education 16% of them is re-qualified, in case of employees with only Bachelor's degree education up to 50% is re-qualified. Employees with only a Bachelor's degree education frequently work at positions that do not require tertiary education.

Despite the facts, tertiary education is still worth attending. Fewer tertiary education graduates are unemployed and they earn more, even though they work at positions where they often do not use their education. The unemployment rate among tertiary education graduates is half in comparison to the average population and tertiary education students earn up to 70–77% more than people with a higher secondary education. The diploma bonus thus belongs to the highest within OECD (see Box 1).

¹⁶ IDEA Study 12/2016 – International comparison of publication output quality regarding scientific disciplines in Slovakia, available online at https://idea.cerge-ei.cz/files/IDEA_Studie_12_2016_Publikacny_vykon_Slovenska/mobile/index.html#p=1. The comparison is based on WoS citation indices Science and Social Science. It covers a significant part of research production, not the entire production and it does not distinguish between tertiary education research and the SAS either.

¹⁷ Available online at <https://erc.europa.eu/projects-figures/erc-funded-projects/>.

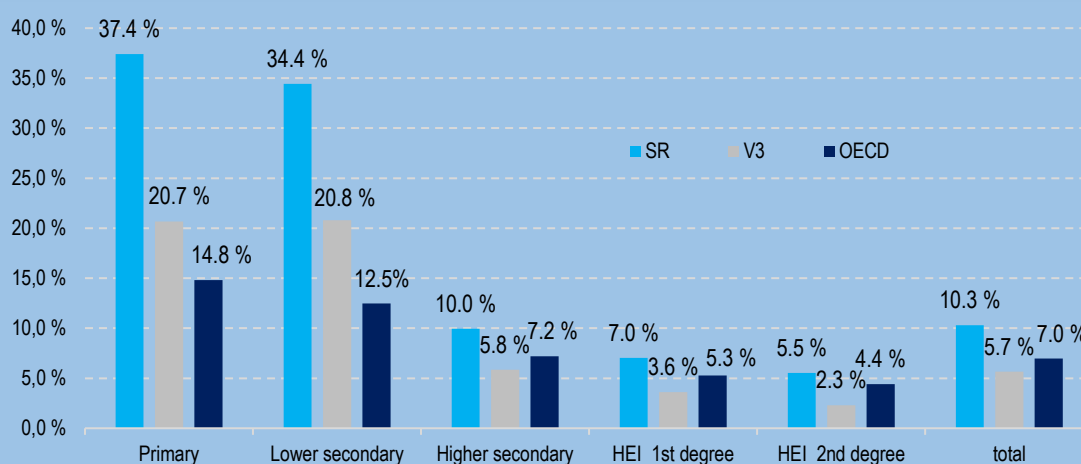
¹⁸ Slovaks in the CR, SCIO survey. Available online at https://www.scio.cz/download/KOMPLETNI_ZPRAVA_slovaci_v_CR.pdf.

Box 1: Is it worth studying?

Tertiary education translates into a lower unemployment rate and higher wages. A person with incomplete elementary education in OECD countries has approximately a twofold chance to be unemployed in comparison to the average, in Slovakia this ratio is as much as 3.6. The most significant step towards employment in Slovakia is represented by completing higher secondary education, completing elementary school has only a minimal impact.

Completing tertiary education has a large impact not only on the chances of finding work, but also on the level of wages. Slovakia is among countries with the biggest differences between income of persons with tertiary education and higher secondary education (difference up to 70%, in case of Master's degree (master's or equivalent degree) up to 77%), the difference between income of persons with higher secondary education in comparison to lower educated persons is also above-average (higher by 35%, the OECD average by 23%)¹⁹.

Graph 6: Unemployment rate according to attained education. Population 25–64 (2015)



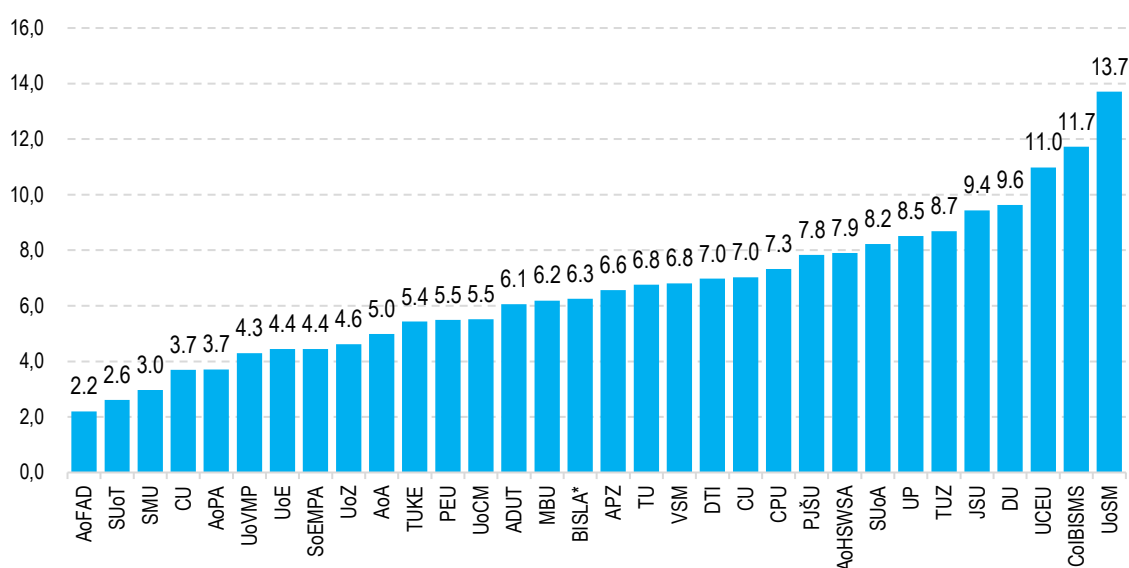
Source: Education at a Glance 2016, OECD

However, not all schools and fields of study are equally successful. At the end of 2015 the lowest number of unemployed graduates of tertiary secondary degree education was in medical and technical domains, the highest among graduates of security and agricultural courses²⁰. The unemployment rate of respective higher education institutions also varied, from low 2–4% in case of graduates from higher education institutions of art and technology to more than 10% in case of graduates from some private higher education institutions. Although this can be caused by local influences, a specific field of study, or personal preferences of students, such a high unemployment rate can also indicate an issue with the quality of schools.

¹⁹ Table A6.1 from OECD Education at a Glance 2016.

²⁰ COoLSaF defines the unemployment rate of graduates as the share of graduates from the last 2 years who are registered at the labour office, younger than 26 and did not have stable work prior to the registration. This includes graduates from all 3 degrees of studies, however, only full time and not external students. The statistic is calculated on the date of 31.12. SCoSTI material: http://www.cvtisr.sk/buxus/docs/V3/nezamestnanost/2015_abs_V3_nezam_web.pdf.

Graph 7: Unemployment rate of graduates according to higher education institutions (2015)



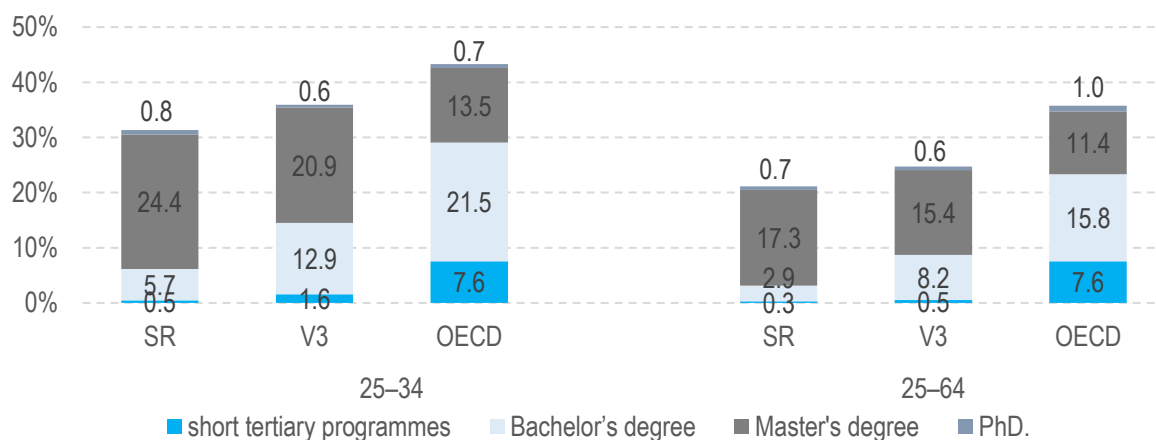
* can be biased due to the low number of graduates

Source: SCoSTI

The share of population with tertiary education in Slovakia is in comparison to OECD countries still low, however, among 30–34-year-old persons it has doubled in the course of the last 10 years. In 2014 the share of young people who are expected to complete their tertiary education exceeded 40%, the objective of the EU 2020 Strategy (Graph 10).

In comparison to other OECD countries, Slovakia has a low share of young adults completing their studies with a Bachelor's degree, a high share of students continues with their studies at the second degree. Short tertiary programmes that are completed by approximately 8% of young people in OECD countries are only pursued by half a percentage point of young population in Slovakia²¹ If a similar share of students as in the case of OECD countries continued to the second and third degree, approximately EUR 48 mil. would be released, which represents one fifth of government funds provided to higher education institutions for education and social support of students.

Graph 8: The share of the population 25–34 according to the highest attained tertiary education (2015)



Source: Education at a Glance 2016, OECD

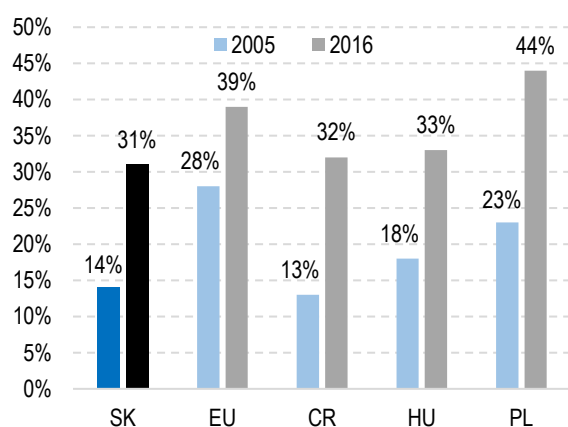
²¹ OECD Education at a Glance 2016, Table A1.2.

If the structure of students as well as the share of tertiary education graduates in Slovakia corresponded to the EU and OECD average, it would translate into a release of approximately EUR 28 mil. The change of structure would bring a decrease in the number of secondary degree students by approximately 30% and a similar decrease in case of postgraduate students. The number of Bachelor's degree students would stay at approximately the same level and the number of tertiary programme students would increase. If grants, that public higher education institutions currently receive for teaching, operation or social support of students²², changed in the same proportion, it would translate into a release of approximately EUR 28 mil., including the costs for short tertiary programmes²³.

It certainly represents a simplified estimation that features multiple limitations. The calculation for example does not take into consideration the issue of economic loss in the form of sunk costs of education. Potential costs and benefits also depend on the particular implemented solution. It also considers short tertiary programmes that are not part of tertiary education in Slovakia. In addition, the universal approach to decreasing the share of Master's degree (master's or equivalent degree) graduates does not take into consideration the issue of graduates' structure regarding the skills mismatch on the labour market, which is relatively significant in Slovakia.

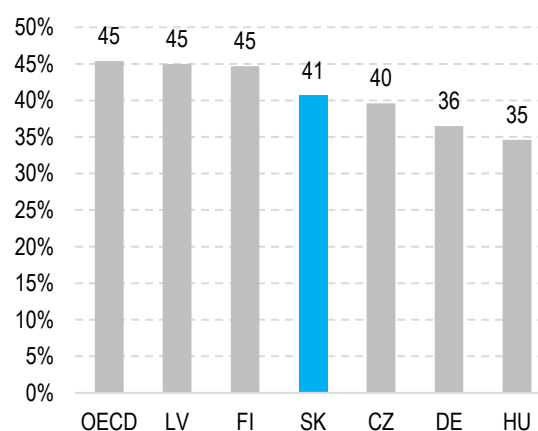
The final report proposes to adopt measures to increase the share of Bachelor's degree students who do not continue to Master's degree (master's or equivalent degree) studies. A significant signalling role can be played by the government and public sector by adjusting qualification criteria for the positions they fill. The increase of the number of Bachelor's degree students must be accompanied by an adequate change in courses in order for Bachelor's degree graduates to be able to find corresponding employability on the labour market. Therefore, measures for the creation of vocationally oriented Bachelor's degree programmes will be prepared.

Graph 9: The share of the population 30–34 with tertiary education (2005 and 2016)



Source: Eurostat

Graph 10: The expected share of persons with tertiary education from the current youth (2014)



Source: Education at a Glance 2016, OECD

²² Expenditure on research and development, specifics or development are preserved in current amounts within the recalculation.

²³ Costs of studying according to the cost ratio of tertiary education programmes in OECD countries.

2 Expenditure

- Slovakia provides 4% of GDP²⁴ (EUR 3.4 bil., which accounts for approximately 10% of total public expenditure) for education in 2017. It represents approximately 1% less of GDP in comparison to the EU average. The difference has been decreasing in recent years. The share of private funding is similar to the OECD average.
- The review assesses expenditures on regional and tertiary education in the annual amount of 3% GDP.
- The public administration budget for 2017–2020 expects that Slovakia will reach the EU average in terms of the amount of public expenditure in proportion to total public expenditure in case the trends in the EU continue unchanged.
- In addition to the increase of expenditures, other reforms are necessary to achieve the desired improvement in the quality of education. The review focuses on short-term and expenditure measures.

Slovak education educates and raises nearly one million pupils and students who are taught by nearly 90 thousand teachers. In 2016 the expenditure on education accounted for approximately EUR 3.2 bil., public funds²⁵ contributed EUR 2.9 bil. The government spent approximately 2.2 billion from the budget and municipalities and HTU contributed another 700 million from their budgets²⁶. Three hundred millions came to education from other sources – from parents and pupils as school fees, food allowances, various fees etc.²⁷.

2.1 Expenditure on education

In 2017 Slovakia provides 4% of GDP²⁸ of public expenditure for education which represents approximately 1% less of GDP in comparison to the EU average. The difference has been decreasing in recent years and an increase to 4.3% of GDP is expected until 2020.

Expenditure as a share in total public expenditure will increase from current 9.8% to 11.2% in 2020, which will lead to a higher share in comparison to the current share in EU countries (Graph 12). However, the difference in public education expenditure measured as the share of GDP remains, considering lower total public expenditure in Slovakia when compared to the EU average.

In addition to the increase of expenditures, other reforms are necessary to achieve the desired improvement in the quality of education. In addition to the universal increase of teachers' salaries the priorities should include the status of young teachers, link between teachers' quality and remuneration, including a bigger share of personal premiums and remuneration within the wage, accreditation process of higher education institutions and the improvement of data on pupil and graduate results.

²⁴ According to the COFOG methodology which classifies every public expenditure according to its intended use.

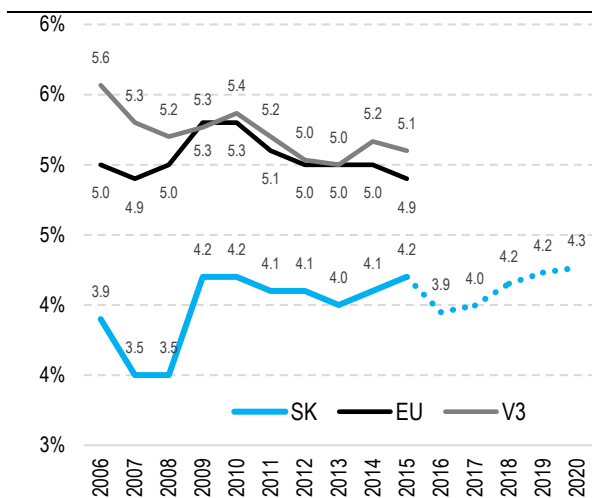
²⁵ They include expenditure from the government budget, municipality and HTU budgets, including funding from EU funds.

²⁶ Within the so-called original competences or by supplementary financing of transferred competences at schools they establish.

²⁷ Does not include private expenditures on school fees or food allowance at private NS, HEI, EAS.

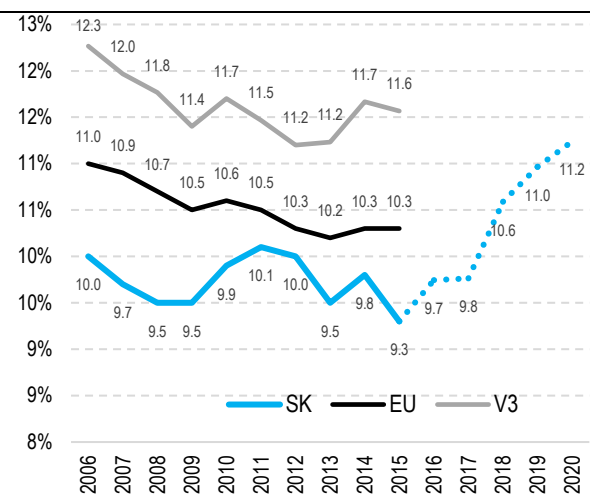
²⁸ According to the COFOG methodology which classifies every public expenditure according to its intended use.

Graph 11: Public expenditure on education in % of GDP (2006–2015 and the prognosis until 2020, COFOG methodology)



Source: Eurostat, BIS

Graph 12: Public expenditure on education in % from total public expenditure (2006–2015 and the prognosis until 2020, COFOG methodology)



Source: Eurostat, BIS

The base scenario of public expenditure on education, research and sport (Table 3) estimates a total increase from 4.2% of GDP (EUR 3,354 mil.) in 2016 to 4.3% of GDP in 2020 whilst preserving the expenditure level according to the Stability programme 2017–2020. Expenditure included in the review’s mandate (regional and higher education institutions and tertiary education research, including EU funds) will increase from 2.9% of GDP in 2016 to 3.1% of GDP in 2020.

More than a half of public funds in education heads to regional education (pre-primary, primary, secondary education²⁹) including transfers to private and religious schools. In 2016 regional education accounted for approximately 55% (EUR 1.9 bil.) of public expenditure on education. The share of the government budget on regional education funding was EUR 1.5 bil, local governments contributed another approximately 400 million (11% in total) in terms of original competences.³⁰ Tertiary education accounted for approximately EUR 700 mil. (20%) of total expenditures on education, the contribution of the government budget represented EUR 500 mil.

²⁹ The definition is available in the interim report of the education spending review, Box 1, p. 11.

³⁰ Within the so-called transferred competences HTU, cities and municipalities perform tasks entrusted by the government which are funded from the government budget. In the domain of education this represents the establishment of elementary and secondary schools. In addition, the government funds private and religious schools and special schools. Regional and local governments have the so-called original competences at their disposal which are financed from their own funds. In the domain of education, it is particularly related to the establishment of nursery schools, elementary art schools, language schools next to elementary schools, children school clubs, leisure centres, dormitories, school catering facilities and education in nature.

Table 3: The base scenario of expenditures on education, research and sport³¹

| Subject areas | BS | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2016 S | 2017 BS | 2018 BS | 2019 BS | 2020 BS |
| Pre-primary education | 314 | 333 | 346 | 360 | 376 |
| proportion of pre-primary education GB | 5 | 5 | 6 | 6 | 6 |
| proportion of pre-primary education orig. competences | 308 | 328 | 340 | 354 | 370 |
| Primary education | 470 | 503 | 521 | 543 | 567 |
| proportion of primary education GB | 453 | 486 | 504 | 525 | 549 |
| proportion of primary education orig. competences | 16 | 17 | 17 | 18 | 18 |
| Secondary education | 921 | 969 | 1,001 | 1,042 | 1,088 |
| proportion of secondary education GB | 873 | 932 | 963 | 1,003 | 1,048 |
| proportion of secondary education orig. competences | 48 | 38 | 38 | 39 | 40 |
| Religious school transfer | 83 | 85 | 88 | 92 | 96 |
| Private school transfer | 67 | 68 | 71 | 74 | 78 |
| Ancillary services in education outside PHEI | 214 | 317 | 275 | 284 | 295 |
| proportion of ancillary services in education GB | 47 | 148 | 99 | 102 | 104 |
| proportion of ancillary services in education orig. competences | 167 | 170 | 176 | 183 | 191 |
| Education not defined according to level | 194 | 199 | 207 | 216 | 226 |
| proportion of education not defined according to level GB | 10 | 10 | 10 | 11 | 11 |
| proportion of education not defined according to level orig. compet. | 184 | 189 | 196 | 205 | 215 |
| Others | 68 | 62 | 64 | 65 | 67 |
| Tertiary education | 705 | 723 | 746 | 774 | 805 |
| proportion in review | 523 | 537 | 555 | 576 | 600 |
| Research and technology outside tertiary education | 137 | 137 | 141 | 146 | 152 |
| Sport including the National Stadium | 48 | 91 | 113 | 51 | 53 |
| Administration in the MoESRS | 25 | 27 | 28 | 28 | 30 |
| EU funds on education | 187 | 196 | 291 | 520 | 520 |
| Total | 3,431 | 3,711 | 3,892 | 4,196 | 4,352 |
| % of GDP | 4.2% | 4.4% | 4.3% | 4.4% | 4.3% |
| proportion of COFOG9 | 3,011 | 3,241 | 3,388 | 3,739 | 3,878 |
| % of GDP | 3.7% | 3.8% | 3.8% | 3.9% | 3.8% |
| proportion in mandate | 2,334 | 2,548 | 2,672 | 2,995 | 3,101 |
| % of GDP | 2.9% | 3.0% | 3.0% | 3.1% | 3.1% |
| proportion of orig. competences | 731 | 748 | 775 | 806 | 841 |

The review identified a potential for savings in the total of EUR 88 mil. The achievement of savings will be gradual, table 4 indicates it for the 2018–2020 period. Particular tasks and their indicators will be developed in the implementation plan, similarly to other expenditure reviews.

Table 4: Identified measures – savings

| Measure | Envelope 2017 (EUR mil.) | Savings (EUR mil.) | | | Potential annual savings (EUR mil.) |
|--|--------------------------|--------------------|------|------|-------------------------------------|
| | | 2018 | 2019 | 2020 | |
| Adopt measures to support the rationalization of the elementary school network. | 66 | 1 | 3 | 8 | 14 |
| Cancel the possibility to acquire credits for a credit premium. | 46 | 0 | 5 | 10 | 46 |
| Adopt measures to increase the share of Bachelor's degree students who do not continue to Master's degree (master's or equivalent degree) studies. | 251 | 2 | 7 | 12 | 28 |

³¹ More information on functional classification: <https://www.minedu.sk/cofog-klasifikacia-vydavkov-verejnej-spravy/>.

The review's assignment is to efficiently allocate additional funds heading to education as well as search for the scope to improve the value for money by relocating expenditures from less efficient policies to more efficient ones. The review, therefore, proposes several measures that will translate into savings. On the other hand, it offers measures to increase the value that have a negative impact on the public administration budget.

Table 5: Identified measures – value

| Measure | Envelope 2017 (EUR mil.) | Expenditure (EUR mil.) | | |
|---|--------------------------------|---------------------------|-------|-------|
| | | 2018 | 2019 | 2020 |
| Increase average salaries of pedagogical and expert staff or tertiary education teachers*. | 1,722.9 | 103.4 | 212.9 | 329.0 |
| Increase teachers' salaries in regional education at the beginning of their career. | 0 | -28 | -29.7 | -31.5 |
| Reform the accreditation process and the accreditation authority in accordance with ESG 2015. | - | -1 | -1 | -1 |
| Link databases about graduates, conduct graduate and employer surveys. | - | -1 | -1 | -1 |
| Strengthen and enhance the offer of educational activities for teachers | - | -2 | -2 | -2 |
| Increase the relevance and objectiveness of external testing and evaluate the education system through sample testing | - | -2 | -2 | -2 |

* including secondary schools and higher education institutions falling under the Ministry

Box 2: BS calculation methodology for 2017–2020

The base scenario represents an analytical tool to quantify the expenditure envelope to which the measures in the final report of the spending review will be quantified.

The basis for the 2017–2020 BS is the actual spending of 2016, GB funding or local governments' own funds. Sources of expenditures represent budgetary funds from the MI and MoESRS ministries and public and ministerial higher education institutions. The level of expenditure in the base scenario is influenced by macroeconomic development and the communicated discretionary measures.

The base scenario will be updated with a macroeconomic prognosis for the public administration budget for 2018–2020 and the resulting impacts in the scenario of unchanged policies or in measures included in the base scenario. The review will produce proposals of measures that could release sources of funding.

The base scenario takes into consideration the following measures:

- The construction of the National Football Stadium,
- The effect of the teachers' salary increase in 2016.

Base scenario for education:

Transfers from GB to ensure the operation of education in selected areas (pre-primary, primary, secondary education) as well as the transfer for religious and private schools were indexed by a combination of wage growth in the private sector and inflation (CPI) – 80% of the index weight belonged to the wage growth and 20% to inflation (according to the school cost ratio for personal and operation expenditure). In case of the COFOG classification for education where the expenditure to respective economic categories was known, personal expenditure was indexed by the wage growth rate in the private sector and goods and services were indexed by the expected inflation rate.

The transfer from the MI SR to municipalities in the domain of education for the transferred execution of government administration (COFOG group 098) was divided between primary education and secondary education according to the number of pupils in respective degrees of primary education. Expected capital expenditure is based on the average from the last 5 years, in case of local governments on the average from the last 3 years due to non-existent data. Other expenditures are indexed by the combination of wage growth in the private sector and inflation (CPI) according to their intended use. Items in whose case the legislative development and communicated measures are known in advanced, are taken into consideration within the BS.

Approximately 6.5% of expenditure on education in the 2007–2016 period came from EU Structural Funds and co-financing, the majority of the funding was created in some contributory and budgetary organisations of the Ministry of Education. Within the 2007–2013 programming period it was in particular the Operational Programme (OP) Education and OP Research and Development, from which approximately one billion Euro were depleted during 2007–2016. Less than a half of these funds headed to regional and tertiary education, the rest was directed to other educational activities. In addition, more than EUR 250 mil. was depleted for research and development.

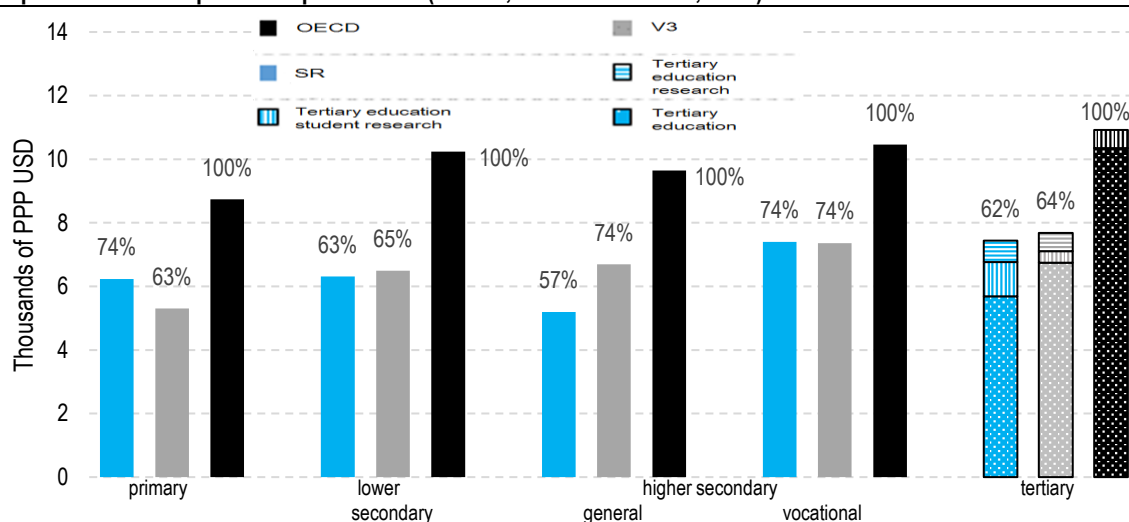
Table 6: Distribution of expenditure on education, research and development according to source (2007 – 2016, % or EUR mil.)

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total |
|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| EU + co-financing | 1% | 2% | 5% | 7% | 5% | 5% | 9% | 11% | 13% | 1% | 6% |
| GB | 99% | 98% | 95% | 93% | 95% | 95% | 91% | 89% | 87% | 99% | 94% |
| Total (EUR mil.) | 1,585 | 1,698 | 1,892 | 1,942 | 1,878 | 1,937 | 2,068 | 2,180 | 2,335 | 2,152 | 100% |

Source: BIS

Approximately one third of EU and co-financing funds during 2007–2016 was used for capital expenditure, 66% of which headed to higher education institutions and 25% to research. Funds were depleted even in 2016, EU funds and co-financing during 2007–2016 accounted for almost 60% of all capital expenditure on education.

Graph 13: Annual expenditure per student (in USD, PPP recalculated, 2014)



* The percentage indicates the share of funds in comparison to OECD.

Source: Education at a Glance, OECD, 2017

Expenditure per pupil slightly increases due to the decrease of school population, however, it is lower than the OECD average and comparable with the V3 average. Slovakia spends less per pupil³² than the average of OECD countries in all degrees of education, while the biggest difference is in the funding of elementary schools'

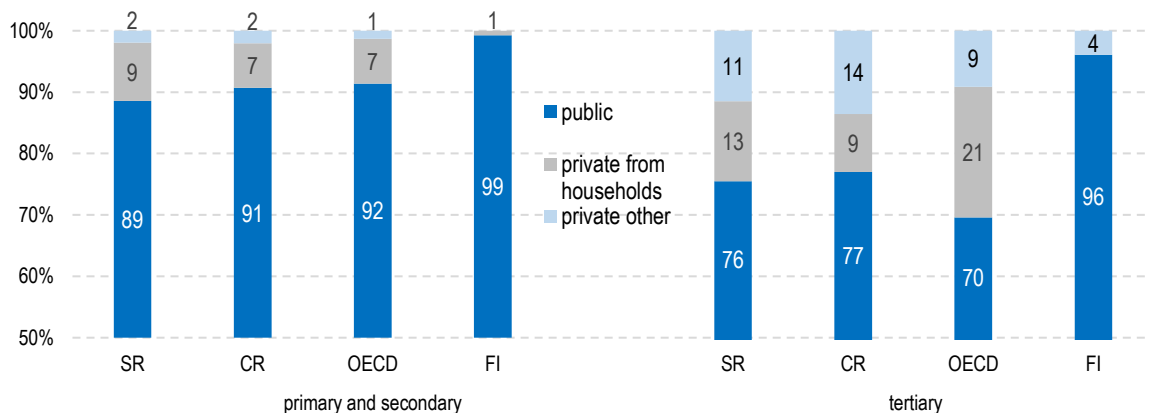
³² After considering different price level in respective countries.

secondary degree and grammar schools. When comparing education funding only, without services for students and research, higher education institutions also lag behind V3.

Slovakia is not significantly different from OECD countries in terms of the public and private funding ratio. Public funding accounts for approximately 85% of all expenditures on education. In case of primary and secondary education, the share is almost identical when compared to the CR as well as the OECD. The share of private funding in tertiary education is slightly lower in comparison to the OECD and almost identical to the CR.

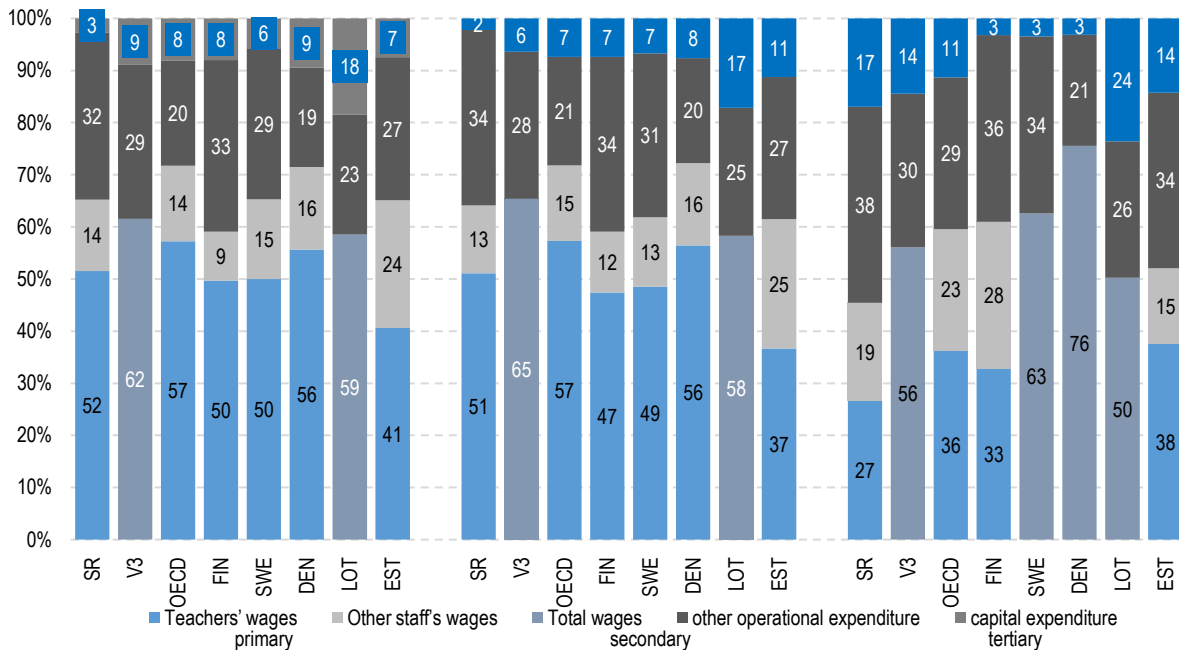
The comparison with OECD countries shows relatively higher expenditures on school operation, material and student services in Slovakia and lower expenditures on wages and social contributions of teachers and other staff. Up to 98% of all expenditures in regional education is represented by operational expenditure from which teachers' wages and social contributions account for 52%.

Graph 14: Public and private funds ratio on education (2014)



Source: Education at a Glance 2017, OECD

Graph 15: Distribution of expenditure on education (from public and private funds, 2015)



Source: Education at a Glance, OECD, 2017

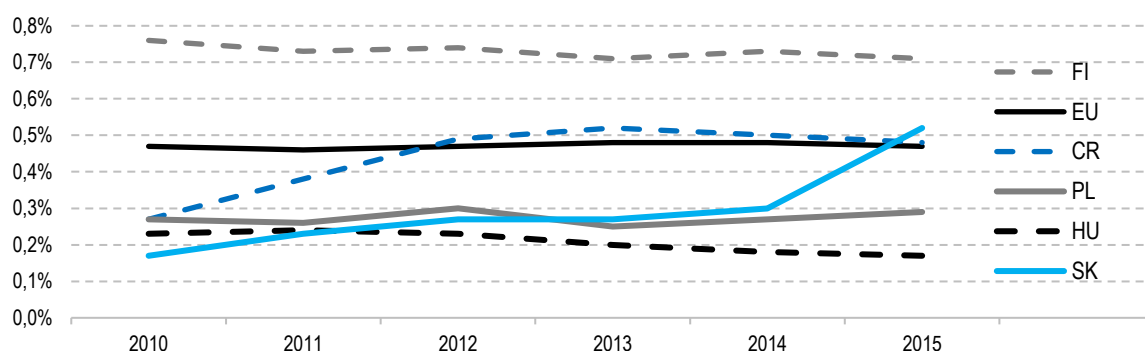
Combined private and public expenditure on tertiary education in 2014 reached 1.1% of GDP, which is less than the OECD average (1.5%). Slovakia, therefore, belongs to the end of the OECD rating, behind neighbouring Czech Republic or Poland (both 1.2% or 1.3%). Expenditure on tertiary education represents 27% of all expenditures on education, which is comparable with the majority of similar countries³³.

Average expenditure per tertiary education student in Slovakia reaches approximately two thirds of the OECD average. In proportion to GDP per capita the expenditure per student has experienced a long-term decreasing tendency since 2008 and has collapsed significantly below the OECD average. The decrease in the number of students since 2008 has reversed this development and the expenditure per student in proportion to GDP is now similar to V3 countries and the OECD average. In 2014 Slovakia's public expenditure on higher education institutions accounted for 1% of GDP, which is less than the OECD average (1.3%) but more than the V3 average (0.9%).

Government transfers represent the main source of funds for 20 Slovak public higher education institutions (PHEI)³⁴, however, the significance of private funds is increasing (they account for approximately one fifth of total expenditures). Public funding together with structural funds represent 77% of PHEI income³⁵, which is a share comparable to other countries with a similar funding model³⁶

Expenditure on research and development at higher education institutions since 2014 has accounted for approximately 0.3% of GDP. In 2015 it has reached the level of 0.5% of GDP, mainly thanks to the significant depletion of money from EU funds, which approximately represents the average of EU countries. As far as the number of researchers per capita is concerned, Slovakia finds itself close to the average level of all OECD countries. Grant funding accounts only for 20% of total funding.

Graph 16: Expenditure on research and development in tertiary education, 2015 (in % of GDP)



Source: Eurostat

³³ OECD, [Education at a Glance 2017](#)

³⁴ In 2002 the majority of state higher education institutions transformed into public higher education institutions (PHEI). In addition to PHEI, three state-run higher education institutions and 12 private higher education institutions operate in Slovakia in the academic year 2016/2017, which are not subject of this commentary.

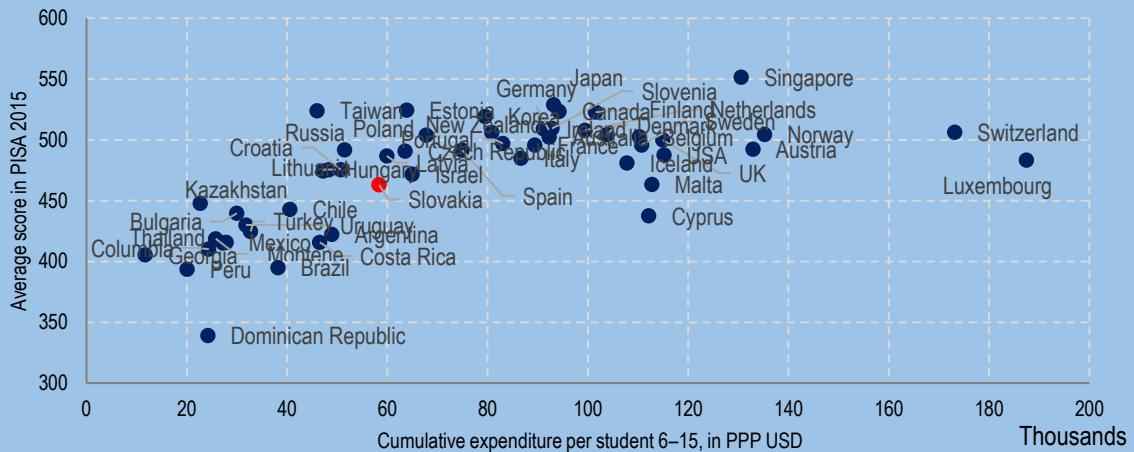
³⁵ The 2015 annual report on the state of tertiary education, available online at <https://www.minedu.sk/vyrocnne-spravy-o-stave-vysokeho-skolstva/>.

³⁶ OECD, [Education at a Glance 2016](#), Tab. B2.3, available online at <http://www.oecd.org/education/skills-beyond-school/education-at-a-glance-2016-indicators.htm>; MoESRS SR 2015: [Kvalita a zodpovednosť](#), p. 243, 246, available online at https://vysokoskolacidopraxe.cvtisr.sk/files/zbornik_2015-kvalita-zodpovednost.pdf.

Box 3: The more money, the better results?

The opinion on the relation between expenditure on education and pupils' results is not definite among economists. Meta-analyses that examine the relation between school funding (the ratio of pupils per teacher, expenditure per student and others) and pupils' results indicate only a negligible influence (Hanushek, 1997). On the other hand, higher expenditure can for example influence groups of pupils who benefited the most from additional funding (Burtless, 1996). However, the consensus remains that the manner of expenditure redistribution is above a certain minimum level of total funding and at least as important as the total volume of funds in education itself (OECD, 2012)³⁷.

Graph 17: Expenditure on education and the average PISA score (2015)



Source: PISA Vol 1, OECD and recalculations of the VMC

Between 2005 and 2013 expenditure per student has increased in Slovakia by almost 2,500 USD³⁸, while the results of pupils have deteriorated. One of the explanations is the fact that the reforms in educational systems are often complex and their effect is displayed only after several years. In most cases pupils' results cannot be measured immediately before and after changes of legislation, curricula or other aspects of teaching. As the examples from Argentina (Galani et al., 2002) or other countries (Gillies, 2010) indicate, changes in educational systems are often displayed on later cohorts of pupils.

³⁷ The comparison of results and expenditure features methodological restrictions and serves rather as an illustration. Expenditures which do not have a direct influence on education (in case of Slovakia also catering, administrative costs for the operation of the Ministry of Education etc.) are included as well.

³⁸ Recalculated using the purchasing power parity.

3 Regional education

- **A key element for the quality of education will be the improvement of teachers' status. Salaries of Slovak teachers increase, however, they are still low in international comparison, which negatively influences the attractiveness of the teaching profession. The increase of teachers' salaries represents one of the expenditure priorities of the government of SR. According to the Government's Statement of Policy the increase of wages should increase their share from 63% to 67% of the income of employees with tertiary education. The OECD average is 88%. The emphasis should be put on teachers at the beginning of their career and on a more significant remuneration for verifiable quality.**
- **There is scope for a more targeted and accurate redistribution of funds among individual schools. The school funding system does not take into consideration the personnel and economic demands of school operation sufficiently enough, e.g. it does not take into consideration teachers' years of professional experience while the salary significantly depends on them.**
- **Slovakia has a similar structure of elementary schools in terms of their size in comparison to other countries, although due to the negative demographic development the network is less efficient than in the past. The minimum size limit of an elementary school in the process of integration into the network is formal and minimum class size limits were not significantly reflected yet. The rationalization can be supported by the reimbursement of transport costs or the provision of school buses. As far as rationalization is concerned, it is necessary to consider not only financial savings, but also potential impacts on quality, inclusion and access to education.**

The main objective of policies in regional education is to enable children and pupils, through education, regardless of their social situation, to acquire education, competences and skills, teach them to develop and cultivate their personality and acquire and strengthen the respect for human rights and fundamental freedoms. Its main task is to enable the acquiring of all lower levels of education i.e. all levels of education except tertiary education. More specifically the pre-primary degree of education, primary degree of education and several types of lower secondary and higher secondary degree of education.

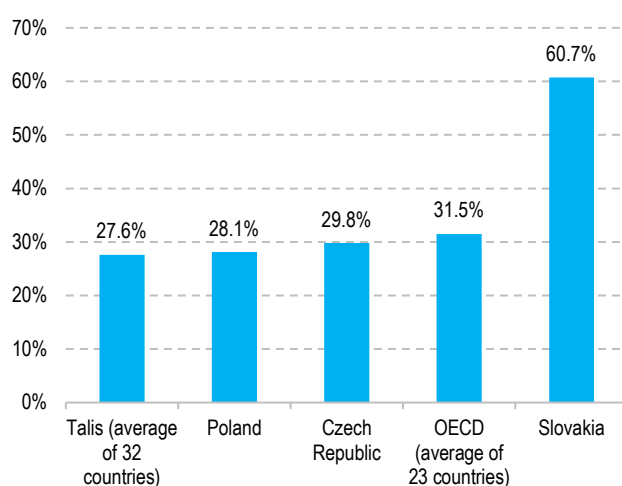
Regional education as a system includes multiples segments. The review mainly deals with the provision of education in elementary and secondary schools. Teachers represent the key factor as far as the increase in the quality of education is concerned. Therefore, the review deals in more detail with salaries which represent the largest item in terms of expenditure in regional education and are crucial for the attractiveness of the teaching profession. In addition, it deals with the link between teachers' quality and remuneration, preparation of future teachers and their professional development. Measures in stated areas represent a potential for benefit of the highest value for additional or currently allocated funds. With regards to the negative demographic development, one of the most discussed topics is the cost efficiency of the elementary school network. The review, therefore, further deals with the possibilities of rationalizing the elementary school network, where due to the significant decrease of school population savings are expected, whilst preserving the same or providing better access to education. In addition to the sum of expenditure, the manner of fund redistribution is also important for the results of educational systems. The review, therefore, deals with the elementary and secondary school funding system. A more just and accurate funding has the potential to bring better value whilst preserving an unchanged envelope of total funding.

3.1 Teachers' salaries and the remuneration system

Teachers' quality belongs to the key factors that determine the quality of education. However, the provision of quality teachers will not be possible without a motivating remuneration system which will be able to adequately reward the work of teachers in education as well as increase the attractiveness of the teaching profession.

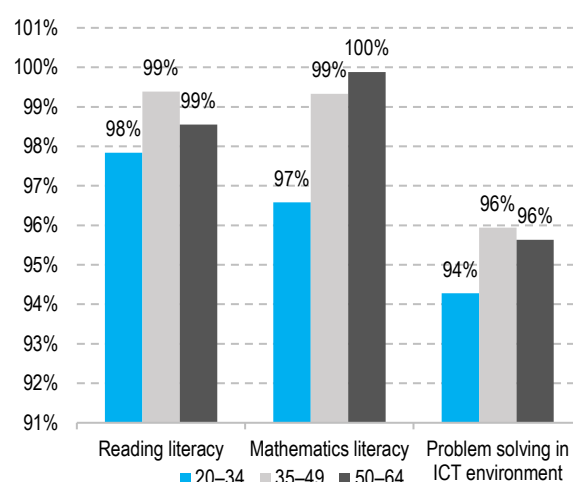
In Slovakia the teaching profession is not attractive. International studies point to the importance of attractiveness in connection to the teaching profession in Slovakia. According to the OECD TALIS Survey³⁹ 60% of Slovak teachers believe that their profession is not socially appreciated enough, which represents the second highest share among all participating countries (the average of 23 OECD countries was approximately 31%). In addition to the international survey it will be necessary to conduct a pilot survey on the attractiveness of the teaching profession in order to systematically grasp the issue. Possible consequences related to the low appreciation of the teaching profession, resulting for example in the lack of interest by high quality candidates, can eventually indicate the fact that according to the OECD PIAAC Survey⁴⁰ young teachers achieve worse results in reading literacy, mathematics literacy and problem solving than their peers with tertiary education. This state is unsatisfactory also from the perspective of international comparison⁴¹.

Graph 18: The share of teachers who certainly do not agree with the claim that their work is appreciated within society (%)



Source: OECD TALIS

Graph 19: The relative score of teachers in comparison to employed peers with tertiary education



Source: EPI based on PIAAC

The salaries of Slovak teachers have been increasing in recent years, however, they still lag behind in international comparison. The relative level of teachers' salaries in accordance with best international practice is objectively expressed in the relation to salaries of employees with tertiary education within the economy. In 2015 pedagogical staff working at the lower level of secondary education earned 62%, including all premiums, of the average salary of employees with tertiary second degree education⁴². The average of OECD countries with available data is 88%. Only teachers in the Czech Republic earned a lower share, on the contrary, a higher portion was recorded in Poland and Hungary.

³⁹ The International OECD Study TALIS was conducted in 2013. The final sample in case of SR consisted of 195 schools with 3,548 teachers teaching at the second degree of elementary schools and at the lower degree of eight-year grammar schools.

⁴⁰ The data was collected in 2011–2012. Adult citizens 16–65 were tested. The size of the sample was 9,280 persons.

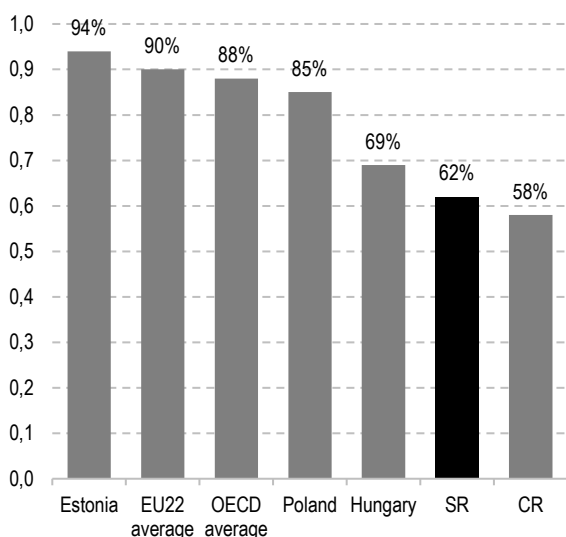
⁴¹ For example in terms of reading literacy, in comparison to Slovakia there is a better ratio between the results of the youngest teachers and their peers with tertiary education in countries such as Belgium, Netherlands, Russia, Spain, France, Japan, Norway, the United Kingdom, South Korea and Czech republic.

⁴² The 61% corresponding to Slovakia, which is indicated by OECD, in case of SR includes also teaching assistants and school principal and deputy principal premiums, which does not completely correspond with the UOE methodology. Those are only wages of employees who have worked the entire year and as full-time employees.

The planned increase of salaries should gradually improve the status of Slovak teachers. The increase of teachers' wages in accordance with the Government's Statement of Policy (i.e. in 2016⁴³, 2017⁴⁴ and in 2019–2020, annually by 6%) will until 2020 increase the share of teachers' income paid from the government budget (transferred competences⁴⁵) from 63% to 67% of income earned by people with tertiary education. Within the entire regional education (including original competences) from 58% to 62%. The increase represents additional cumulative expenditure of public administration in 2016–2020 in the amount of approximately EUR 954 million, in comparison to the 2016 budget (724 million from the government budget for employees within transferred competencies and 230 million from city and municipality budgets for employees within original competences).⁴⁶ These account for a significant contribution to the overall increase of expenditure on education to which the SR government committed.

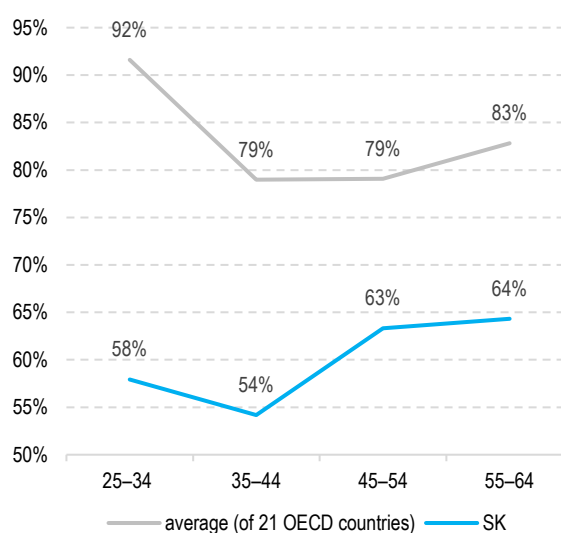
Teachers' salaries in Slovakia at the beginning of their career lag behind salaries of people with tertiary education relatively more. Teachers working at the degree of lower secondary education 25–34 are in a more unfavourable situation and lag behind in relative salaries in comparison to their peers in 21 OECD countries by 34 percentage points. Teachers in the age category 45–54 lag behind in relative salaries by 16 percentage points. Teachers' salaries at the beginning of their career should increase more significantly in order to make the teaching profession attractive throughout the entire career and to encourage interest of talented people. A more detailed comparison of salaries according to the taught subjects or environmental demands is not available. At the same time these factors influence the amount of compensation in an alternative profession. In some countries they are directly part of the remuneration, e.g. in the United Kingdom there is a premium for teachers in the London area. Regional and sectoral differentiation of compensation can represent an appropriate tool for priority public policies. However, at the same time it would require an adjustment of public service employees' compensation.

Graph 20: The share of average salaries of pedagogical staff in lower secondary education in salaries of employees with tertiary education (% , 2015)



Source: OECD EAG

Graph 21: The salary ratio of pedagogical staff and employees with tertiary education according to age (% , 2014)



Source: OECD EAG, Trexima

⁴³ From September.

⁴⁴ Planned salary increase according to the GSP in 2018 is moved to September 2017.

⁴⁵ Especially pedagogical and expert staff from elementary and secondary schools and special schools is paid within the transferred competences. Especially pedagogical and expert staff from nursery schools, elementary art schools and language schools is paid within the original competences from local government budgets.

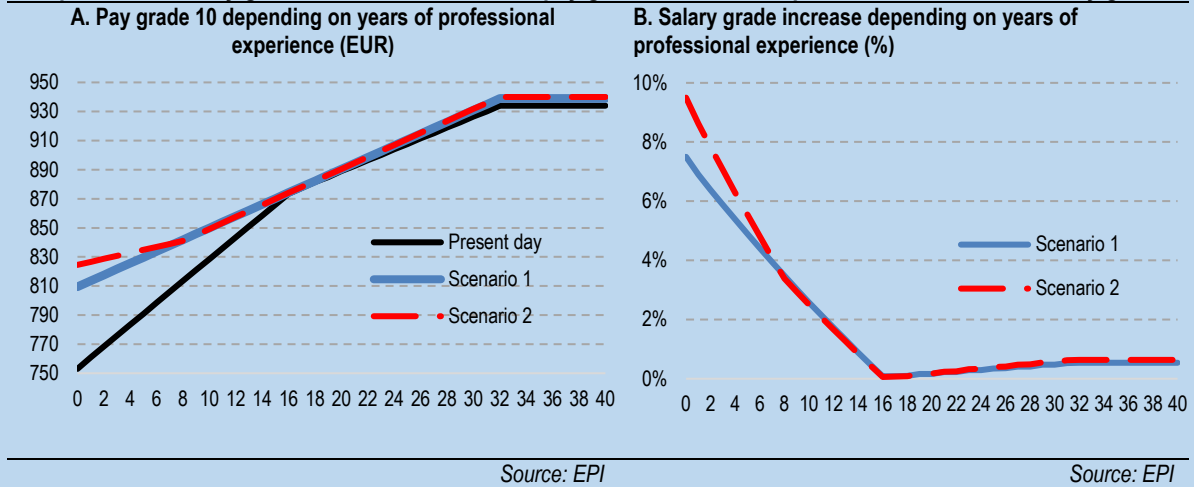
⁴⁶ The quantification does not include the comparison of salaries of ministerial secondary schools in order to achieve accordance with the international OECD methodology.

Box 4: Alternatives of salary increase of pedagogical and expert staff at the beginning of their career.

Currently the salary grade increases throughout 32 years of professional experience overall by 24% while during the first 16 years it increases quicker and then slows down⁴⁷. We estimate the impact of the salary grade increase adjustment depending on recognised years of professional experience in two alternative scenarios in order to have a significantly higher salary grade in the first 16 years of recognised years of professional experience, while after reaching 16 years of recognised years of professional experience the level of the salary grade would be maintained at the current level. No pedagogical expert employee would see a decrease in their salary grade.

- **Scenario 1:** A one-off salary grade increase by 7.5%, subsequent increase by 0.5% for each full year of recognised professional experience.
- **Scenario 2:** A salary grade increase by 9.5%, subsequent increase by 0.25% for 1–8 years of recognised professional experience, from the 9th year an increase by 0.5%.

Graph 22: The salary grade – an illustration of the pay grade 10 and the impact on the increase of salary grade



Such technical change, which would add 7.5% to teachers without years of professional experience, would overall cost EUR 24.6 mil., EUR 18.7 mil. (scenario 1) from the government budget for transferred execution and in case of a 9.5% increase EUR 28.2 mil. would be required, EUR 21.5 mil. from the government budget (scenario 2).

Table 7: Estimation of the financial impact related to the change within the consideration of years of professional experience (EUR mil.)

| | Only grade (without premiums) | | | Including premiums | | |
|-------------------|-------------------------------|------------------|-------|--------------------|-----|-------|
| | GB | OC ⁴⁸ | total | GB | OC | total |
| Scenario 1 | 17.2 | 5.4 | 22.6 | 18.7 | 5.9 | 24.6 |
| Scenario 2 | 19.7 | 6.2 | 25.9 | 21.5 | 6.8 | 28.2 |

Source: EPI

The salary increase should be accompanied by additional measures focused on improving teachers' quality. It is in particular necessary to adopt measures to increase the share of practice in the preparation of future teachers, strengthen and enhance the quality of the offer of educational activities for teachers and adjust the attestation procedure in order to improve the link between remuneration and quality.

Pre-graduate preparation of teachers does not have a sufficient link to practice. The amount of time associated with practical training (inspections, output practice) on average accounts for only 5–8% of the total study

⁴⁷ The salary grade increases by 1% for each full year of recognised professional experience until it reaches 16 years. For each full year of recognised professional experience from 17–32 years the salary grade increases by 0.5% For 32 years of recognised years of professional experience the salary grade will increase by 24%.

⁴⁸ Original competences.

time in pedagogical courses in Slovakia (MoESRS, 2012). According to a European Commission study, Slovakia is among countries with the lowest minimum required amount of practical training hours for future teachers directly in the school environment (EC, 2013). The training process of future teachers is dominated by mainly an academic approach that results in a mismatch between the training and actual teaching practice in schools. Conducted research among pedagogical graduates shows that they see the largest difficulties in the unreadiness to work with pupils with special educational needs. According to them, they also lack practical skills when working with a class and pupils such as organisation and planning of work in class, work with available software used in schools, school administration and others (MoESRS, 2012).

Teachers' professional development does not sufficiently correspond to the development needs of teachers and schools. According to the 2013 OECD TALIS study the lack of an appropriate offer for further education represented the second largest obstacle in further education of Slovak teachers (43% in Slovakia, the OECD average is 39%) (OECD 2014). As far as the form of teachers' professional development is concerned, courses and workshops and educational conferences and seminars are the most frequent ones (OECD 2014). These most frequently attended forms of professional development by teachers, however, often do not reflect the specific needs of respective schools and teachers and have a low impact on the improvement and increase in efficiency of the teaching process (Musset 2010). The foundation of professional development should in case of the teaching profession occur directly in schools and among teachers (EU 2010).

In addition it is also necessary to assess whether funds spent on teachers' salaries are targeted (setting the structure of the salary system), or what is the amount in relation to the actual needs (setting the level of salaries). In this regard, the review has identified two main challenges. On the one hand, the overall low level of salaries, particularly in case of young teachers and also the insufficient consideration of the performance and quality with regards to remuneration that is partially caused by the lack of funds for this purpose.

The system of claimable remuneration has an insufficient link to quality. The current system of remuneration should be taking into consideration the quality of work through personal premiums, remunerations and particularly by taking into consideration career levels with regards to pay grades. A credit premium was introduced in order to ensure teachers' professional development and improvement of quality. Personal premiums and bonuses represent conventional financial tools of school principals which cannot be claimed while the premium and career system is subject to centrally established rules. The salary grade represents on average 76% of the total salary, premiums (including overtimes) and bonuses account for 24%. From which the credit premium accounts on average for 4% of the total salary, personal premium and bonuses represent 12%. The remaining 8% is represented by segments that can be claimed (e.g. the premium for management).

Career levels do not sufficiently distinguish teachers according to the level of their professional competencies. Currently there are four career levels⁴⁹. Acquiring a higher career level translates into an advancement to a higher pay grade⁵⁰. The highest representation of teachers is at the second career level (almost half of all teachers), followed by the third career level (approximately one third of teachers). Approximately one tenth of teachers achieved the highest career level. However, currently there is a lack of clear indicators based on which it would be possible to reliably assess the level of teachers' professional competences. Indicators should be a part of professional standards. In addition, the current manner of attestation execution is too formal and is not capable to sufficiently assess the level of teachers' competences. This is also confirmed by the results of the qualitative research⁵¹ in which all participants agreed that the career advancement of a teacher does not correlate with the increasing quality of a teacher's teaching in the class (Liška, 2015). The insufficiently ensured quality of institutions providing attestations represents a significant issue as well. Higher education institutions

⁴⁹ The second career level requires a successful completion of the adaptation education, the third and fourth level the performance of attestations.

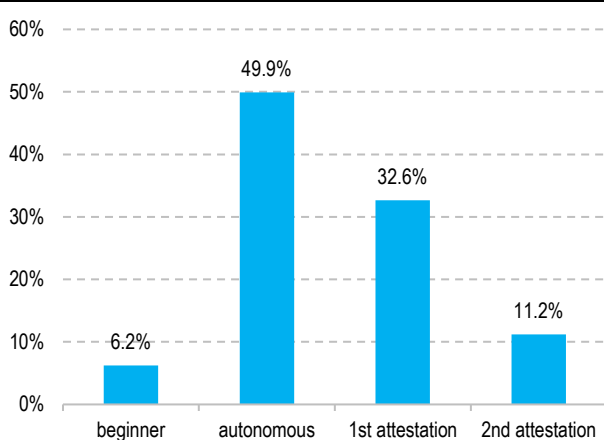
⁵⁰ Advancement to the second level increases the grade by approximately 9%. However, in reality the salary increases only by 3% because a beginning pedagogical employee has a premium of 6% of the salary grade they are classified in. In case of an advancement to the third and fourth level the increase is approximately 12%.

⁵¹ It was conducted in the form of semi-structured individual interviews with ten school principals.

with the right to perform attestations have various levels⁵², in case of the Methodology and Pedagogy Centre there is not even a quality assurance and assessment process related to its activity or accreditation.

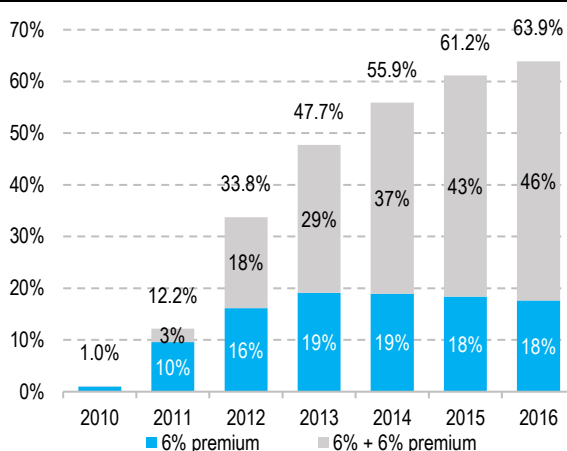
The second tool of teachers' remuneration system with the aim to improve their quality is the credit premium. Teachers can acquire a credit premium of 6% of the salary grade for each 30 credits, although for a maximum total of 60 credits. Credits can be acquired for completing accreditation programmes of further education⁵³, completing a PhD examination or a language state exam from a foreign language, education abroad, or authorship or co-authorship of authorised or recommended textbooks and workbooks. Credits are valid for seven years. In 2016 this premium was received by 63.9% of pedagogical staff, while approximately one third of them received the lower credit premium and two thirds of staff from the total number of teachers receiving credits obtained the higher premium. Costs related to credit premiums for pedagogical staff in schools and educational institutions accounted for EUR 46 million.

Graph 23: Pedagogical staff at respective career levels (% , 2016)



Source: BIS

Graph 24: The share of pedagogical staff receiving credit premiums (% , 2016)



Source: Eduzber

The credit premium is linked to the completion of educational programmes whereas it is not assessed how these programmes benefited to the quality improvement of a teacher's work. This results in the fact that the dominant motivation for the completion of education is not the need to improve the quality of one's pedagogical activity, but the acquisition of credits that are necessary for the receipt of a credit premium. This is also confirmed by the results of a survey conducted by the Slovak Chamber of Teachers whereby the largest number of respondents (71.3%) indicated the need to acquired credits as their primary motivation to attend trainings (SCT, 2014). Cancelling the possibility to acquire credits for a credit premium would remove negative motivations and create scope for a better allocation of saved funds into the non-grade segments of salary.

Personal premium and bonus cannot be claimed and are not awarded on the basis of a unified methodology. Other tools with a link to quality in the remuneration system are personal premium and bonus. The employer decides on both of them based on the proposition of the superior employee and they cannot be claimed. Personal premium can reach up to 1.24 times the salary grade, the bonus is not limited. One of the sources for such types of remuneration is also the assessment of the school's principal. Since the law establishes that the school principal once per year assesses the results, quality and the complexity of performing pedagogical activity and the rate of mastering and using professional competences of pedagogical staff.

The allocation of additional funds is not based on clearly defined criteria. Additional funds cannot be claimed and therefore, no specific funds are reserved for them. This results in a significant variability in terms of paid

⁵² It is shown for example by the Accreditation Committee or Academic Ranking and Rating Agency assessments.

⁵³ Updated education, innovative education and specialised education.

personal premiums and bonuses among respective schools. For example in 2016 up to 13.8% of elementary schools did not award any personal premium, in case of grammar schools it accounted for 5.3% and in case of secondary vocational schools for 2.6%. No bonuses were awarded in 5.3% of elementary schools and grammar schools, in case of secondary vocational schools the value was 4.3%.

3.2 The funding system of elementary and secondary schools

The spending review deals with the funding system of elementary and secondary schools, including special schools. Almost 95% of their funds come from the government budget (EUR 1.54 bil. in 2016). At the same time, they were allocated up to 88% on the basis of the standard principle, the so-called allocation formula (EUR 1.44 bil in 2016). This method tries to determine the needs of each school as precisely as possible and allocate funds to them based on clear, objective and consistently applied rules and criteria. The objective of the review is to examine the ways to ensure a more efficient redistribution of funds among schools in accordance with internationally accepted principles and thus create better conditions for quality education.

The funding system has two levels and takes into consideration the characteristics of schools and pupils. The funding of regional schools features two levels. At the central level the Ministry of Education “calculates” the amount of funds to cover personal and operating costs for each school based on the number of pupils and respective standard⁵⁴. The school authority of the school consequently features a certain degree of flexibility – 10% of the envelope for personal costs and 20% for operational costs can be redistributed according to current needs between their schools⁵⁵. The centrally calculated envelope of funds is targeted to cover personal and operational costs. However, the amount of funds for respective operational items (e.g. wages, bonuses, heating etc.) is not centrally determined. The school budget is proposed by the school principal and approved by the school authority.

The amount of funds for each school is calculated as a product of respective standards and the number of the school’s pupils. The value of standards is calculated in a “top-down” manner. The centrally determined envelope of funds will be calculated per pupil according to coefficients reflecting the personnel and economic demands related to school operation. In addition, standards capture various teaching costs based on multiple pupil characteristics and school size.

From an international perspective the funding is common and is derived from generally accepted principles. Well-designed funding systems should take into consideration multiple internationally acknowledged principles. The funding system in Slovakia was also built on these principles. For example the funding per pupil in general creates conditions for efficient spending of funds and creates a competitive environment for quality education as well. At the same time the coefficients that take into consideration various needs of pupils and structural differences in terms of costs result in a fair allocation of funds. In addition, the system should be transparent and allocate adequate funding to schools.

⁵⁴ Standard is the amount of funds that the government provides per pupil.

⁵⁵ The school authority, or the school, however, has to follow binding legislation. For example the necessary amount of teachers’ wages is to a significant extent determined by central regulations which regulate the remuneration manner of teachers. These funds must be paid to teachers.

Table 8: Basic parameters of standardised funding

| Structure of the standard | Consideration of personnel and economic demands of the school | Consideration of pupils' characteristics | Share (2015) |
|-------------------------------|--|---|--------------|
| Wage | 24 categories, according to coefficients of the personnel and qualification structure of schools ⁵⁶ , ES size | the zero grade of ES, teaching language, bilingual study, health disadvantage and talent etc. | 84.6% |
| Operational heating | 8 categories according to coefficients related to heating demands ⁵⁷ , ES size | health disadvantage and talent etc. | 15.4% |
| educational process | 24 categories according to schools' economic demands coefficient ⁵⁸ , ES size | teaching language, bilingual study, health disadvantage and talent etc. | 2.3% |
| operation without heating | 6 categories according to operational demands coefficients, ES size | health disadvantage and talent etc. | 4.1% |
| further education of teachers | 24 categories as 1.5% from the wage standard | - | 1.3% |

Source: ER 2015

International experience confirms that in addition to the total envelope of funds the manner of their redistribution among schools is also important in terms of the relation to quality (Hanushek, 2006; Wößmann, 2016). This applies particularly to cases where there is a minimum critical amount of funds within the system and they increase at the same time (OECD, 2012a). It is the case of Slovakia as well, even though, our total amount of expenditure lags behind developed countries.

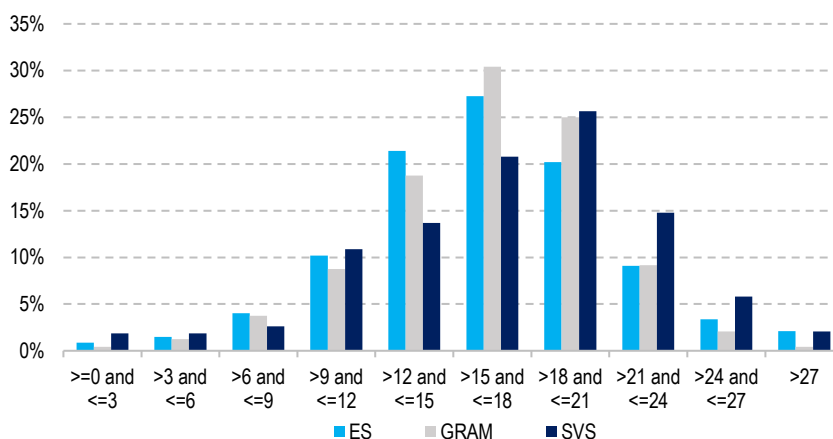
The current system does not take into consideration the personnel and economic demands of schools sufficiently accurate. It does not take into consideration the teachers' years of professional experience which significantly influence the wage. Schools with more experienced teachers have currently budgeted relatively fewer funds than schools with less experienced teachers in comparison to actual wage costs. These differences can be significant as well, since the average number of years of professional experience at schools relatively varies. The extreme case is a situation when a teacher after 32 years of pedagogical experience has a higher salary grade by 24% than the teacher with the same qualification but zero experience. The system only takes into consideration the qualification (salary grade and employment group to which the teacher is assigned) and the credit premium for the completion of further education programmes. This is due to the absence of individual data for each teacher. Therefore, when allocating funding to schools, pedagogical staff's years of professional experience will be taken into consideration. For this purpose the teachers' qualification structure coefficient will be complemented by the number of years of professional experience.

⁵⁶ The personal demands coefficient is derived from the average number of pupils per teacher and the average number of non-pedagogical staff per teacher for the particular school category of the entire Slovak Republic. The ratio of pedagogical and non-pedagogical average salary is also taken into consideration. It also takes into consideration the 6 categories of pupil assignment on the basis of health disadvantage or general intellectual talent. In case of secondary schools we distinguish three categories. The qualification structure coefficient reflects the salary grade without the achieved years of professional experience and the credit premium.

⁵⁷ They are derived from the temperature zone in the location of the school.

⁵⁸ They are derived from personal demands coefficients.

Graph 25: Quantity of schools according to the teachers' average number of years of professional experience

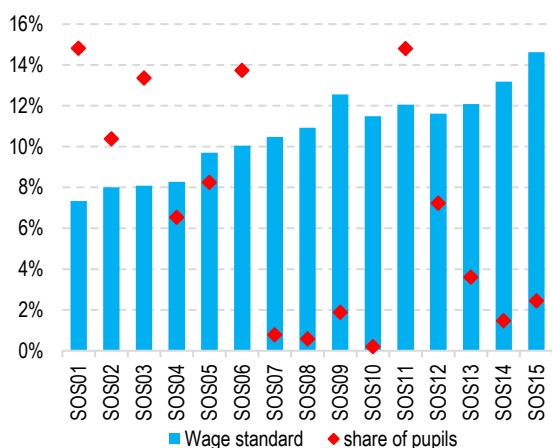


Source: BIS, EPI recalculations

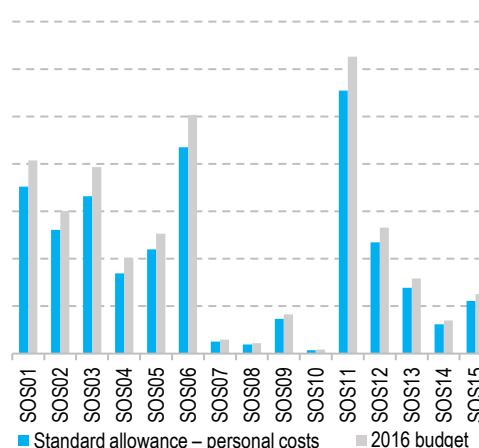
The number of SVS standards is too high with regards to the need to differentiate their different costs. Various personnel and economic costs are currently taken into consideration with regards to 15 categories of secondary vocational schools. The differences in standards in some categories are insignificant and only a small share of pupils attends them. At the same time these SVS categories only have a small portion of total funding allocated to them by means of standards. The system is thus unnecessarily complicated. For example, secondary vocational schools in the category 7 and 8 are attended only by slightly fewer than 1% of pupils and the difference in standards is minimal. Ultimately only EUR 5 mil. (EUR 3 mil and EUR 2 mil.) from the total standardised envelope for wage costs of EUR 300 mil. are allocated to these two categories.

Graph 26: The standards and the standardised envelope of funds according to SVS categories (2016)

A. The amount of the wage standard and share of pupils



B. The wage standard (in EUR mil.)



Source: Eduzber, EPI recalculations

In some cases it is possible to specify the standards⁵⁹. Experience from practice for example indicate that multiple secondary vocational school courses are financially overvalued (e.g. paramedical courses) and others are undervalued (e.g. agricultural schools etc.). It seems that the standards of secondary art schools are overvalued

⁵⁹ The expert discussion has featured a proposal of adding a new element to the funding system, the number of classes. It is expected that the consideration of classes would better reflect costs which, to a large extent, are linked to them. In an extreme case, a school currently has to divide one class into two when a new pupil arrives, while it will only receive a standard per pupil which does not have to cover additional marginal costs. This can at the same time create a disadvantage in comparison to a school which educates a class with one missing pupil. Marginal costs can play an important role particularly in case of small elementary schools where they represent a relatively significant additional requirement for the school budget.

as well, on the other hand, grammar school standards seem to be undervalued. In order to have a more accurate funding respective coefficients of personnel and operational demands of schools will be rendered more real.

A full reduction of secondary vocational school standards in the system of dual education results in issues related to the coverage of their wage costs. Secondary vocational schools currently undergo a reduction of the standardised envelope of funds per pupil in the dual education system by the amount corresponding to the wage standard for practical teaching. The practice indicates that there is an issue in terms of wage provision for the teacher (master in vocational education), particularly in schools where one class organises both pupils from the standard and the dual mode. Additional costs arise for schools as well, e.g. costs related to changes in planning and organisation, alignment of curricula for both streams and monitoring of pupils with practical education which is currently not taken into consideration by the funding system. This fact can also represent one of the reasons that reduces the motivation of secondary vocational schools to participate in the dual education system.

There is scope for a more targeted spending of funds. For example the connection of the Ministry's information system with the so-called Eduzber (collection of data for funding purposes) can help reveal potential duplicities of funding. Another example is the funding of pupils who live abroad and who perform their compulsory education in Slovakia. Currently they are provided with a 10% standard. In addition, a separate issue is represented by the funding of emergency situations for which the school authority can request purpose targeted funds from the Ministry. The current legal framework does not sufficiently specify when the school authority has right to request funds, in particular with regards to its obligation to look after the state of the building. Another example is constituted by the provision of funds for construction, extension and reconstruction of schools (capital investments) that are allocated based on the memorandum between the Ministry of Education and the receiver of the funds. This manner does not create a sufficiently strong legislative framework that would guarantee a consistent performance of obligations and commitments of the receiver of funds for a determined purpose and monitoring options.

3.3 Rationalization of the elementary school network

The rationalization of the elementary and secondary school network is an important topic from the perspective of educational system costs. In particular in case of smaller elementary schools that are supported by a higher standard per pupil of EUR 66 million per year, which accounts for 8.7% of elementary schools' budget⁶⁰. The aim of this support is to ensure the best possible access to education for all pupils in their mother tongue. The spending review examines ways how to make the network of small elementary schools more efficient while maintaining the same or improved access to education. Although smaller secondary schools are not supported by a higher standard, in case of emptier classes it is necessary to cover the inevitable wage and operational costs and thus relatively fewer funds are left for the school's development, or there is a transfer of funds at the level of the school authority.

It is inevitable to take into consideration the potential impacts on the access to education, quality and inclusion as well. The primary objective should not only consist of financial savings or preference of closeness over quality of teaching, but rather of what is in the best interest of pupils in a particular situation.

Due to the negative demographic development the elementary school network is less efficient than in the past. Therefore, measures to support the rationalization of the elementary school network should be adopted. Since 2000 the total number of elementary school pupils has decreased by 33%, from almost 651 thousand to 433 thousand. The elementary school network has only partially adjusted to the demographic development. The total number of schools has decreased by 14% and the number of classes by almost 20%. A more important indicator in terms of costs is the number of teachers which has decreased by almost 23%. Since

⁶⁰ Education is also more expensive in case of smaller secondary schools. The funding system, however, does not subsidize smaller secondary schools.

the decrease in the number of schools, classes and teachers was relatively lower than the decrease in the number of pupils, ultimately the average size of a school has also decreased (21%) and class (17%), as well as the number of pupils per teacher (14%). An increase of the ratios is expected in the near future due to positive demographic development⁶¹.

In general it can be anticipated that throughout the decrease in the number of pupils the average size of schools, classes and the number of pupils per teacher will decrease slower than the number of pupils itself. Only in case of a larger decrease it is possible to reduce the number of classes and teachers, alternatively cancel the entire school. This relation is also influenced by other factors such as for example the reduction of the maximum limit for the number of pupils in a class.

Table 9: Basic indicators of the elementary school network (2000, 2016)

| Year | Pupils | Schools | Teachers | Classes | School size | Class size | Pupils per teacher |
|-------------------|-----------------|---------------|---------------|---------------|---------------|---------------|--------------------|
| 2000 | 650,966 | 2,447 | 40,352 | 29,093 | 267 | 22.4 | 16.1 |
| 2016 | 433,465 | 2,101 | 31,200 | 23,369 | 211 | 18.5 | 13.9 |
| difference | -217,501 | -346 | -9,152 | -5,724 | -56.5 | -3.8 | -2.2 |
| | -33.4% | -14.1% | -22.7% | -19.7% | -21.1% | -17.1% | -13.9% |

Source: SCoSTI (2000, 2016), EPI recalculations

The secondary school network has adapted better to the decrease in the number of pupils. At secondary vocational schools the number of pupils has decreased by 33%, from 202 thousand to 134 thousand. The number of schools has decreased by almost 40%, the number of teachers by more than 34% and the number of classes by almost 26%. Due to consolidation the current average size of secondary vocational schools is larger than in 2000 by 9% and the number of pupils per teachers has slightly increased by almost 1%. On the contrary, the average size of a class has decreased by 11%.

At grammar schools the number of pupils has decreased by 10%, from 80 thousand to 72 thousand. The number of grammar schools has increased by more than 12%, the number of teachers has decreased by more than 11% and the number of classes increased by almost 9%. The average size of a grammar school has decreased by 20%, the average size of a class decreased by 17% and the number of pupils per teacher slightly increased by more than 1%.

Table 10: Basic indicators of the secondary school network (2000, 2016)

| | Number of pupils | | Number of teachers | | Number of schools | | School size | | Class size | | Pupils per teacher | |
|-------------------|------------------|---------------|--------------------|---------------|-------------------|---------------|---------------|-------------|---------------|---------------|--------------------|-------------|
| | GRAM | SVS | GRAM | SVS | GRAM | SVS | GRAM | SVS | GRAM | SVS | GRAM | SVS |
| 2000 | 80,615 | 202,612 | 6,509 | 17,137 | 212 | 731 | 380 | 277 | 29.4 | 25.2 | 12.4 | 11.8 |
| 2016 | 72,287 | 134,154 | 5,761 | 11,246 | 239 | 443 | 302 | 302 | 24.2 | 22.4 | 12.6 | 11.9 |
| difference | -10.3% | -33.8% | -11.5% | -34.4% | 12.7% | -39.4% | -20.5% | 9.0% | -17.7% | -11.1% | 1.6% | 0.8% |

Source: SCoSTI (2000, 2016), EPI recalculations

Box 5: The average size of classes and the number of pupils per teacher in international comparison

On average we have less crowded classes and on the contrary, a rather above-average number of pupils per teacher in international comparison. In 2014, at the primary degree, an average class in Slovakia had 17.9 pupils whereas in OECD it was 21.1 pupils. At the lower secondary degree it was 19.3 pupils in Slovakia

⁶¹ According to the SO SR prognosis the population of pupils 6–14 will slightly increase in the following years. The population of pupils 15–18 will join with a slight delay. This positive demographic development has been already displayed at the primary degree of elementary schools and until 2023 the average size of elementary schools should increase from current 211 to 222 pupils. The average class size in elementary schools should increase from 18.5 to 19.4 pupils until 2023 and the number of pupils per teacher from 13.9 to 14.5.

whereas 23.1 pupils in OECD. Larger classes are also found in neighbouring countries while their size is slightly below or at the average OECD level. On the other hand, in case of the number of pupils per teacher Slovakia is rather at an above-average level⁶². More specifically, in 2014 at the primary degree there were 17.2 pupils per teacher on average in Slovakia whereas the OECD average was slightly above 15 pupils. At the lower secondary degree there were 12.5 pupils per teacher on average in Slovakia whereas the OECD average was 13 pupils.

If Slovakia reached the OECD average in both indicators simultaneously i.e. in the number of pupils per teacher as well as in class size, it would record estimated overall savings of EUR 12.3 million thanks to the increase in terms of class size with regards to the number of pupils and operating costs savings. Operating costs savings would account for EUR 4.9 mil. and in case of teachers for EUR 7.5 mil.

Table 11: The average class size and the number of pupils per teacher – international comparison (2015)

| Degree of education | Number of pupils per teacher | | Class size | |
|---------------------|------------------------------|-----------------|------------|-----------------|
| | primary | lower secondary | primary | lower secondary |
| Slovakia | 17.2 | 11.6 | 17.9 | 19.2 |
| OECD | 15.2 | 13.0 | 21.1 | 23.3 |
| EU 21 | 14.3 | 11.2 | 19.7 | 20.9 |
| Czech Republic | 19.0 | 11.8 | 20.8 | 21.6 |
| Hungary | 11.2 | 10.6 | 21.3 | 20.7 |
| Poland | 11.1 | 9.7 | 18.5 | 22.1 |

Source: OECD EAG

There is scope for a more efficient elementary school network

In Slovakia we do not have a higher number of smaller elementary schools as it is the case in most countries with comparable characteristics. Based on the data from the 2015 PISA survey the occurrence of small elementary schools in Slovakia does not seem significantly troublesome. The results show only countries where elementary schools are attended by 15-year-old pupils continuously from the first grade, therefore, in case of Slovakia only elementary schools with second degree⁶³. More specifically, 10% of the smallest elementary schools in Slovakia has fewer than 97 pupils, similarly to Finland. In Sweden and Denmark it is fewer than 86 pupils, in Estonia and Latvia fewer than 60 pupils. On the other hand, in the CR the school size limit of the first decile is as much as 135 pupils. However, other countries have relatively more pupils in larger schools.

Table 12: School distribution of primary and lower secondary education according to the number of pupils

| | 1 st decile | 2 nd decile | 3 rd decile | 4 th decile | 5 th decile | 6 th decile | 7 th decile | 8 th decile | 9 th decile |
|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Czech Republic | 135 | 182 | 223 | 271 | 307 | 403 | 458 | 501 | 635 |
| Slovakia | 97 | 144 | 183 | 202 | 236 | 278 | 343 | 412 | 530 |
| Finland | 97 | 117 | 168 | 231 | 292 | 344 | 402 | 504 | 642 |
| Sweden | 86 | 165 | 189 | 226 | 269 | 309 | 358 | 435 | 565 |
| Denmark | 80 | 127 | 212 | 319 | 413 | 487 | 582 | 676 | 814 |
| Latvia | 51 | 85 | 105 | 132 | 191 | 262 | 353 | 480 | 665 |
| Estonia | 50 | 69 | 95 | 130 | 180 | 227 | 414 | 628 | 802 |

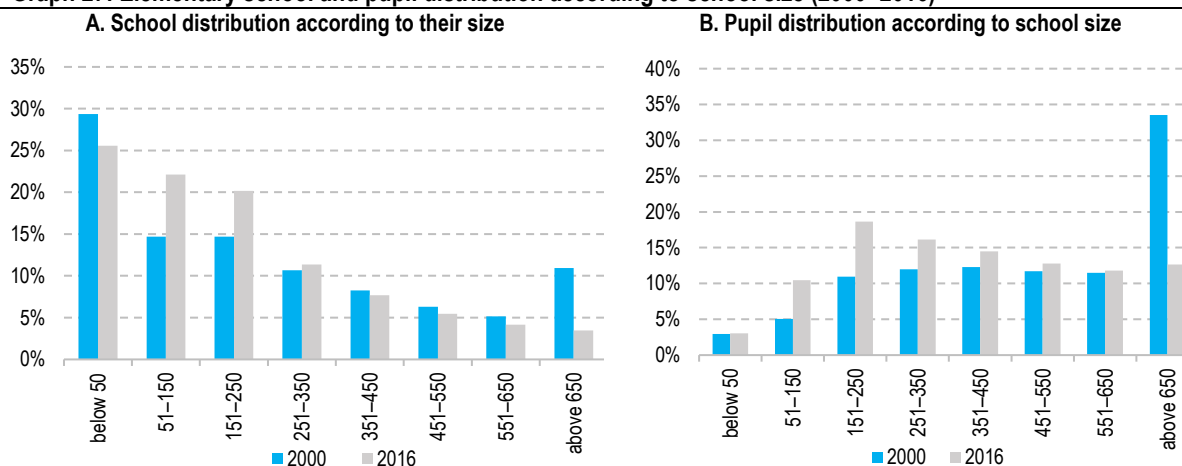
Source: OECD PISA 2015, EPI recalculations

⁶² The comparison can be biased to a certain extent. The data in Slovakia is not reported exactly in accordance with the international OECD methodology and the methodology of SCoSTI recalculations is not published. Teachers with managerial competences, where teaching and the management position are equally important, should be included among teachers. In Slovakia the number of deputy principals and principals at elementary schools as well as their working hours are reported only once every four years. At secondary schools the number of principals and deputy principals is reported annually, but without their working hours. Assigning a principal of a united school to a particular ISCED degree can result in issues as well.

⁶³ Countries in which it was impossible to distinguish institutions of the lower (ISCED 2) and higher secondary education (ISCED 3) were removed from the selection. The schools were selected in the CR (140), Denmark (263), Estonia (190), Finland (160), Latvia (226), SR (173) and Sweden (183). The sample selection of schools is representative at the level of particular countries which enables to apply these data after considering respective weights for the entire country.

According to national data the smallest schools prevail in the network, however, overall they are attended by a relatively small share of pupils. More specifically, elementary schools with fewer than 50 pupils represent 25% while these schools are attended only by 3% of all pupils. Up to 68% of schools has fewer than 250 pupils but is attended only by 32% of all pupils. Elementary schools with more than 250 pupils account for only 32% but are attended by up to 68% of all pupils.

Graph 27: Elementary school and pupil distribution according to school size (2000–2016)



Source: SCoSTI, EPI recalculations

Source: SCoSTI, EPI recalculations

The protection system of smaller elementary schools features weaknesses as well

The government takes into consideration the higher costs of teaching in elementary schools through a higher standard per pupil – the so-called compensatory allowance. While the number of pupils studying on a full-time basis, in the same teaching language within the same school authority in the area of the particular municipality is taken into consideration. The government thus creates conditions for the proximity of schools to pupils' domicile hence the best possible access to education for all pupils in their mother tongue. At the same time the diversity of the education offer is supported by supporting various school authorities.

The system also supports smaller and fully organised⁶⁴ elementary schools that feature a lower number of pupils in class and lower expertise in learning at the secondary degree. The compensatory allowance equally supports the access to education for pupils at the primary as well as secondary degree, even though, the availability of education in the form of the proximity of physical infrastructure plays a more important role in case of younger pupils. Moreover, smaller fully organised schools have relatively smaller classes and fewer pupils per teachers because it is not possible to join pupils from several grades into one class at the secondary degree. In addition the expertise of teaching decreases with school size at the secondary degree of elementary schools. Whereas in case of fully organised schools with more than 250 pupils the expertise of teaching is 88%, it is only 64% in schools with fewer than 50 pupils because at the secondary degree teachers specialise in subjects and therefore, smaller schools can have issues engaging a qualified teacher for a low number of working hours. On the contrary, in general at the primary degree the expertise of teaching is higher than 90% because one teacher teaches most of the subjects and thus no issues arise with regards to the fulfilment of their working hours. Moreover, in 2016 ninth graders in schools where there were fewer than 15 pupils in the 9th grade achieved statistically lower results in comparison to the national average⁶⁵. This comparison certainly takes into consideration only the raw results of pupils without regards to other factors that significantly influence pupils' results (e.g. their socio-economic

⁶⁴ Fully organised elementary school provides education in all grades 1–9. A not fully organised school is a school which does not feature all grades.

⁶⁵ They achieved a slightly worse success rate than the national average in mathematics (47.2% vs. 52.8%), Slovak and literature (58.1% vs. 62.6%), as well as in Hungarian and literature (61.0% vs. 64.6%).

background). If the compensatory allowance protected only pupils at the primary degree of elementary school, the overall savings would, after taking into consideration the increased transport costs, be EUR 14 mil.⁶⁶.

The compensatory allowance supports two small elementary schools in one municipality as well, if the schools have different school authorities. For example, if both a municipal and religious school or private school with the same Slovak teaching language are situated in the municipality and have together fewer than 250 pupils, they will both receive an increased standard per pupil⁶⁷. If the compensatory allowance took into consideration the total number of pupils according to the teaching language in all elementary schools in a particular municipality with no regards to the school authority, overall savings at the level of approximately EUR 6.7 million would be achieved. In absolute terms, the largest contributors to savings would be school authorities of religious schools by approximately EUR 3.7 mil. The change would relatively impact private schools the most, which would lose 21% of their budget⁶⁸.

Table 13: Impact analysis of the compensatory mechanism defined according to municipality area (2016)

| School authority | Original budget | New budget (in EUR mil.) | Savings | Savings (in %) |
|---|-----------------|-----------------------------|------------|-------------------|
| Church | 41.9 | 38.2 | 3.7 | 8.7% |
| District office in the headquarters of the region | 0.8 | 0.7 | 0.1 | 11.4% |
| Municipality | 704.5 | 704.3 | 0.3 | 0.0% |
| Private school authority | 12.1 | 9.5 | 2.6 | 21.3% |
| Local government | 1.5 | 1.3 | 0.1 | 9.6% |
| TOTAL | 760.7 | 754.0 | 6.7 | 0.9% |

Source: Eduzber, EPI recalculations

In addition to the funding system, efficient regulatory tools are important as well

In the process of integration of new schools into the network the so-called minimum limit of elementary school size is evaluated, this regulation is only formal. According to the Education Act only schools fulfilling the assumption that they will be attended by a minimum of 30 pupils (not fully organised schools) or a minimum of 150 pupils (fully organised schools) should be integrated into the school network⁶⁹. Practically it is an ex ante conditionality that should minimise the risk that schools integrated into the network will be attended by a low number of pupils in the future. In practice also schools with a lower number of pupils than the amended quantity by the legislation are integrated into the network and there are also newly integrated schools that do not achieve the minimum attendance even after several years⁷⁰. Nonetheless, the issue of school size within the network can be partially resolved by a minimum limit in terms of the number of pupils in classes which also implicitly determines the minimum school size in case of a particular number of classes from the beginning and throughout the entire time of its existence.

Minimum limits on the number of pupils in a class have not had a more significant impact in the first year of their effect. In Slovakia minimum limits were introduced for classes of selected grades of elementary and secondary schools since the school year 2015/2016. A similar regulation of minimum class size is applied

⁶⁶ We estimate that EUR 7.04 mil. would be paid in transport costs. The savings estimation does not take into consideration the demographic development or the fact that the closest large ES could be too far or that it may not have sufficient capacity.

⁶⁷ For example in Bratislava where there should not be a serious problem in terms of access, the compensatory allowance is received by 1 ES established by the city district Jarovce, 1 ES established by the district office, 14 private ES and 3 religious ES.

⁶⁸ The estimation's limitation is that in case of the unification of schools in a municipality it does not take into consideration the potential capacity constraints.

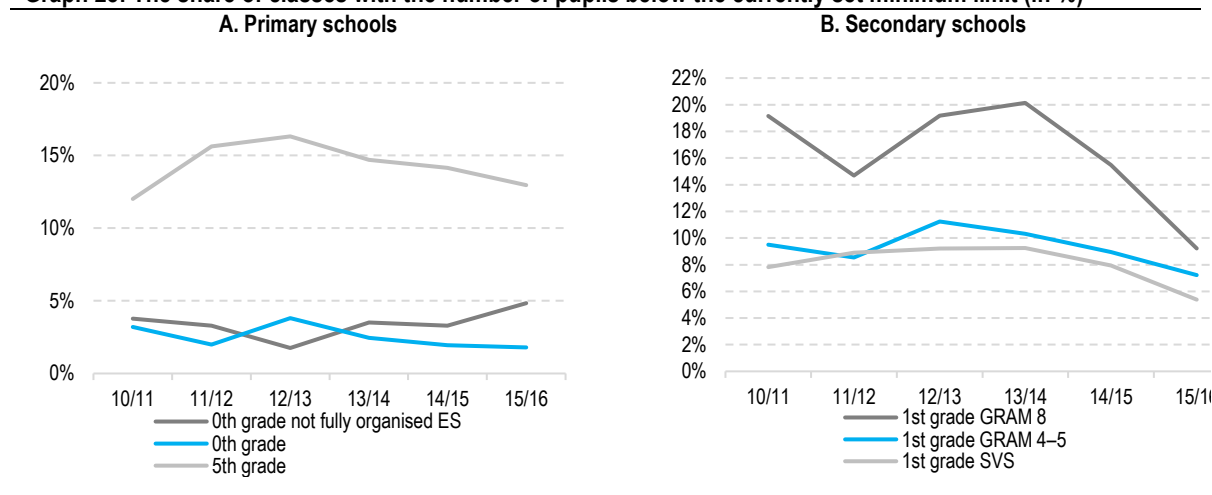
⁶⁹ If the closest elementary school is difficult to access, the school authority can also establish an elementary school with a lower number of pupils.

⁷⁰ From 30 elementary schools which have been created during the previous seven years, all of them had a number of pupils below the minimum limit at the moment of their opening. The minimum number of pupils was achieved by 9 schools, after two or three years of existence and one school was cancelled. The remaining schools have not exceeded the limit to this day, however, they have all been established in the school year 2012/2013 and later. Since these are schools with four up to nine grades, they can acquire more pupils in the following years.

in multiple European countries⁷¹. According to our estimations⁷² no significant decrease in the number of classes below the limit has been registered in the first year. Schools knew about the introduction since 2013 and thus could have prepared or even reacted sooner to the new regulation. No significant changes occurred at elementary schools. By comparison, in case of eight-year grammar schools the share of classes below the limit has decreased throughout the previous two years from 20% to 9%. The same development, however in a much smaller extent, occurred at secondary vocational schools.

The reason for the lower effectiveness is probably a free system of exceptions and the absence of control and sanctions. There is currently a free system of exceptions through which the school authority can reduce the minimum limit. Moreover, the consequences resulting from the violation of the legislation are not determined and control mechanisms are missing. It is necessary to examine, whether a central intervention into the autonomy in terms of school management should not be performed only in cases when the government provides a higher standard per pupil to smaller schools. Setting the limit as the school average should be evaluated as well⁷³. Since the school year 2016/2017 the limits in elementary schools have been applied only in case of fully organised schools with Slovak teaching language. The objective is to prevent the potential decrease in access to primary education and in case of national minorities the decrease in access to education in their mother tongue as well.

Graph 28: The share of classes with the number of pupils below the currently set minimum limit (in %)



Source: SCoSTI, EPI recalculations

Source: SCoSTI, EPI recalculations

Central regulatory and financial measures may not be sufficient.

Whereas the state primarily receives benefits from the rationalization in the form of lower expenditure, new political costs arise for municipalities that are responsible for the establishment and cancellation of schools. On the one hand, savings in terms of expenditure from the rationalization of schools have minimal impact on the improvement of a local government unit's budget, since education is, to a large extent, covered by the government budget. On the other hand, parents, school principals as well as teachers and school authorities oppose the cancellation of schools. Parents can for example be concerned about the time requirements related to pupils' transport to the new school. School principals are concerned about the rationalization with regards to the subjectively recognised autonomy of their school that they do not want to sacrifice. The unification of schools can bring dismissals that will produce resistance among teachers and other school staff. Therefore, using only "hard" financial and regulatory tools from the central level for the rationalization may not be sufficient,

⁷¹ According to the last available data from the school year 2010/2011, the minimum class size was regulated in twelve European countries. They range from 10 pupils (e.g. in Austria for primary education) to 24 in Portugal (primary to higher secondary education).

⁷² It is an estimation of the number of classes below the minimum limit which derived from the distribution of pupils into classes in the particular grade of the same name. In simple terms, it is the average (but not the actual) class size within the grade.

⁷³ In Germany the minimum limit is linked to the average number of pupils in classes which leaves more room for the decision-making of the principal. (Eurydice, 2012)

active communication with partners⁷⁴ is necessary as well, or at least a partial reduction of political costs (e.g. by supporting efficient transport of pupils).

There are alternative methods to provide access to education that are not sufficiently supported

One of the primary objectives of the educational system is to ensure good access to education for all pupils, regardless of their domicile. In addition to the physical infrastructure of the school network the availability of other methods related to the provision of access to education is important as well. It is for example the reimbursement of pupils' transport costs to schools or usage of rental or purchased school buses. An inefficient setting of these tools can prolong the commute of pupils to schools and intensify the importance of the physical proximity of the school to pupils' domicile. Additional time requirements for the commute or lack of appropriate transport opportunities can decrease the attention of pupils in class and negatively influence their lives outside school (Bard et al., 2006; Howley, Howley and Shamblen, 2001).

The state currently reimburses pupils' transport costs to legal representatives, however, for example it does not take into consideration the teaching language. The state nowadays reimburses transport costs, if pupils cannot commute to elementary school within the municipality of their domicile. In 2015, 59,209 pupils received reimbursement for their transport in the amount of EUR 7,059,562, whereas elementary schools were attended by a total of 427,418 pupils. The transport allowance is provided to pupils of elementary schools from municipalities in which no elementary school or its part is established, who commute to the neighbouring municipality. The condition for the allocation of funds is the conclusion of the school district⁷⁵ between the municipality with the pupil's domicile and the municipality in which they attend elementary school.

The state nowadays reimburses transport costs of pupils, if they cannot commute to the elementary school within the municipality of their domicile, due to the lack of their establishment. No funds are obtained by pupils from municipalities in which there is for example an established elementary school with Slovak teaching language whereas they have an interest to be educated in a language of a national minority and also vice versa. Reimbursement of transport costs is not provided to pupils of private elementary schools or pupils who commute within one city or a larger municipality. Moreover, the system is administratively demanding for schools. In order to streamline the system and achieve a state when no one is disadvantaged, it is possible to reimburse bus transport services for all pupils who commute to school.

Box 6: Free bus transport services for pupils of regional education

The expected impact of introducing free suburban buses for pupils of regional education on public administration budget accounts for EUR 15–22 mil. annually. We estimate an annual impact of EUR 9 – 16 mil. in case of the introduction of free public transport. The direct impact is calculated as the loss of turnover of the subsidized suburban and public bus transport for pupil tickets with regards to the share of elementary and secondary school pupils within the total number of transported persons with pupil tickets. The number of transported persons with pupil tickets includes also higher education institution students, in some cases disabled persons etc., therefore, a sensitivity analysis to the share of regional education pupils is performed on the total number of transported persons with pupil tickets. The share of pupils in the number of transported persons with pupil tickets in case of suburban transport is estimated within the range of 50–75%,

⁷⁴ Therefore, in some countries (England, Quebec in Canada, Scotland) a consultative approach with local stakeholders is applied. Decision-making can thus become slower and more complicated, however, it leads to a more balanced result which takes into consideration the economic and social influences (Ares Abalde, 2014).

⁷⁵ A school district of an elementary school is represented by the territory of the municipality or its part. If the municipality is the school authority of multiple elementary schools, the municipality determines school districts for respective elementary schools. If the municipality does not establish an elementary school, it can reach an agreement with neighbouring municipalities on a joint school district of an elementary school. If such agreement is not concluded and the fulfilment of mandatory school attendance will be threatened, the district office in the headquarters of the region will decide with regards to the joint school district of a elementary school.

in case of public transport it is 40–75%. We assume, that the pupil ticket and other reduced tickets cost 60% of the full ticket's price⁷⁶.

Cancelling the transport allowance of ES pupils will produce savings up to a maximum of EUR 7 mil.

Transport costs are currently reimbursed for pupils whose health status does not allow them to commute to school by public transport. We assume that even after the introduction of subsidized suburban bus transport their travel costs will continue to be reimbursed. Therefore, savings in relation to the cancellation of the transport allowance of ES pupils should be inferior to EUR 7 mil.

We do not expect an increased need for performance within bus transport services as a result of the introduction of free transport for pupils. An increased number of pupils in buses may in theory lead to **an increased need for performance in bus transport services**, primarily during peak hours. This scenario is considered to be less probable. Between 2006 to 2015 the number of vehicle km of subsidized suburban buses actually decreased by only 3%, while the number of transported persons decreased by 40%⁷⁷. A practically identical offer of buses in the past was able to transport almost twice as much passengers. In addition, the average occupancy of a bus is according to the survey⁷⁸ from 2015, even in morning peak hours, only 25 passengers. Due to same reasons we do not estimate a loss of other paying passengers as a reaction to the higher number of pupils in buses, despite the fact that such effect was created in railway transport after the introduction of discounts in 2014.

Another mode of transport is represented by school buses. In some countries it is common to provide pupil transport to schools by means of school buses⁷⁹. Nowadays this option is rarely used by Slovak municipalities⁸⁰. A pilot project of school buses is currently taking place in selected municipalities⁸¹. School buses provide pupils with increased safety and comfort and provide connection even in places that are not sufficiently covered by public transport. While in Slovakia there is relatively a lot of small schools in the proximity of other schools. In the school year 2014/2015 up to 415 out of 528 elementary schools with fewer than 50 pupils had within the distance of less than 5 km another elementary school in the neighbouring municipality.

The case study performed on two selected districts Zlaté Moravce and Senica shows that not only ticket reimbursement, but also bus renting and purchasing represent a less expensive manner how to ensure pupils' access to education. In case of considered conservative average savings the introduction of school buses would bring approximate annual savings of EUR 12 mil. per year throughout Slovakia (see box 7). A more precise quantification of universal savings within the territory of Slovakia would be possible after a school network analysis in respective districts. On the other hand, social consensus is important as well in order to have 6-year-old pupils universally commuting to other municipalities. The proximity of a school can represent a particularly important factor in terms of school attendance of pupils from socially disadvantaged environment or pupils attending schools with other than Slovak teaching language.

⁷⁶ With an extreme hypothesis of zero turnover from other reduced tickets, the turnover estimation from pupil tickets would increase by EUR 2.2 mil.

⁷⁷ The data does not include the Prešov and Trnava region.

⁷⁸ The bus transport survey was conducted for the Ministry of Transport and Construction of the SR by the contractor KPM CONSULT a.s in June 2015 as part of the delivery of the solution with regards to multimodal transport relations in transport systems in the form of the Transport Model of the SR.

⁷⁹ For example in Lithuania the "yellow buses" programme is taking place. It is funded from the investment programme and the Ministry of Education annually decides on the number and size of purchased buses. Between 2000–2014, 700 buses were purchased in this fashion (Shewbridge, C. et al. 2016).

⁸⁰ To cover the costs related to their own or rented bus, municipalities may use the funds allocated from the government for pupils' transport costs.

⁸¹ It is a pilot project which is implemented within the cooperation of the Ministry of Education, Ministry of Interior and the Ministry of Transport.

Box 7: Case study on the introduction of school buses

A more detailed analysis, which takes into consideration multiple factors, was performed on two selected districts – Zlaté Moravce and Senica. The analysis quantifies potential savings stemming from the cancellation of small elementary schools with up to 50 pupils. This affects only state school authority schools with the Slovak teaching language. Three alternatives of a more efficient provision of access to schools are assumed:

- Ticket reimbursement whilst using the current suburban transport;
- Renting buses from a private operator and the introduction of school buses;
- Purchase and operation of owned schools buses within the district.

Based on the school network and road network analysis we have discovered that ideally it would be possible to transport a total of 266 pupils from 12 potentially closed schools in the Senica district and 159 pupils from 7 schools in the Zlaté Moravce district. We have contemplated, that it is possible to transport pupils to the closest larger school within the maximum time of 25 minutes⁸².

All analysed options are better than the current state and their implementation would thus represent a more efficient provision of access to education. Cancelling small schools will achieve certain savings in terms of operation, additional costs arise with the implementation of one of the potential pupil transport alternatives. The financially least expensive alternative is the reimbursement of tickets within the current suburban transport. In the course of 20 years the savings in both districts would together account for EUR 6.9 mil. in current prices (EUR 345 thous. per year). A similarly favourable option is represented by the full operation of school buses by a private contractor which would save EUR 6.2 mil (EUR 310 thous. per year). The purchase and operation of owned buses represent the most expensive option, however, in the course of 20 years it would still generate savings of EUR 1.2 million (62 thous. per year) in comparison to the current state.

Table 14: Value for money indicators

| | Senica | | Zlaté Moravce | |
|--------------------------------|--------------|--------------------|---------------|--------------------|
| Number of closed schools | 12 | | 7 | |
| Number of transported children | 266 | | 159 | |
| Kilometres with detours | 57 thous. | | 24 thous. | |
| Scenario | NPV | Discounted savings | NPV | Discounted savings |
| Scenario zero | -146,279,247 | 0 | -89,539,584 | 0 |
| Reimbursed tickets | -142,201,072 | 4,078,175 | -86,731,466 | 2,808,118 |
| Rental | -142,852,925 | 3,426,322 | -86,770,482 | 2,769,102 |
| Owned buses | -145,749,437 | 529,810 | -88,824,012 | 715,572 |

Source: EPI recalculations

A more precise quantification of universal savings within the territory of Slovakia would be possible after a school network analysis in respective districts. The introduction of school buses operated by a private contractor and closing of small schools with up to 50 pupils in the Zlaté Moravce and Senica district would according to the estimation bring savings of 3.2%, or 2.4% of total costs of all elementary schools in these two districts. In case of considered conservative average savings of 2% the introduction of school buses would bring approximate annual savings of EUR 12 mil. per year throughout Slovakia⁸³.

⁸² The time estimation does not include the time necessary for boarding and disembarkation of pupils.

⁸³ The analysis does not capture all costs and benefits. For example it does not take into consideration the lower security with regards to the transport of younger pupils without supervision, demographic development in respective municipalities, benefits related to the preservation of a smaller school in the form of social and cultural importance for the municipality, impacts on capital expenditure, or the use of purchased buses for other purposes. The vanished schools may also provide services such as for example a children's school club and catering which do not have to be provided in other schools due to capacity reasons. The quantification does not take into consideration the non-financial aspects such as quality and inclusion either.

4 Higher education institutions and tertiary education research

- The funding system poorly distinguishes the quality of schools or their specialisation. Higher education institutions are motivated to compete for funds by increasing their performances. It is necessary to update the calculation of courses' economic demands.
- Activity assessment of higher education institutions and the assessment of their research under complex accreditation do not meet international standards. The issue resides in the institutional setting of the Accreditation Committee and the questionable guarantee of independence and transparency of assessment processes. The assessment process of research does not take place on the basis of an actual expert quality assessment with a supplementary use of scientometric data and other quantitative indicators (so-called *informed peer review*) in line with best practice.
- The challenge for the research funding system is currently represented by a poor link between remuneration and quality due to the maladjustment of research assessment and a low share of competitive grants with rigorous evaluation.

The funding system of higher education institutions poorly distinguishes the quality of teaching and does not contribute to the diversification of institutions. Transfers for public higher education institutions are provided for four base areas⁸⁴. The distribution of most transfers⁸⁵ for teaching (performance of accredited study courses) and research (research, development and artistic activity) is based on performance competition (its quantity as well as quality) in research and teaching. The same indicators are taken into consideration while determining the performance of a higher education institution, which does not create conditions for system diversification. The transfer corresponding to a unit of performance is not fixed and determined in advance. The final transfer therefore, also depends on the change in performance of other higher education institutions. The grant system for teaching thus e.g. motivates higher education institutions to increase the number of students, predominantly in less cost demanding study courses which optimises costs for the studies of one student, on the other hand, this can lead to the decrease of entrance and graduation requirements.

The transfer determination system does not distinguish higher value-added (higher quality) of provided education between respective courses, or higher education institutions since no tools for its quantification are identified. An example of the current poor quality differentiation is the quality of teaching measured within the parameter *pedagogical activity* which is the most important portion of transfers in terms of budget – the grant for teaching. Despite the sophisticated calculation^{86 87} the difference in the quality of teaching and qualification structure is measured⁸⁸ – cumulatively – at the level of higher education institutions – as very low. The difference between the lowest and highest product of relevant coefficients is less than 10%.

⁸⁴ Transfers are provided by a block grant, i.e. the PHEI separately decides on the usage of the majority of funds within determined areas with the exception of targeted funds. In addition, the only other established limit specifies that personal costs mustn't exceed 80% of the fund provided for operational expenditure. Source: <https://www.minedu.sk/rozpis-dotacii-zo-statneho-rozpocitu-verejnym-vysokym-skolam-na-rok-2017/>

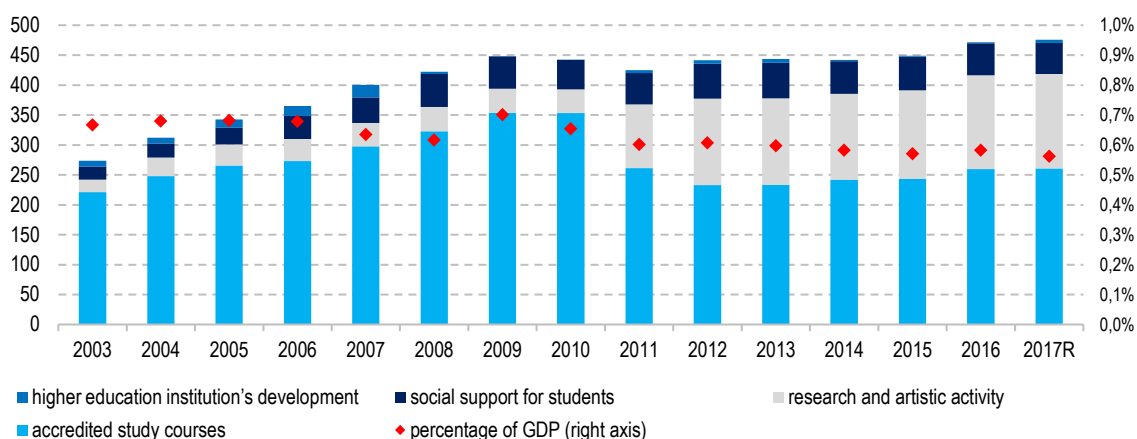
⁸⁵ Other portions for teaching and research are allocated as lump sums, or on the basis of teaching specifications (special institutes, practical teaching, students with special needs, wages for lecturers from abroad), capital expenditure is also allocated based on the assessment of institutions' needs. Teachers and research staff of higher education institutions compete for funds of the SGA (EUR 10.4 mil.) and CEGA (EUR 3 mil.) grant schemes directly on the basis of scientific projects, therefore, they are not considered as performance.

⁸⁶ It redistributes not only on the basis of the recalculated number of students, but also tries to capture personnel demands of teaching as well through the course coefficient, and the teaching quality through graduates' employability according to courses and the qualification structure of tertiary education teachers.

⁸⁷ QSC – qualification structure coefficient of a higher education institution – weighted product of the average registered recalculated number of teachers with various academic and scientific titles/degrees.

⁸⁸ QSC and KAP coefficients

Graph 29: Direct transfers to PHEI according to respective areas⁸⁹ (in EUR mil.) and the share in GDP (right axis)



Source: Annual reports on the state of education MoESRS SR, BoHEI, FPI

The funding system takes into consideration the economic demands of courses, their calculation needs to be updated. The course coefficient⁹⁰, together with grants for specifics,⁹¹ tries to capture the various study demands across various courses. Coefficients which take into consideration economic demands require an update. A just and efficient redistribution of funds will require coefficients' adjustment which will be derived from higher education institutions' costs for respective study courses according to a comparable methodology and with the possibility of a detailed cost analysis (e.g. the TRAC methodology).

The funding system lacks an element which would motivate higher education institutions to diversify. The potential of higher education institutions to fulfil various needs of the state and the society (vocational Bachelor's degree education and others) is thus not sufficiently used. Technical tools could be represented by the enlargement of the funding system to incorporate the element of *performance agreements*, alternatively the allocation of a higher amount of funds to higher education institutions' development projects supporting their specialisation.

Quality assurance

The selected competing funding model of PHEI is particularly sensitive to efficient and independent quality assurance since it is precisely the external quality assessment of tertiary education which creates counterweight to financial motivations. The current external system of quality assurance, implemented by the Accreditation Committee⁹² – a SR government advisory body, particularly emphasises the assessment of conditions for the performance of accredited study courses (personnel arrangements), to a small extent it focuses on education results achieved by students. On the basis of broadly designed accreditation processes the Committee provides the minister with recommendations with regards to the attribution of rights at the study

⁸⁹ In 2006–2010 a portion of the funds (approximately 30%) within the transfer for the performance of accredited study courses was divided based on the same criteria as the transfer for research, development and artistic activity. In 2011 these funds were transferred to the mentioned transfer and the rules within the transfer for the performance of accredited study courses have changed with regards to the consideration of publication and artistic activity. (Report on the state of education in Slovakia, Annex 2)

⁹⁰ The course coefficient (CC) is calculated on the basis of a standardised number of students and non-pedagogical staff per tertiary education teacher. It attains the value from 1.00 for law to up to 6.99 for veterinary courses.

⁹¹ Grants for specifics try to reflect economic demands of the course, e.g. they contain transfers for practical/laboratory learning in technical, natural science and information courses. The combination of CC and grants for specifics in 2008 replaced the economic demands coefficient and the personal demands coefficient.

⁹² The Accreditation Committee performs the complex accreditation of higher education institutions in six-year intervals, within the period between complex accreditations it grants accreditation to respective activities and certifications of a higher education institution: new study courses and the capability to perform habilitation proceedings and proceedings related to the appointment of professors.

course level. Accreditation of study courses is re-evaluated within the complex accreditation⁹³ of the higher education institution at least once every six years when the Accreditation Committee assesses the quality of creative activity (research, in depth of the issue) of a higher education institution as well, which directly influences the performance aspect of the transfer. The final decision on the accreditation is issued by the minister.

The Accreditation Committee and the accreditation process do not meet international standards. Assessments and recommendations of the Committee, as well as final decisions on accreditation processes although are declared as independent, however, most committee members come from and actively operate within the domestic tertiary education environment, only one member comes from abroad⁹⁴. The setting of the current committee does not include any internal or external control or evaluation mechanisms. Due to the questionable guarantee of independence and transparency of assessment processes the committee has lost its fully-fledged membership in the European Association for Quality Assurance in Higher Education (ENQA) in 2012^{95,96}.

The accreditation process is administratively demanding which increases the risk of formalism by HEI assessment. The administrative, time as well as financial complexity of the accreditation process, in combination with the limited material-technical background of the Committee, ultimately leads to the fact that the entire process predominantly consists of the assessment of formal criteria which do not fully reflect European standards in this area (ESG 2015)⁹⁷.

The final report proposes an institutional reform of the Accreditation Committee and the modification of the accreditation process. The Committee will change from an advisory to an independent decision-making accreditation body, the decision making process will be transparent with a diversified panel of experts with a guaranteed minimisation of conflicts of interests, the emphasis from formal criteria will be transferred to content and targeted criteria and the agency's activity will be regularly assessed. The Accreditation Committee will apply for the membership in the European Association for Quality Assurance in Higher Education (ENQA). The emphasis should be put more on the assessment of educational results, stemming from the audit of the higher education institution's internal quality assurance system which meets trends in this area in Europe.

4.1 Research and development at higher education institutions

Expenditure on research and development at higher education institutions since 2014 has accounted for approximately 0.3% of GDP⁹⁸. In 2015 they have reached the level of 0.5% of GDP, which approximately represents the average of EU countries⁹⁹, mainly thanks to the massive depletion of money from EU funds. As far as the number of researchers is concerned, Slovakia finds itself close to the average level of all OECD countries¹⁰⁰.

The performance of Slovak research (including the SAS) significantly lags behind in comparison to other developed countries¹⁰¹. The difference regarding the number of impacted publications per capita concerns almost

⁹³ Within complex accreditation the Accreditation Committee comments on the accreditation of all study courses, performance of the habilitation and inaugural proceeding, integration of a higher education institution, the setting of an internal quality assurance system with regards to the higher education institution's education, the quality assessment of the creative activity and the fulfilment of a higher education institution's mission.

⁹⁴ 15 out of 22 members come from Slovak HEI. One member of the AC comes from the Czech Republic, where s/he also operates.

⁹⁵ European Association for Quality Assurance in Higher Education. Source: <http://www.akredkom.sk/index.pl?tmpl=externe>; <http://www.akredkom.sk/index.pl?tmpl=zahr1>.

⁹⁶ Report of the Panel appointed to undertake a review of the Accreditation Commission of the Slovak Republic (ACSR) for the purposes of the granting of full membership of the European Association for Quality Assurance in Higher Education (ENQA), pp. 38-40
Source: http://www.akredkom.sk/dokumenty/Panel_ENQA_report_Jan_2013.doc.

⁹⁷ European Commission/EACEA/Eurydice, 2015. The European Higher Education Area in 2015: Bologna Process Implementation Report. Luxembourg: Publications Office of the European Union.

⁹⁸ Without academies of art.

⁹⁹ Gross expenditure on development and research as the percentage of GDP is on a long-term basis among the lowest from OECD countries. In 2014 it was 0.9% of GDP in Slovakia while the OECD average reached 2.4% of GDP, more than 2.5 times the value of Slovakia.

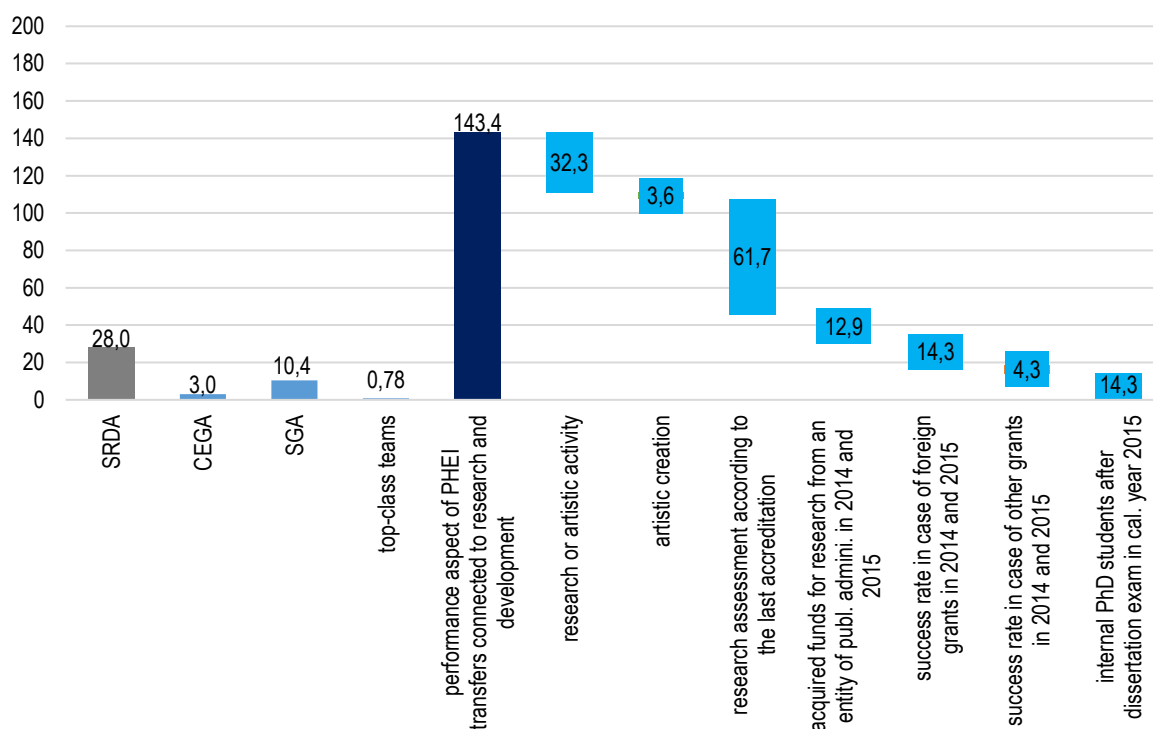
¹⁰⁰ OECD (2017), Researchers (indicator). doi: 10.1787/20ddf0f0f-en.

¹⁰¹ IDEA Study 12/2016 – International comparison of publication output quality of scientific disciplines in Slovakia, available online at https://idea.cerge-ei.cz/files/IDEA_Studie_12_2016_Publikacny_vykon_Slovenska/mobile/index.html#p=1. The comparison is based on the

all scientific disciplines, including those with a strong representation in terms of the number of researchers. The contrast further intensifies if only publications in top-class scientific journals are assessed. On the contrary, approximately 2% of Slovak research outputs (including tertiary education research) are published in low-quality, so-called predatory journals which represents the second highest share among OECD countries¹⁰².

An indicator of low developed excellency in Slovak research is the poor usage of grants. Since 2007 there has only been one Slovak project (specifically from the Institute of Chemistry of the SAS) among more than 7,000 funded projects from one of the most prestigious grant schemes in the world the ERC¹⁰³. In the course of the same period, the ERC funded 25 project from the CR, 56 projects from Hungary or 680 projects from the Netherlands.

Graph 30: Tertiary education research funds from the government budget, 2017 (EUR mil.).



Source: MoESRS SR, BoHEI

The funding system of tertiary education research is marked by a poor link to output quality and a low share of competitive grants. Both factors are an indication of a low developed approach to the assessment of research. The main parameters for the redistribution of funds for research at a PHEI are the assessment results of their research according to the complex accreditation (43% in 2017, EUR 62 mil.) and their scientific results¹⁰⁴ from the previous two years (22.5%, EUR 32 mil.). Accreditation tools should bring stability and foreseeability (“long-term money”), tools for publication, on the other hand, competition (“short-term money”). Grant funding (in Slovakia

WoS citation indices Science and Social Science. It covers a significant part of research production, not the entire production and it does not distinguish between tertiary education research and the SAS either.

¹⁰² IDEA Study 16/2016 - Predatory journals in Scopus (according to Beall's list). Available online at <https://idea.cerge-ei.cz/files/IDEA Studie 16 2016 Predatorske casopisy ve Scopusu/mobile/index.html#p=2>.

¹⁰³ Source: <https://erc.europa.eu/projects-figures/erc-funded-projects/>.

¹⁰⁴ Scientific, research or artistic activity. Each publication output in the years $n-2$ and $n-3$ was based on the current methodology assigned a specific weight and publication points throughout years are simple added up. In addition, direct publication performance enters into transfers for the performance of accredited study courses (EUR 29 mil. in 2017).

the SGA, CEGA and in particular the SRDA¹⁰⁵) at the maximum accounts for 23% of total funding¹⁰⁶. The final report recommends to increase the share of competitive grants in public expenditure on research with the aim of a more targeted support of excellent research.

Performance funding criteria, which distribute most of the funds, poorly distinguish the quality of outputs. The assessment of results by complex accreditation does not correspond to international practice, grants rewarding publications are mechanical, without a sufficient differentiation of quality.

Despite the inspiration taken from the British RAE/REF system, in practice the actual peer review assessment of research institutes is missing. The backbone of the British research assessment system is represented by the method of informed *peer review* with a clearly defined objective and the corresponding adequately and transparently selected tools. The institutional organisation is different as well. A separate expert body (HEFCE) decides on the distribution of grants for research within the British system, not the Ministry.

The issue within complex accreditation is represented by the wrong manipulation with the scientometric indicator, the Impact Factor (IF). Publications are classified into qualitative groups on the basis of an arbitrary set key for IF values of respective publications which is not in line with best practice for combining scientometric indicators and expert assessment. On the contrary, such usage weakens the main advantages of the *peer review* assessment. The setting of other attributes' weight is also questionable, they differ across fields without an explicit justification.

The further potential of peer review assessment is not fully used. *Peer review* assessment systems e.g. in the United Kingdom or the Netherlands fulfil important roles by creating an information base for further decisions. One of such advantages is the fact that *peer review* assessments of institutes and their resulting evaluation reports are able to identify top-class institutes, assess results within the context of institutes' mission or create regular benchmarks for the quality of research. This information represents an important input within decision-making with regards to HEI, research institute management and is also useful for the design of research and innovation strategies at the national level. The Slovak system of complex accreditations creates this information only to a limited degree, primarily due to the lack of capacity. The final report recommends to introduce the so-called "informed peer-review" assessment of research and development.

Since 2017 articles in category B and C (high impact-factor journals, journals in WoS or Scopus databases) have been awarded according to the scientometric indicator during the transfer breakdown, which represents a step towards the right direction, even though the new methodology of publication outputs has been taken into consideration only by the weight of 10% so far.

Tertiary education research produces an extreme high number of contributions in conference proceedings within areas in which this type of outputs occurs marginally in other countries¹⁰⁷. Institutions produce 70% and more publications in the "other" category, even though they receive a very low score for them in comparison to other outputs. Some institutions acquire a significant portion of their grants for publications in this manner (Graph 33). Due to the above-mentioned, in 2017 some modifications in the methodology of publication evaluation were introduced whose long-term effect cannot be assessed for now.

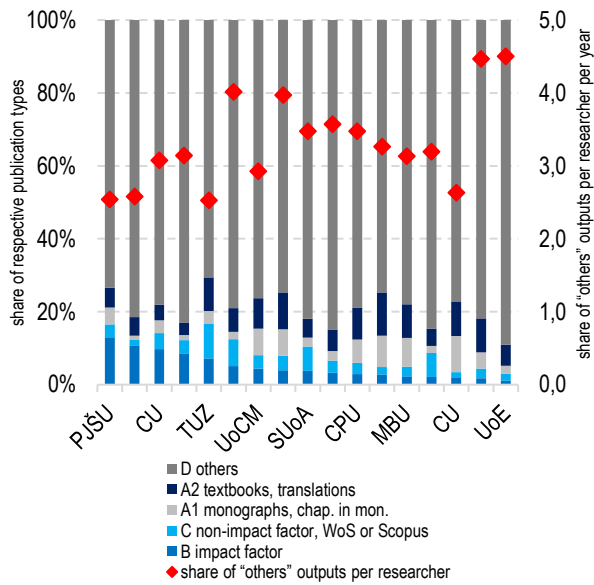
¹⁰⁵ In 2017 Slovak Research and Development Agency of the MoESRS SR had an allocation of EUR 28 mil., however, not all funds were acquired by public higher education institutions. SGA EUR 10.4 mil. and CEGA EUR 3 mil.

¹⁰⁶ These represent budgeted expenditures for 2017 from the government budget on research and technology without expenditures on the SAS, EU funds and co-financing from the GB and expenditure on Ministry's research. In international comparison, Slovakia is among countries with an extra high share of institutional funding.

https://www.researchgate.net/profile/Koen_Jonkers/publication/303488024_Research_Performance_Based_Funding_Systems_a_Comparative_Assessment/links/574556fd08ae9ace8421b154.pdf.

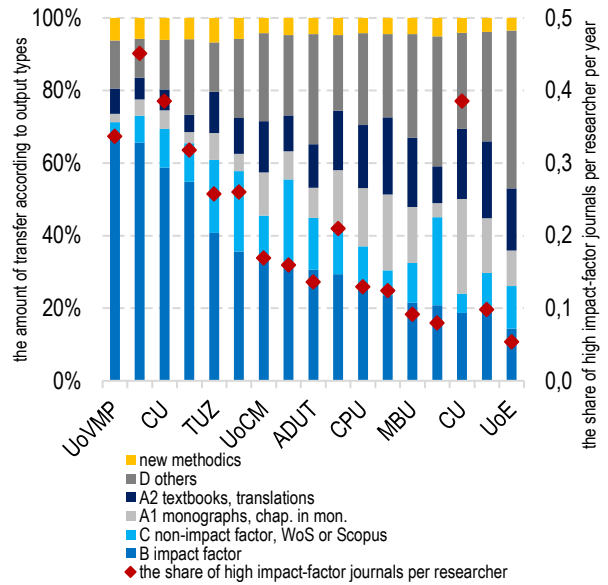
¹⁰⁷ According to the WoS database Slovakia attains 179 articles in conference proceedings per 1 million inhabitants in the fields of Economics, Finance, Management and Business, whereas Poland only 10, Germany and the USA 3 articles.

Graph 31: The share of research output types according to HEI¹⁰⁸



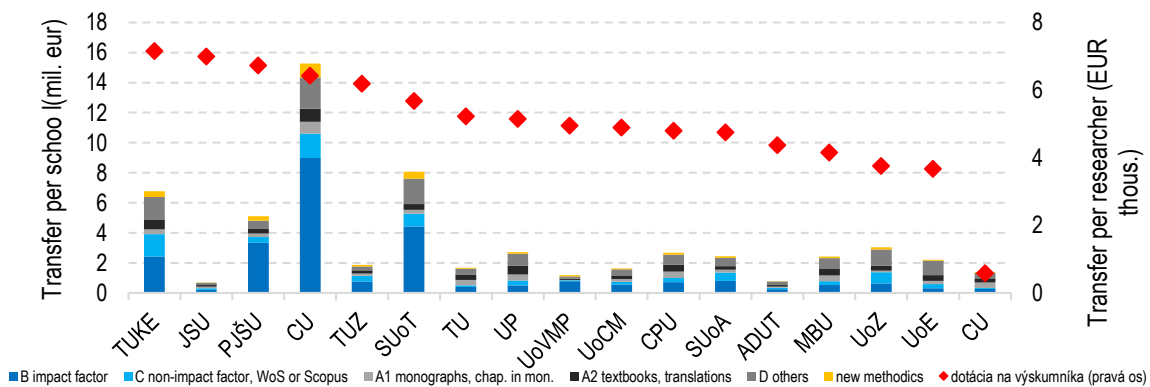
Source: Transfer breakdown methodology of PHEI 2017, Annual reports on the state of tertiary education 2014, 2015

Graph 32: The share of research output types in transfers for publications for HEI¹⁰⁸



Source: Transfer breakdown methodology of PHEI 2017, Annual reports on the state of tertiary education 2014, 2015

Graph 33: Transfers for publications according to research output types (EUR mil.) and transfer per researcher (EUR thous.)



Source: Transfer breakdown methodology of PHEI 2017, Annual reports on the state of tertiary education 2014, 2015

¹⁰⁸ Scientific outputs for 2014 and 2015 (source: Transfer breakdown methodology of PHEI 2017), researchers: average re-calculated number of scientific and research staff that has worked at the institution in 2014 and 2015 (Source: Annual reports on the state of tertiary education 2014 and 2015).

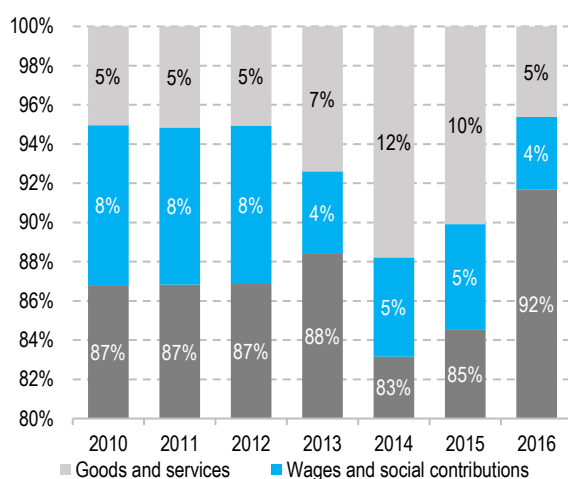
5 Expenditures of MoESRS SR organisations

- Operational MoESRS expenditure (without transfers) in 2010–2016 on average accounted for EUR 201 mil. per year. Without regional educational authorities which were delimited to the chapter of the Ministry of Interior SR in 2013, on average they account for EUR 161 mil. per year.
- Personnel costs of the Ministry of Education have been increasing since 2012 at an average rate of approximately 4% per year. Their decomposition shows an average decrease of employment rate by 1% per year together with an increase in wages by 5% per year.
- Expenditures of multiple MoESRS SR organisations were significantly influenced by the absorption of EU funds. Therefore, between 2012 and 2014 personnel expenditure as well as expenditure related to goods and services approximately doubled and in 2016 subsequently decreased almost to their original level.
- Investments within the Ministry of Education approximately account for 10% of the chapter's budget (on average EUR 150 mil. per year).
- Almost all previous and future investments within the chapter of the Ministry of Education are implemented through operational programmes Research and Development or Research and Innovation.

5.1 Operational expenditure

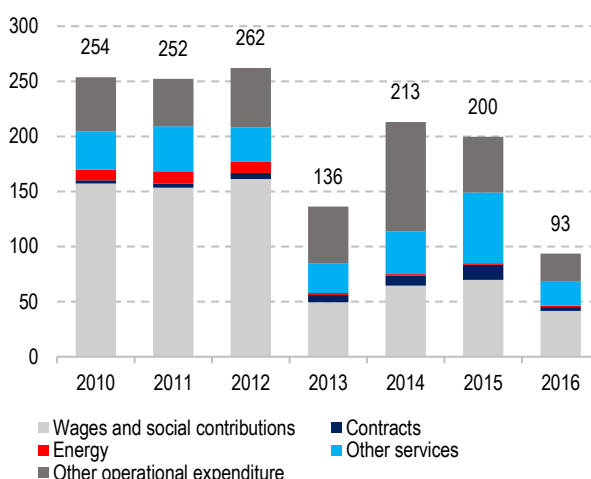
Expenditure related to goods and services together with personnel expenditure have in 2010–2016 on average accounted for 13% of operational expenditure of the MoESRS chapter. The remaining operational expenditure whose total ranges from EUR 1.1–2.0 bil. is represented by transfers, particularly to public higher education institutions and higher territorial units.

Graph 34: Main categories of operational expenditure (%) 2010–2016



Source: BIS, VMC

Graph 35: Chapter's operational expenditure structure without transfers (in EUR mil.), 2010–2016



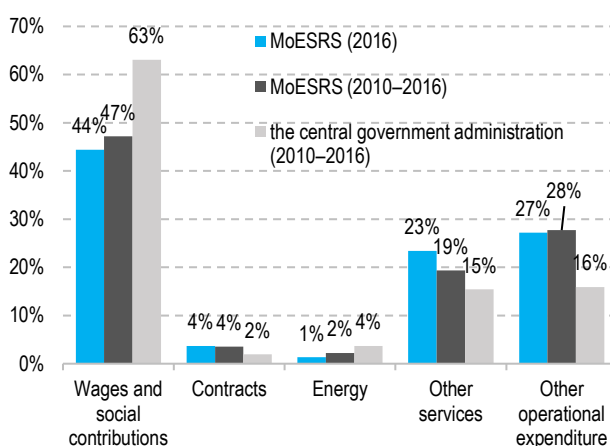
Source: BIS, VMC

Operational MoESRS expenditure (without transfers) in 2010–2016 is approximately at the level of EUR 201 mil. per year, more than 80% is represented by personnel expenditure and expenditure related to services. Expenditure has significantly decreased in 2013 after the delimitation of regional educational authorities into the chapter of the Ministry of Interior SR, to EUR 161 mil. per year.

The ratio between personnel costs and expenditure related to services (Graph 36) is tilted towards services when compared to the average of the government administration. The situation is also similar in case of IT expenditure (Graph 38): the Ministry of Education spends several times more of its IT expenditure as well as expenditure

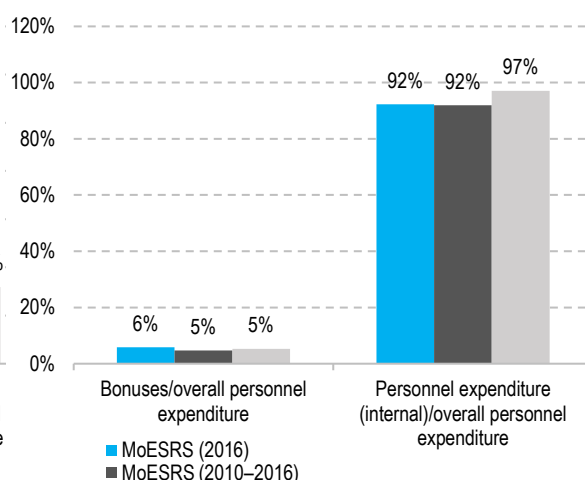
on all services on external IT services (guaranteed delivery of IT supplies which the Ministry does not possess internally) than the average of the government administration.

Graph 36: Chapter's operational expenditure structure without transfers (2010–2016), %



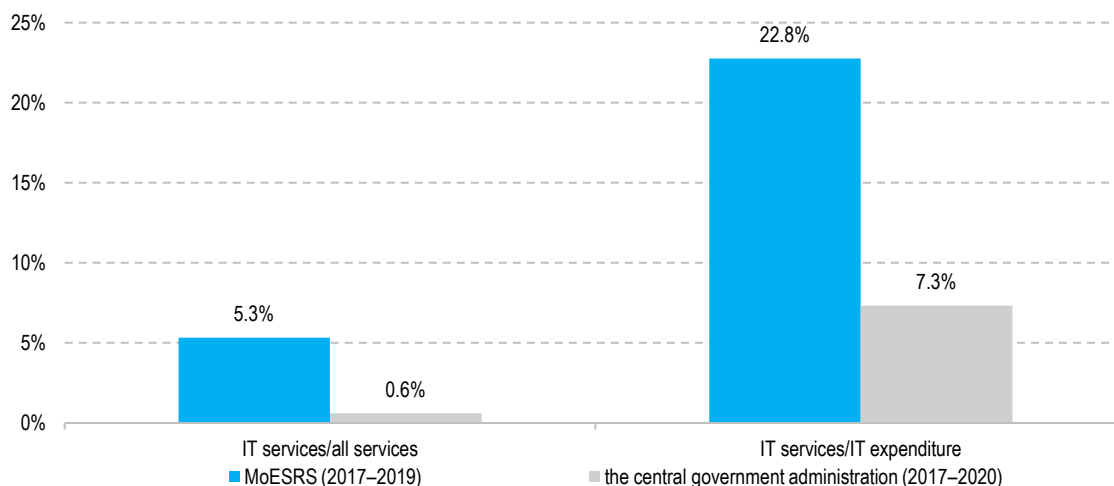
Source: BIS, VMC

Graph 37: Chapter's personnel expenditure – selected indicators (2010–2016), %



Source: BIS, VMC

Graph 38: Chapter's expenditure related to IT services – selected indicators (2017–2020)



Note: The data represent the average of 2017–2019 due to a different classification before 2017.

Source: BIS, VMC

The Office of the MoESRS spends a higher share than the average of offices for services (significantly more for special services and bonuses for employees outside employment relationship), material, energy, water and communication.

Table 15: Office's expenditure with a significantly higher share in operational expenditure (2010–2016)

| Expenditure | Office of the MoESRS | Office of the MoESRS | All offices |
|---|----------------------|------------------------------|-------------|
| | EUR mil. | % of operational expenditure | |
| Material | 13.4 | 33% | 8% |
| Services | 9.9 | 25% | 19% |
| Special services | 5.1 | 13% | 8% |
| Bonuses for employees outside employment relationship | 0.7 | 2% | 0.4% |
| Energy, water and communication | 3.0 | 7% | 5% |

Note: Special services represent a sub-item of economic classification 637004, the definition is established by the MoF SR in the methodological guidance n° MF/010175/2004-42

Source: BIS, VMC

Contributory and budgetary organisations

The MoESRS SR performs its activity either directly in its Office or through subordinate contributory and budgetary organisations established for this purpose (CBO). Together there are 17 organisations within the Ministry of Education, while two of them deal exclusively with sport and therefore, are not subject of the review. Analysed DMO significantly differ from another – Slovak Research and Development Agency (SRDA) annually distributes more than EUR 25 million for research and development, while the Slovak Historical Institution in Rome has 2 employees. Depending on the involvement in EU projects, subordinate organisations employ approximately 1,200 to 2,500 employees, the Office of the Ministry of Education approximately 540 people.

Table 16: List of subordinate DMO within the Ministry of Education

| Abbreviation | Name | Main activity | Type of activity |
|--------------|---|--|------------------|
| SRDA | Slovak Research and Development Agency | Support of research and development, grants | grants |
| SCoSTI | Slovak Centre of Scientific and Technical Information | Library services, scientific databases, ministerial statistics, popularisation of research and technology, Museum of Education and Pedagogy | support |
| STCH | Slovak Teachers' Choir Home | Ensuring the operation of teachers' ensembles | culture |
| IUVENTA | IUVENTA | Work with youth, grants for youth organisations, school subject Olympics | grants |
| ILC | International Laser Centre | Scientific institution | research |
| MPC | Methodology and Pedagogy Centre | Methodical activity, education of pedagogical and non-pedagogical staff in education, attestations | support |
| NUCEM | National Institute for Certified Educational Measurements | National and international measurements (Testovanie 5,9, external part of the upper secondary school leaving exam (maturita), PISA, PIRLS, TIMMS) | control |
| NLLI | National Lifelong Learning Institute | Creation of complex lifelong learning system, creation and implementation of educational programmes, international assessment of adults PIAAC | support |
| SHIR | Slovak Historical Institution in Rome | Research in historical archives | research |
| SPL | Slovak Pedagogical Library | Specialised scientific library focused on the area of education and related disciplines, methodologically manages libraries. | support |
| GIVE | Government Institute of Vocational Education | Expert and methodological management of secondary schools, ensuring expert and pedagogical as well as educational activities of secondary vocational education | support |
| NIE | National Institute for Education | Creation of national educational programmes for general-education subjects, verification, experiments | support |
| SSI | State School Inspection | Inspection activity | control |
| RA | Research Agency | Ensuring the implementation process of assistance from EU Structural Funds | support |
| RICPaP | The Research Institute for Child Psychology and Pathopsychology | Research of psychological aspects in relation to the development of children and youth | research |

DMO deals with several types of activities – e.g. the support of teachers and schools, distribution of grants or research. The support for schools is provided by the *National Institute for Education (NIE)*, *Government Institute of Vocational Education (GIVE)* and the *Methodology and Pedagogy Centre (MPC)*. Two institutions,

the *State School Inspection (SSI)* and the *National Institute for Certified Educational Measurements (NUCEM)*, help the state control the quality of education.

Three organisations predominantly work in research (*International Laser Centre (ILC)*, *Research Institute for Child Psychology and Pathopsychology (RICPaP)*, *Slovak Historical Institution in Rome (SHIR)*). For two of them the agenda consists of grant distribution, IUVENTA to youth organisation and the Slovak Research and Development Agency (SRDA) allocates grants for research. Research and development is also supported by the Research Agency (RA) whose agenda is to ensure the implementation process of assistance from EU Structural Funds.

Slovak Teachers' Choir Home (STCH) ensures the operation of teachers' choirs and the *Slovak Pedagogical Library (SPL)* manages historical library stocks. NLLI deals with the support of lifelong learning. The largest organisation, *The Slovak Centre of Scientific and Technical Information (SCoSTI)* deals with several areas at the same time, it manages statistical data and registries for the Ministry, supports research and development and also manages the scientific library and access to scientific databases.

More than 70% of subordinate organisation expenditures in 2013–2015 accumulated in four of them, in recent years many have been almost completely funded by EU funds. More than 70% of expenditures of seven organisations in 2013–2015 was funded from European funds (including co-financing) when they implemented directly allocated national projects.

Table 17: Expenditure of subordinate DMO for 2013–2015, on average per year

| | Expenditure without transfers | Transfers | Total expenditures | EU share + co- financing* | Share of capital expenditure | Number of employees | Share of wage costs* |
|----------------------|-------------------------------------|---------------|-----------------------|------------------------------|---------------------------------|------------------------|-------------------------|
| <i>EUR thousands</i> | | | | | | | |
| SCoSTI | 44,389 | 4,719 | 49,108 | 78% | 32% | 494 | 23% |
| MPC | 26,385 | 6,792 | 33,176 | 80% | 0% | 449 | 39% |
| SRDA | 1,490 | 25,137 | 26,627 | 0% | 0% | 48 | 62% |
| GIVE | 31,219 | 24 | 31,244 | 95% | 0% | 271 | 21% |
| NLLI | 10,759 | 1,408 | 12,167 | 94% | 0% | 123 | 22% |
| NUCEM | 10,067 | 524 | 10,591 | 81% | 1% | 195 | 33% |
| IUVENTA | 4,897 | 3,519 | 8,415 | 44% | 1% | 104 | 39% |
| RA | 6,561 | 23 | 6,584 | 73% | 0% | 217 | 76% |
| SSI | 4,199 | 50 | 4,249 | 2% | 3% | 206 | 83% |
| RICPaP | 5,189 | 4 | 5,193 | 83% | 0% | 84 | 35% |
| NIE | 3,700 | 61 | 3,762 | 31% | 0% | 60 | 32% |
| ILC | 848 | 148 | 996 | 21% | 25% | 31 | 55% |
| STCH | 376 | 7 | 383 | 0% | 0% | 21 | 58% |
| SPL | 350 | 1 | 351 | 0% | 7% | 17 | 64% |
| SHIR | 77 | 1 | 78 | 0% | 0% | 1 | 44% |
| Total | 150,507 | 42,417 | 192,923 | 77% | 9% | 2,321 | 32% |

* calculated from expenditure without transfers

Source: BIS

Together with the decreasing trend in subordinate organisation expenditures, which is connected to a larger allocation of EU funds to demand-driven projects, a question of further operation of some DMO arises. The spending review recommends to examine the activities of subordinate DMO with the aim to evaluate their continued operation, separation from the Office of the Ministry as well as other organisations. The efficiency in ensuring their activities through chapters should be evaluated, alternatives such as transferring competences, procurement of external suppliers as well as transferring activities to the private (non-profit) sector (with the support of the state) should be considered as well. At the same time it should in particular take into consideration the cost efficiency, agenda which they perform, the need for availability in relation to clients, independence and public interest.

The majority of expenditures in subordinate budgetary and contributory organisations of the chapter is represented by operational expenditure, wage and social contribution expenditure approximately accounted for one third of expenditures without transfers. In 2014 the expenditure increased by almost 40%, in comparison to 2013, in 2016 they decreased to half when compared to 2015.

Human resources

Personnel costs of the Ministry of Education have been increasing since 2012 at an average rate of approximately 4% per year. The development of total costs was significantly influenced by the depletion of EU funds. They have been increasing together with the employment rate until 2015, in 2016 they returned to the level from 2012. The employment rate in the MoESRS SR chapter has decreased from its maximum in 2015 (EUR 82 mil., 2,865 employees) to 1,804 employees (EUR 44 mil.).

Table 18: Development of personnel costs related to organisations of the Ministry of Education (2012–2016)

| | Personnel costs (EUR thous.) | | | | | Change of personnel costs (2012 = 100%) | | | | Average increase |
|----------------------|------------------------------|---------------|---------------|---------------|---------------|---|-------------|-------------|-------------|------------------|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2013 | 2014 | 2015 | 2016 | |
| SRDA | 1,290 | 1,254 | 921 | 964 | 1,258 | 97% | 71% | 75% | 98% | -1% |
| SCoSTI + IEIP | 3,964 | 7,437 | 12,002 | 14,188 | 4,832 | 188% | 303% | 358% | 122% | 5% |
| STCH | 224 | 223 | 223 | 232 | 234 | 99% | 99% | 104% | 104% | 1% |
| IUVENTA | 1,472 | 2,349 | 2,625 | 2,177 | 1,179 | 160% | 178% | 148% | 80% | -5% |
| ILC | 572 | 546 | 499 | 393 | 405 | 95% | 87% | 69% | 71% | -8% |
| MPC | 5,793 | 10,233 | 14,379 | 17,180 | 4,353 | 177% | 248% | 297% | 75% | -7% |
| NUCEM | 1,254 | 2,335 | 4,895 | 4,067 | 1,019 | 186% | 390% | 324% | 81% | -5% |
| NLLI | 255 | 2,532 | 2,646 | 2,797 | 571 | 994% | 1,039% | 1,098% | 224% | 22% |
| SHIR | 0 | 0 | 36 | 47 | 52 | | 100% | 132% | 146% | |
| SPL | 220 | 239 | 239 | 242 | 252 | 109% | 109% | 110% | 114% | 3% |
| GIVE | 970 | 4,121 | 9,115 | 10,816 | 2,247 | 425% | 940% | 1,115% | 232% | 23% |
| NIE | 1,936 | 1,806 | 1,335 | 1,355 | 1,247 | 93% | 69% | 70% | 64% | -10% |
| SSI | 3,547 | 3,448 | 3,557 | 3,630 | 4,156 | 97% | 100% | 102% | 117% | 4% |
| RA | 4,636 | 5,067 | 4,816 | 5,108 | 4,652 | 109% | 104% | 110% | 100% | 0% |
| RICPaP | 560 | 1,377 | 2,180 | 3,245 | 823 | 246% | 390% | 580% | 147% | 10% |
| Office of the MoESRS | 10,867 | 12,220 | 13,058 | 15,537 | 16,828 | 112% | 120% | 143% | 155% | 12% |
| Total | 37,559 | 55,186 | 72,527 | 81,979 | 44,108 | 147% | 193% | 218% | 117% | 4% |

* since 1.1.2014 SCoSTI has been merged with IEIP (Institute of Educational Information and Prognoses)

Source: BIS

Human resources costs funded from the government budget have increased between 2012–2016 by 40%, this translated into an annual increase by approximately 9%. Personnel costs from the government budget funding increased equally from EUR 24 mil. in 2012 to EUR 33 mil. in 2016. More than a double increase of total costs connected to human resources (as well as the decrease to the level from 2012) was caused by human resources, covered by European funds (these were fixed-term positions during the implementation of projects). The average wage increased throughout the duration of projects and decreased after their completion. The number of employees includes staff hired for a fixed-term as well (Table 21).

Table 19: Development of personnel costs related to organisations of the Ministry of Education, funded from the GB (2012–2016)

| | Personnel costs from the government budget (EUR thous.) | | | | | Change of personnel costs from the GB (2012 = 100%) | | | | Average increase |
|-------------------------|--|---------------|---------------|---------------|---------------|--|-------------|-------------|-------------|---------------------|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2013 | 2014 | 2015 | 2016 | |
| SRDA | 1,290 | 1,254 | 921 | 964 | 1,258 | 97% | 71% | 75% | 98% | -1% |
| SCoSTI + IEIP* | 3,032 | 3,681 | 2,930 | 3,505 | 3,150 | 121% | 97% | 116% | 104% | 1% |
| STCH | 204 | 198 | 192 | 202 | 211 | 97% | 94% | 99% | 103% | 1% |
| IUVENTA | 750 | 761 | 721 | 742 | 734 | 101% | 96% | 99% | 98% | -1% |
| ILC | 314 | 312 | 322 | 306 | 310 | 99% | 103% | 97% | 99% | 0% |
| MPC | 2,380 | 2,614 | 3,593 | 3,383 | 4,250 | 110% | 151% | 142% | 179% | 16% |
| NUCEM | 724 | 661 | 1,016 | 623 | 967 | 91% | 140% | 86% | 134% | 8% |
| NLLI | 211 | 170 | 166 | 171 | 288 | 81% | 79% | 81% | 136% | 8% |
| SHIR | 0 | 0 | 36 | 47 | 52 | | 100% | 131% | 144% | |
| SPL | 220 | 239 | 239 | 242 | 252 | 109% | 109% | 110% | 115% | 3% |
| GIVE | 661 | 939 | 786 | 761 | 2,040 | 142% | 119% | 115% | 309% | 33% |
| NIE | 1,041 | 1,076 | 1,172 | 986 | 1,238 | 103% | 113% | 95% | 119% | 4% |
| SSI | 3,502 | 3,360 | 3,557 | 3,630 | 4,156 | 96% | 102% | 104% | 119% | 4% |
| RA | 559 | 402 | 356 | 1,805 | 907 | 72% | 64% | 323% | 162% | 13% |
| RICPaP | 560 | 606 | 595 | 662 | 765 | 108% | 106% | 118% | 137% | 8% |
| Office of the MoESRS | 8,425 | 9,715 | 9,768 | 12,124 | 12,859 | 115% | 116% | 144% | 153% | 11% |
| Total | 23,873 | 25,988 | 26,370 | 30,153 | 33,437 | 109% | 110% | 126% | 140% | 9% |

* since 1.1.2014 SCoSTI has been merged with IEIP (Institute of Educational Information and Prognoses)

Source: BIS

The largest fluctuation with regards to the number of employees were in agencies which implemented European projects, this concerned the fixed-term staff. SCoSTI, MPC, NUCEM, but also NLLI and GIVE, all of them have implemented programmes within the OP Education and OP R&D The largest increase in employees occurred in NLLI and GIVE between 2012–2015 (up to 1,000% in comparison to 2012) who were employees for a fixed-term and left the organisation in 2016. Organisations who have not directly implemented European projects (e.g. SPL, ILC or SRDA) did not register large changes in terms of employment. The overall employment rate of the Ministry decreased between 2012 and 2016 by an average rate of 1% per year.

Table 20: Development of the number of employees in organisations of the Ministry of Education (2012–2016)

| | number of employees* | | | | | change in the number of employees (2012 = 100%) | | | | Average increase |
|-------------------------|----------------------|--------------|--------------|--------------|--------------|--|-------------|-------------|------------|---------------------|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2013 | 2014 | 2015 | 2016 | |
| SRDA | 52 | 51 | 48 | 46 | 46 | 98% | 92% | 88% | 88% | -3% |
| SCoSTI + IEIP | 256 | 450 | 552 | 481 | 252 | 176% | 216% | 188% | 98% | 0% |
| STCH | 21 | 21 | 23 | 20 | 24 | 101% | 111% | 94% | 115% | 3% |
| IUVENTA | 71 | 101 | 112 | 99 | 61 | 142% | 158% | 139% | 86% | -4% |
| ILC | 33 | 34 | 28 | 32 | 27 | 105% | 86% | 98% | 83% | -5% |
| MPC | 292 | 377 | 480 | 489 | 185 | 129% | 164% | 167% | 63% | -11% |
| NUCEM | 61 | 107 | 284 | 193 | 43 | 176% | 465% | 317% | 70% | -8% |
| NLLI | 11 | 155 | 108 | 107 | 34 | 1,424% | 990% | 983% | 314% | 33% |
| SHIR | 0 | 0 | 1 | 1 | 2 | | 100% | 118% | 136% | |
| SPL | 17 | 17 | 17 | 17 | 17 | 102% | 103% | 103% | 103% | 0% |
| GIVE | 38 | 225 | 284 | 303 | 66 | 595% | 751% | 802% | 174% | 15% |
| NIE | 80 | 75 | 58 | 48 | 47 | 94% | 73% | 60% | 59% | -12% |
| SSI | 219 | 214 | 203 | 200 | 199 | 98% | 93% | 91% | 91% | -2% |
| RA | 217 | 220 | 219 | 211 | 185 | 101% | 101% | 97% | 85% | -4% |
| RICPaP | 48 | 69 | 87 | 96 | 59 | 143% | 180% | 199% | 123% | 5% |
| Office of the MoESRS | 456 | 468 | 494 | 522 | 557 | 100% | 106% | 112% | 119% | 5% |
| Total | 1,872 | 2,584 | 2,998 | 2,865 | 1,804 | 150% | 177% | 166% | 88% | -1% |

* recalculated number of employees, rounded to whole persons

Source: BIS

** since 1.1.2014 SCoSTI has been merged with IEIP (Institute of Educational Information and Prognoses)

Average wages have increased since 2012 by 21% (5% per year on average), to the largest extent in 2015. The highest salaries are in the SHIR (situated in Italy, only two employees) and in the Research Agency and the Office of the Ministry, until 2016 they have increased most rapidly in the GIVE, MPC and NUCEM.

Table 21: Development of average wages in organisations of the Ministry of Education (2012–2016)

| | average monthly salary | | | | | change of the average salary (2012 = 100%) | | | | Average increase |
|----------------------|------------------------|--------------|--------------|--------------|--------------|--|-------------|-------------|-------------|------------------|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2013 | 2014 | 2015 | 2016 | |
| SRDA | 1,087 | 1,055 | 1,140 | 1,135 | 1,302 | 97% | 105% | 104% | 120% | 5% |
| SCoSTI + IEIP | 866 | 936 | 1,229 | 1,430 | 1,000 | 108% | 142% | 165% | 115% | 4% |
| STCH | 576 | 578 | 552 | 670 | 540 | 100% | 96% | 116% | 94% | -2% |
| IUVENTA | 898 | 942 | 1,077 | 1,125 | 916 | 105% | 120% | 125% | 102% | 0% |
| ILC | 977 | 975 | 1,063 | 738 | 916 | 100% | 109% | 76% | 94% | -2% |
| MPC | 1,025 | 1,136 | 1,193 | 1,356 | 1,326 | 111% | 116% | 132% | 129% | 7% |
| NUCEM | 927 | 1,036 | 927 | 1,104 | 1,200 | 112% | 100% | 119% | 129% | 7% |
| NLLI | 1,136 | 711 | 1,360 | 1,388 | 900 | 63% | 120% | 122% | 79% | -6% |
| SHIR | | | 1,629 | 1,621 | 1,543 | | 100% | 100% | 95% | |
| SPL | 731 | 770 | 787 | 802 | 831 | 105% | 108% | 110% | 114% | 3% |
| GIVE | 1,023 | 967 | 1,517 | 1,478 | 1,438 | 95% | 148% | 144% | 141% | 9% |
| NIE | 1,137 | 1,119 | 1,101 | 1,163 | 1,269 | 98% | 97% | 102% | 112% | 3% |
| SSI | 1,002 | 986 | 1,071 | 1,104 | 1,269 | 98% | 107% | 110% | 127% | 6% |
| RA | 1,273 | 1,399 | 1,362 | 1,478 | 1,517 | 110% | 107% | 116% | 119% | 4% |
| RICPaP | 714 | 1,138 | 1,187 | 1,300 | 837 | 159% | 166% | 182% | 117% | 4% |
| Office of the MoESRS | 1,389 | 1,474 | 1,472 | 1,619 | 1,680 | 106% | 106% | 117% | 121% | 5% |
| Total | 1,100 | 1,109 | 1,245 | 1,374 | 1,342 | 101% | 113% | 125% | 122% | 5% |

* since 1.1.2014 SCoSTI has been merged with IEIP (Institute of Educational Information and Prognoses)

Source: BIS

Goods and services

The majority of the expenditure on goods and services was represented by European funds (70% in 2015, including co-financing), in 2016 it was lower in comparison to 2012. Expenditure on goods and services has increased the most between 2013 and 2014 (almost doubled), almost the entire increase was funded from European funds (expenditure from GB funds almost did not increase). In 2016 after the completion of the programming period total expenditures fell to two thirds of the amount from 2012.

Table 22: Expenditure on goods and services, all funds

| | Expenditure on goods and services, all funds (EUR thous.) | | | | | Change of expenditure on goods and services (2012 = 100%) | | | |
|----------------------|---|---------------|----------------|----------------|---------------|---|-------------|-------------|------------|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2013 | 2014 | 2015 | 2016 |
| SRDA | 438 | 416 | 376 | 469 | 664 | 95% | 86% | 107% | 152% |
| SCoSTI + IEIP | 16,802 | 14,047 | 20,284 | 17,808 | 5,075 | 84% | 121% | 106% | 30% |
| STCH | 147 | 148 | 154 | 148 | 159 | 100% | 105% | 100% | 108% |
| IUVENTA | 1,875 | 2,372 | 2,951 | 2,044 | 1,186 | 127% | 157% | 109% | 63% |
| ILC | 364 | 275 | 211 | 204 | 194 | 75% | 58% | 56% | 53% |
| MPC | 10,712 | 6,199 | 11,373 | 19,712 | 6,485 | 58% | 106% | 184% | 61% |
| NUCEM | 1,004 | 2,889 | 12,877 | 2,734 | 1,679 | 288% | 1,283% | 272% | 167% |
| NLLI | 964 | 9,585 | 8,609 | 6,109 | 395 | 994% | 893% | 634% | 41% |
| SHIR | 0 | 0 | 35 | 37 | 34 | | 100% | 104% | 96% |
| SPL | 92 | 93 | 107 | 108 | 104 | 101% | 116% | 117% | 113% |
| GIVE | 894 | 7,615 | 32,124 | 29,865 | 980 | 851% | 3,592% | 3,339% | 110% |
| NIE | 5,483 | 3,139 | 2,320 | 1,141 | 381 | 57% | 42% | 21% | 7% |
| SSI | 644 | 581 | 506 | 526 | 547 | 90% | 79% | 82% | 85% |
| RA | 1,159 | 1,151 | 1,810 | 1,684 | 1,249 | 99% | 156% | 145% | 108% |
| RICPaP | 108 | 3,611 | 3,336 | 1,799 | 434 | 3,329% | 3,075% | 1,659% | 400% |
| Office of the MoESRS | 21,221 | 27,621 | 41,561 | 30,630 | 27,664 | 130% | 196% | 144% | 130% |
| Total | 61,909 | 79,744 | 138,635 | 115,018 | 47,230 | 129% | 224% | 186% | 76% |

* since 1.1.2014 SCoSTI has been merged with IEIP (Institute of Educational Information and Prognoses)

Source: BIS

Expenditures funded from the government budget slightly decreased between 2012–2015. They began to increase after the completion of the programming period in 2016 and have returned to the level from 2012.

Table 23: Expenditure on goods and services, funded from the government budget

| | Expenditure on goods and services, government budget (EUR thous.) | | | | | Change of expenditure on goods and services (2012 = 100%) | | | |
|----------------------|---|---------------|---------------|---------------|---------------|---|-------------|------------|------------|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2013 | 2014 | 2015 | 2016 |
| SRDA | 438 | 416 | 376 | 469 | 664 | 95% | 86% | 107% | 152% |
| SCoSTI + IEIP | 11,160 | 7,479 | 7,049 | 1,949 | 2,970 | 67% | 63% | 17% | 27% |
| STCH | 107 | 109 | 117 | 106 | 97 | 101% | 109% | 99% | 90% |
| IUVENTA | 566 | 791 | 747 | 744 | 794 | 140% | 132% | 131% | 140% |
| ILC | 106 | 85 | 81 | 72 | 77 | 80% | 77% | 68% | 72% |
| MPC | 993 | 734 | 2,057 | 3,007 | 6,432 | 74% | 207% | 303% | 648% |
| NUCEM | 789 | 931 | 1,028 | 1,120 | 1,603 | 118% | 130% | 142% | 203% |
| NLLI | 872 | 306 | 121 | 116 | 135 | 35% | 14% | 13% | 15% |
| SHIR | 0 | 0 | 35 | 37 | 34 | | 100% | 104% | 96% |
| SPL | 92 | 93 | 107 | 108 | 104 | 101% | 116% | 117% | 113% |
| GIVE | 578 | 583 | 1,031 | 610 | 980 | 101% | 178% | 106% | 170% |
| NIE | 3,644 | 1,195 | 2,189 | 845 | 375 | 33% | 60% | 23% | 10% |
| SSI | 569 | 525 | 502 | 526 | 547 | 92% | 88% | 93% | 96% |
| RA | 848 | 776 | 1,096 | 898 | 531 | 92% | 129% | 106% | 63% |
| RICPaP | 104 | 122 | 97 | 104 | 250 | 117% | 93% | 100% | 240% |
| Office of the MoESRS | 21,097 | 27,548 | 26,299 | 26,427 | 24,839 | 131% | 125% | 125% | 118% |
| Total | 41,963 | 41,693 | 42,933 | 37,138 | 40,430 | 99% | 102% | 89% | 96% |

* since 1.1.2014 SCoSTI has been merged with IEIP (Institute of Educational Information and Prognoses)

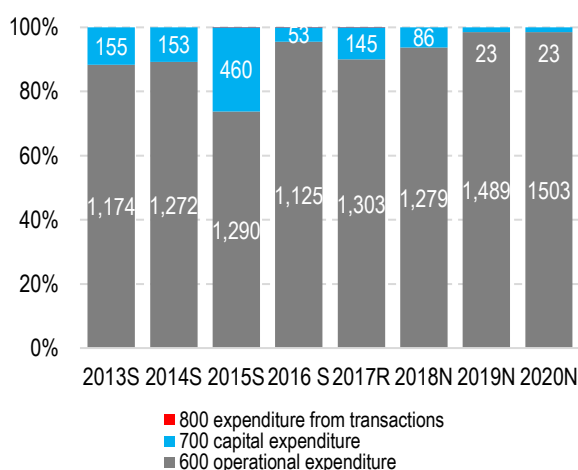
Source: BIS

5.2 Capital expenditure

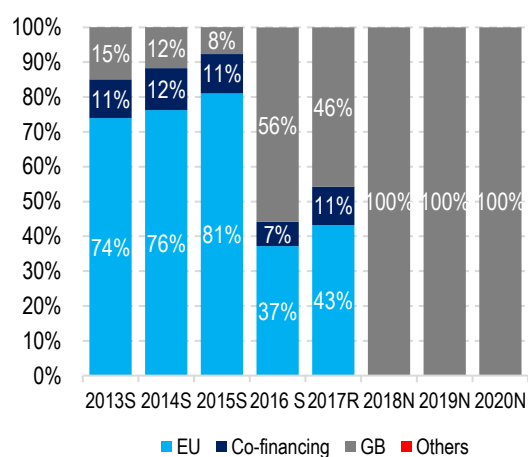
Investments within the Ministry of Education approximately account for 10% of the chapter's budget (on average approximately EUR 150 mil. per year). Until 2015 investments were primarily funded from European sources (almost 90% including co-financing). In 2016 sources from European funds and GB were approximately equal, the total investment budget decreased to EUR 53 mil. (4% of the budget). The 2017 budget estimates an increase of investment expenditure to EUR 145 mil., approximately half is represented by investments within the OP R&I. The draft budget for 2018–2020 only estimates investments from the GB (in 2019 and 2020 only EUR 23 mil.), expected investments from the OP R&I are not currently developed within the budget.

However, 2015 was an exceptional year where due to the depletion of funds from the programming period investments increased to EUR 460 mil. (413 mil. within the OP R&D). On the other hand, 2016 was a mirror year where the share of investments funded from ESIF decreased below 40% and total investments decreased to EUR 53 mil.

Graph 39: Distribution of MoESRS SR expenditure (2013–2020)



Graph 40: Investment costs of the MoESRS SR according to the source of funding (2013–2020)



Source: BIS

Almost all investments of the chapter of the Ministry of Education in 2013–2016 were undertaken through operation programmes Research and Development or Research and Innovation (90% in 2015, the expectation for 2017 is 50%). It is not possible to acquire more detailed information on the investments within the OP R&D/R&I for 2018–2020, most of them are classified as operational expenditure, transfers to public higher education institutions, other legal persons and as *Advances for European Union projects*. We recommend to budget all planned investments for projects within the OP R&I at the level of investment actions.

The largest investment planned within the OP R&I is the Accord project whose aim is to increase the competitiveness and attractiveness of the Comenius University and the Slovak University of Technology and support their co-operation in the area of research and innovation through coordinated investments into research and innovation capacities and infrastructure. Estimated costs account for EUR 52.5 mil., no CBA or feasibility study was developed for the project before its introduction to the operational programme, they are currently being processed in co-operation with JASPERS. Expenditures on the Accord project are not itemized within the draft budget. We recommend to have the ACCORD project economically evaluated by the MoF SR before submitting the project to the JASPERS evaluation (IQR).

For the upcoming years the only other significant investment is the construction of the National Football Stadium in Bratislava. The MoESRS SR estimates total expenditures of 90.24, the investment action in the table below

contains only EUR 74 mil. allocated from the government budget¹⁰⁹. We recommend to develop and publish an investment plan of the Ministry of Education, regardless of the source of funding. Respective subject areas of the investment plan (education, research and development and innovation) can be updated separately.

Table 24: The largest investment actions of the Ministry of Education, EUR mil. (2013–2020)

| Investments in MoESRS SR programmes | 2013S | 2014S | 2015S | 2016 S | 2017R | 2018N | 2019N | 2020N |
|---|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|
| OP Research and Development | 123.4 | 119.3 | 413.3 | 17.2 | | | | |
| Support of research and development | 64.5 | 60.8 | 233.8 | 6.2 | | | | |
| Research and development infrastructure | 26.7 | 38.6 | 136.9 | 8.2 | | | | |
| Higher education institution infrastructure | 32.2 | 19.9 | 39.3 | 2.8 | | | | |
| OP Research and Innovation | | | | 0.1 | 78.7 | 0 | 0 | 0 |
| National Programme for Sport Development SR | 5.6 | 5.5 | 5.7 | 5.3 | 48.5 | 68.3 | 5.3 | 5.3 |
| National Football Stadium | | | | | 10.6 | 63.0 | 0 | 0 |
| Reconstructions of football stadiums | 4.5 | 4.5 | 4.5 | 4.5 | 37.0 | 4.5 | 4.5 | 4.5 |
| Tertiary education and research, social support for students of higher education institutions | 14.6 | 9.2 | 3.3 | 7.8 | 8.1 | 8.1 | 8.1 | 8.1 |
| National Programme for Education and Youth | 1.1 | 0.6 | 17.2 | 5.1 | 7.6 | 7.7 | 7.7 | 7.7 |
| OP IS | 8.4 | 15.7 | 11.6 | 6.0 | | | | |
| Total | 155.0 | 153.0 | 460.0 | 52.8 | 142.8 | 84.2 | 21.1 | 21.1 |

Source: BIS

Box 8: The process of investment selection and evaluation

OP Research and Innovation (ESIF)

Projects within the OP R&I are divided according to priority axes among the MoESRS SR, MoE SR and the Research Agency. The selection process of projects within the OP R&I formally takes place similarly to other operational programmes. Financial analysis is required with projects that generate income, national projects are not subject to any economic testing.

1. *Strategy and setting of objectives*
 - a. Priority axes and objectives are set at the level of the operational programme.
 - b. The operational programme is initially approved by the SR government, afterwards by the European Commission.
 - c. The accordance with the Partnership Agreement, Research and Innovation Strategy for Smart Specialisation of SR and EC priorities is monitored.
 - d. Priority axes divided among the MoESRS SR, MoE SR and the Research Agency.
2. *Calls for proposals and project selection*
 - a. The OP R&I implies the implementation of one large project and several national projects. Most projects are demand-driven.
 - b. All calls for proposals related to demand-driven projects are evaluated by the Central Coordinating Authority (CCA), the accordance with objectives and investment priorities of the OP as well as with the rules for EU funds are monitored.
 - c. Calls for demand projects result from the RIS3 strategy. Before the introduction to an operational programme, national projects are consulted and approved by the European Commission.

¹⁰⁹ Without committed funds from previous years.

- d. The only “investment plan” is the indicative schedule of calls for proposals and the list of national projects.
- 3. *Selection of alternatives and economic assessment*
 - a. According to OP rules only a financial analysis is mandatory for projects. The operational programme does not require an economic analysis (CBA), it is not mandatory for any projects.
 - b. The selection of alternatives does not exist formally/methodologically, feasibility studies are not being developed.

Other investments

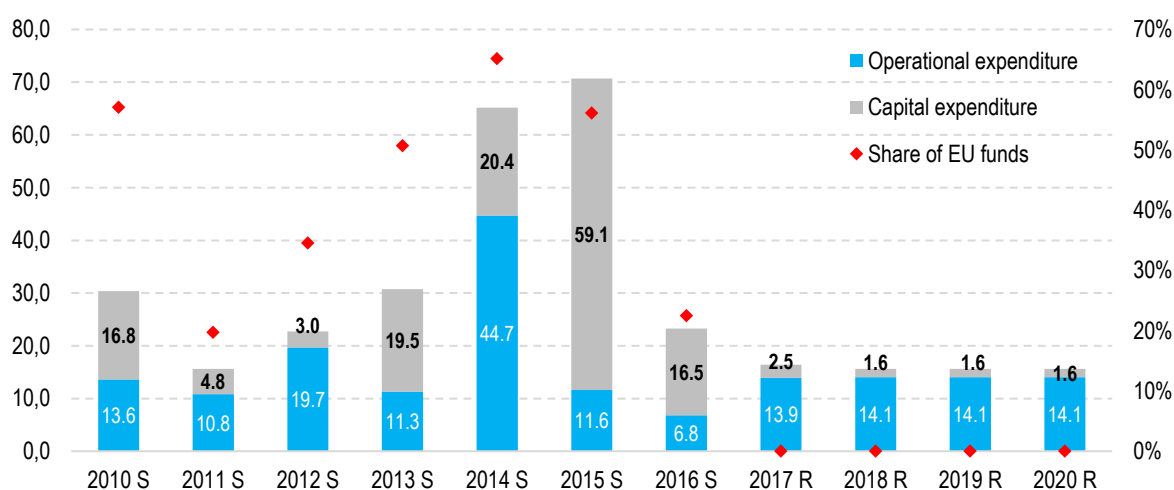
There is no methodology at the Ministry of Education for the economic assessment of investments and measures (their impact on budget, what benefits they will bring) which result from the programming and strategic documents. The materials also lack prioritization of measures.

For all investments above EUR 40 mil. (above 10 mil. in IT) a feasibility study and a cost-benefit analysis will be developed and published at the beginning of the investment process, in accordance with the Public Investment Assessment Framework. At the same time a ministerial methodology in education will be developed, which will be derived from the Public Investment Evaluation Framework and will specify parameters for the Ministry of Education.

5.3 IT expenditure and investments

IT expenditure of the chapter of the Ministry of Education, Science, Research and Sport SR (MoESRS SR)¹¹⁰ reaches the total of EUR 30 mil., the average for 2017–2020 is EUR 18 mil. which ranks it among the ministries with the highest IT expenditure. EU funds are significantly participating in funding, on average by almost a half. Planned IT expenditure of the MoE for 2018–2020 currently does not include sources from structural funds, nor known and planned, investments from structural funds which are not currently approved.

Graph 41: IT expenditure of MoE chapter 2010–2020 (EUR mil.), share of EU funds (% , right axis)



Source: BIS

¹¹⁰ Hardware, software, communication infrastructure and telecommunications technology expenditure. Definition according to the final report on the computerisation spending review, Annex 1 <http://goo.gl/MpIF12>.

For a long period of time IT expenditure has been concentrated in two organisations, at the Office of the Ministry itself and in the Slovak Centre of Scientific and Technical Information (SCoSTI), on average it reaches 75% of chapter expenditure. In case of the Office they account for 1% of expenditure, with regards to SCoSTI it accounts for 30% of the institution's budget. The analysis further deals only with the expenditure of the Office of the Ministry, SCoSTI expenditure is analysed separately.

Table 25: IT expenditure of MoE organisations (EUR mil.)

| Organisation | 2010 S | 2011 S | 2012 S | 2013 S | 2014 S | 2015 S | 2016 S | 2017 R | 2018 R | 2019 R | 2020 R |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| MoE | 2.7 | 1.8 | 3.6 | 14.5 | 40.3 | 35.7 | 16.3 | 14.8 | 13.9 | 13.9 | 13.9 |
| SCoSTI | 15.6 | 2.8 | 2.3 | 10.3 | 9.1 | 32.3 | 6.5 | 1.3 | 1.3 | 1.3 | 1.3 |
| Others | 12.1 | 11 | 16.8 | 5.9 | 15.8 | 2.7 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 |
| Total | 30.4 | 15.6 | 22.7 | 30.8 | 65.2 | 70.7 | 23.3 | 16.4 | 15.6 | 15.6 | 15.6 |

Source: BIS

Average IT expenditure of the Office of the Ministry in 2017–2020 accounts for EUR 16 mil. A large portion of IT expenditure of the Ministry of Education is directed to direct provision of connectivity and licensing services for elementary and secondary schools, not for the Office's development of information services. More than 80% of the Office's budget in 2017–2020 should be represented by operational costs, almost 50% of the approved budget in 2017 heads to 3 items – provision of Microsoft licences for elementary and secondary schools, provision of data services for schools (Infovek 2) and transfers for the academic data network SANET.

Table 26: The largest cost items (EUR mil.)

| Item | Expenditure | Share in the 2017 IT budget |
|--------------------|-------------|-----------------------------|
| Microsoft licences | 3.5 | 24% |
| SANET | 1.8 | 12% |
| Infovek 2 | 1.7 | 11% |
| Total | 7.0 | 47% |

Source: Ministry of Education

Licences for Microsoft products are ensured by the scheme reserved for educational institutions, the unit price (EUR 19/pc.) is seven times more favourable in comparison to *Academic Select*¹¹¹ licence models. The annual fee of EUR 3.5 mil is based on the number of teachers and enables pupils as well as teachers to use the software.

MoESRS SR manages more than 40 information systems. It does not analytically monitor their costs or key performance indicators¹¹² which would evaluate the implementation of expected benefits with regards to particular IS. The most important, in terms of budget, are the Information System of the Ministry, Circulation of Digital Educational Content (CSDEC), information system Digitalisation of the educational system of the Ministry of Education for a uniformed approach to e-services for particular agendas and the Digital Curriculum Within Reach project. Most information systems of the Ministry do not have explicitly settled copyrights.

The Ministry of Education already uses the governmental cloud for some systems, however, it does not have a long-term migration plan yet. It currently completes a detailed migration plan for all operated IS, together with a CBA and time-related impacts which is derived from an in-depth ICT audit¹¹³ and from experience connected to the implementation of the first migration wave of Ministry's information systems to the governmental cloud from the end of 2016.

Investments

The IT Investment Strategic Framework within the Ministry is defined by the Approach to the Computerisation and Digitalisation of Education to the 2020 perspective. However, the approach

¹¹¹ Favourable prices for educational institutions.

¹¹² Action plan proposals contain measurable parameters, their initial and required state of key systems.

¹¹³ Conducted under the guideline of the Ministry of Finance SR n°MF/020304/2014.

has no approved action plans and does not describe the investment selection methodology. The methodology for the selection of IT investments does not even exist in any other document at the Ministry. A better process organisation should enable to identify the best possible alternative.

One of the significant future investments of the Ministry is represented by the EDUNET_SK project with expected costs of EUR 53 million excluding VAT. The objective of the EDUNET_SK project is to provide guaranteed telecommunication and data services including the support and security for elementary and secondary schools for the duration of 48 months. A cost–benefit analysis or a different internal document which would document why the Ministry chose a centralised procurement for the entire territory including support is not available. However, until recently such obligation did not exist. The Ministry proceeded on the basis of existing experience and practice with the operation of a centralised solution (Infovek 2) and a decentralised solution (SANET) with regards to bandwidth, security and efficient management of services.

Other investments include the construction of a new licence portal for the administration and distribution of Microsoft licence keys, building of a Ministry Data Warehouse (MDWH) for the purposes of storing Ministry's historical data from the BIS and its enlargement by means of data sources of other agendas and projects.

SCoSTI

The Slovak Centre of Scientific and Technical Information (SCoSTI) is an important organisation in terms of IT expenditure. It is among the offices with a high IT expenditure share in relation to the total budget, the long-term average reaches 35%, the share of EU funding 59%. As a directly managed organisation of the MoESRS SR, it represents an information centre for research, technology, innovation and education as well as has a scientific library. The largest SCoSTI IT projects include the construction and operation of a data centre for research and development (DC R&D, EUR 33 mil of investments) but also the national telepresence infrastructure or the strengthening of the academic data network SANET. The infrastructure built by the SCoSTI serves the scientific and academic community as well as the Ministry of Education.

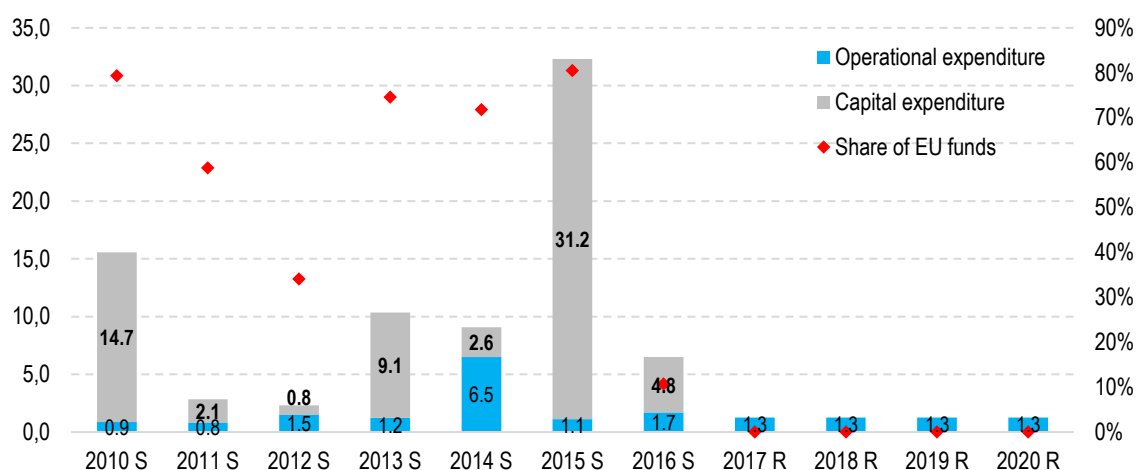
SCoSTI IT expenditure significantly fluctuates from EUR 1 to 10 mil., depending on the availability of funding particularly from EU Structural Funds. A significant increase to EUR 30 mil. was recorded in 2015, primarily due to the implementation of projects related to the construction of the national telepresence infrastructure and the strengthening of the high-speed connection of the SANET network.

The average for 2017–2020 accounts for EUR 1 mil., it does not include the currently not approved projects and planned investments funded from EU funds.

Operational costs for the 2010–2016 period account for approximately 30% of total IT expenditure. Almost 100% of planned expenditure for 2017–2020 is operational since planned investment expenditure from prepared national projects, which are co-financed from European Structural and Investment Funds (ESIF), are not considered within the overview.

The largest cost item of the approved SCoSTI IT budget for 2017–2020 (not considering planned investments within ESIF projects) – is the operation of the data centre for research and development which is estimated at the level of approx. EUR 500 thous. per year.

Graph 42: SCoSTI budget for IT expenditure (EUR mil.)



Source: BIS

The largest cost items and operation

SCoSTI operates 21 information systems, in some cases it possesses exclusive copyrights, or a licence which enables modification of work. The number of their users significantly fluctuates, from systems with fewer than 30 users per year to systems with more than 12 thous. users.

Table 27: Number of SCoSTI IS users and costs related to their construction

| Name of the IS | Number of users | Capital expenditure (VAT included) |
|--|-----------------|------------------------------------|
| CRZP | 125,152 | 125,000 |
| APS | 70,000 | 475,000 |
| CREPC and CREUC | 12,295 | 590,000 |
| SK CRIS | 1,420 | 450,000 |
| PRIMO | 775 | 499,896 |
| ISS SCoSTI | 659 | 324,535 |
| MATLAB | 442 | 152,536 |
| SAS | 193 | 499,000 |
| Scientific SW applications for biology | 30 | 383,640 |
| COMSOL | 24 | 120,250 |

Source: SCoSTI

SCoSTI does not analytically monitor key performance indicators¹¹⁴ according to which the implementation of expected benefits with regards to particular IS within the data centre could be evaluated. It acquires operational metrics for the data centre on demand from the supplier. In 2016 the computing capacity of the centre was on average used to 30 – 35% (CPU), memory to 80–90% (RAM). The use of CPU's is significantly influenced by campaign IS, e.g. the anti-plagiarist system which abruptly uses as much as 90% of available capacity.

Investments

In the upcoming six years the SCoSTI will implement the project related to the completion, enlargement and operation of the data centre for research and development for approximately EUR 40 mil. The aim of the project is to provide tertiary education teachers, students and research staff with a data centre which will in particular, among other things, enable abrupt processing of a large amount of data in short time and provide

¹¹⁴Action plan proposals contain measurable parameters, their initial and required state of key systems.

secure large-capacity storage of scientific data. According to the SCoSTI, other public clouds, including the governmental cloud, are not suitable for this purpose.

The project includes a partial developed and published feasibility study.¹¹⁵ The study does not state unambiguously defined eliminating criteria which eliminated alternative options from the economic assessment. Moreover, sources and the benefits' method of calculation are not described in detail either and the accuracy of quantification with regards to costs of alternatives is questionable.

¹¹⁵ http://www.cvtisr.sk/cvti-sr-vedecka-kniznica/projekty/narodne-projekty/horizontalna-ikt-podpora-a-centralna-infrastruktura-pre-institucie-vyskumu-a-vyvoja-dc-vav-ii.html?page_id=19533.

6 Bibliography

- Ares Abalde, M. (2014), "School size policies: A literature review", OECD Education Working Papers, No. 106, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jxt472ddkjl-en>.
- Bard, J., Gardener, C. and Wieland, R. (2006), "Rural school consolidation: History, research summary, conclusions, and recommendations", *The Rural Educator*, pp. 40 – 48 .
- Berne, R. and L. Steifel (1999), "Concepts of School Finance Equity: 1970 to the Present", in Ladd, Helen F., Rosemary Chalk, and Janet S. Hansen (eds.), *Equity and Adequacy in Education Finance: Issues and Perspectives*, Committee on Education Finance, National Research Council, Washington, DC.
- Burtless (1996), *Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success*, Brookings Institutions Press, Washington D. C.
- Eurydice (2012), *Key Data on Education in Europe 2012*, Education, Audiovisual and Culture Executive Agency, ISBN 978-92-9201-242-7
http://eacea.ec.europa.eu/education/Eurydice/documents/key_data_series/134EN.pdf
- Juan Diego Alonso and Alonso Sánchez, editors (2011), *Reforming Education Finance in Transition Countries Six Case Studies in Per Capita Financing Systems*, The World Bank Study
- Kirst, M. W. (1990). „Accountability: Implications for state and local policymakers.“ Washington DC: Office of Educational Research and Improvement, U.S. Department of Education
- European Commission/EACEA/Eurydice, 2014. *Financing Schools in Europe: Mechanisms, Methods and Criteria in Public Funding*. Eurydice Report. Luxembourg: Publications Office of the European Union.
- Fazekas, M. (2012); "School Funding Formulas: Review of Main Characteristics and Impacts", OECD Education Working Paper No. 74
- Galiani et al (2002), *Evaluating the Impact of School Decentralization on Educational Quality*, *Economía* Vol. 2, No. 2 (Spring, 2002), pp. 275 – 314
- Gillies, (2010), *The power of persistence, Education System Reform and Aid Effectiveness, Case Studies in Long-Term Education Reform* http://www.equip123.net/docs/E2-Power_of_Persistence.pdf
- Hanushek (1997), *Assessing the Effects of School Resources on Student Performance: An Update*, *Educational Evaluation and Policy Analysis* , Vol. 19, No. 2, pp.141 – 164
- Howley, C. B., A.A. Howley and S. Shamblen (2001), "Riding the school bus: A comparison of the rural and suburban experience in five States", *Journal of Research in Rural Education*, Vol. 17/1, pp. 41 – 63.
- OECD (2012), *Does money buy strong performance in PISA?*, OECD publishing, <https://www.oecd.org/pisa/pisaproducts/pisainfocus/49685503.pdf>
- Shewbridge, C. et al. (2016), *OECD Reviews of School Resources: Lithuania 2016*, OECD Reviews of School Resources, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264252547-en>

7 List of abbreviations

| | |
|--------------|---|
| AHELO | Assessment of Higher Education Learning Outcomes |
| AC | Accreditation Committee |
| SRDA | Slovak Research and Development Agency of the Ministry of Education, Science, Research and Sport SR |
| CBA | Cost–benefit analysis |
| COFOG | Classification of the Functions of Government |
| CPU | Central processing unit |
| CUDO | Information system for the circulation of digital educational content |
| SCoSTI | Slovak Centre of Scientific and Technical Information |
| CR | Czech Republic |
| STCH | Slovak Teachers' Choir Home |
| EDUNET | Project regarding the Internet connection for schools |
| EC | European Commission |
| ENQA | European Association for Quality Assurance in Higher Education |
| ERC | European Research Council |
| ESG | Regulations and directives for quality assurance in the European Higher Education Area |
| ESIF | European Structural and Investment Funds |
| EU | European Union |
| Eurostat | Statistical Office of the European Union |
| GRAM | Grammar school |
| GDP | Gross domestic product |
| IS EREES | Information system E-services of regional education's educational system |
| ISCED | International Standard Classification of Education |
| IQR | Independent Quality Review, Jaspers review phase |
| IT | Information technology |
| IUVENTA | Slovak Youth Institute |
| EPI | Educational Policy Institute |
| KAP | Tertiary education graduates' employability coefficient |
| CEGA | Cultural and Educational Grant Agency of the Ministry of Education, Science, Research and Sport SR |
| QSC | Qualification structure coefficient of a higher education institution |
| CC | Course coefficient |
| MoF SR | Ministry of Finance of the Slovak Republic |
| ILC | International Laser Centre |
| MPC | Methodology and Pedagogy Centre |
| NS | Nursery school |
| MoESRS SR | Ministry of Education, Science, Research and Sport SR |
| NPV | Net present value |
| NUCEM | National Institute for Certified Educational Measurements |
| NLLI | National Lifelong Learning Institute |
| OECD | Organisation for Economic Co-operation and Development |
| OP | Operational programme |
| OP IS | Operational programme Information Society |
| OP R&I | Operational programme Research and Innovation |
| OP R&D | Operational programme Research and Development |
| OP Education | Operational programme Education |
| PIAAC | Programme for the International Assessment of Adult Competencies |

| | |
|---------|--|
| PIRLS | Assessment –reading comprehension (reading literacy of fourth grade ES pupils) |
| PISA | Assessment of reading, mathematics and natural science literacy of 15-year-old pupils of ES and SS |
| PPP | Purchasing power parity |
| DMO | Directly managed organisations of the Ministry |
| BCO | Budgetary or contributory organisations |
| RAE/REF | British research funding system |
| MDWH | Ministry Data Warehouse |
| BIS | Budgetary information system |
| SANET | Slovak Academic Data Network |
| SAS | Slovak Academy of Sciences |
| SHIR | Slovak Historical Institution in Rome |
| SCT | Slovak Chamber of Teachers |
| ER | Evaluation report |
| SVS | Secondary vocational school |
| SPL | Slovak Pedagogical Library |
| SR | Slovak Republic |
| GIVE | Government Institute of Vocational Education |
| NIE | National Institute for Education |
| SSI | State School Inspection |
| TIMMS | Assessment – mathematics and natural science (knowledge and skills of fourth grade ES pupils) |
| TRAC | Cost analysis methodology |
| VMC | Value for Money Committee |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UOE | UNESCO/OECD/Eurostat joint methodology for the classification of expenditures |
| COoLSaF | Central Office of Labour, Social Affairs and Family |
| V3 | Hungary, Poland, Czech Republic |
| RA | Research Agency |
| SGA | Research Grant Agency of the Ministry of Education, Science, Research and Sport SR and SAS |
| HEI | Higher education institution |
| HTU | Higher territorial unit |
| RICPaP | The Research Institute for Child Psychology and Pathopsychology |
| PHEI | Public higher education institution |
| EAS | Elementary art school |