Deputy Prime Minister's Office for Investments and Informatization of the Slovak Republic

Ex post impact evaluation of the National Strategic Reference Framework implementation to achieve NSRF's strategic objective

Final report

Tento projekt bol spolufinancovaný Európskou úniou.

Európska únia
Európsky fond regionálneho rozvoja

KPMG Slovensko spol. s r.o.

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Acronyms

ALMP	Active Labour Market Policies
CF	Cohesion Fund
COLSAF	Central Office of Labour, Social Affairs and Family
DiD	Difference in Differences
EU	European Union
FE	Fixed Effects
GDP	Gross Domestic Product
IPHA	Investment Projects Holistic Assessment
ITMS	Information Technology Monitoring System
LLL	Life-Long Learning
MRC	Marginalised Roma Communities
NSRF	National Strategic Reference Framework
NUTS	Nomenclature of Territorial Units for Statistics
OP	Operational Programme
OPD	Operational Programme Transport
OPIS	Operational Programme Information Society
OPRD	Operational Programme Research and Development
OPESI	Operational Programme Employment and Social Inclusion
PSM	Propensity Score Matching
RDI	Research and Development Infrastructure
RES	Renewable Energy Sources
RSEA	Regional Socio-Economic Appraisal
SCM	Synthetic Control Method
SF	Structural Funds
SR	Slovak Republic
TEN-T	Trans-European Transport Networks
ÚPPVII	Deputy Prime Minister's Office for Investments and Informatization of the Slovak Republic
USP	University Science Park
VAT	Value-Added Tax
VC	Research Centre

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Executive Summary

The final report of the ex post evaluation concerning the impacts of the National Strategic Reference Framework implementation summarises two evaluation phases: (i) thematic and territorial concentration of resources and (ii) comprehensive analysis of selected thematic areas. The first phase is based mainly on factual information drawn from the national monitoring system in geographic and thematic classification. The second phase represents a set of four thematic evaluations whose focus was identified on the basis of the results of the first phase.

The purpose of the evaluation was to identify, analyse and, where possible, quantify the impacts/effects of support within all of the Structural Funds and Cohesion Fund strategic priorities, as well as assess the extent to which the strategic objective of the National Strategic Reference Framework was met. The objective of the evaluation was to provide knowledge and recommendations that can be used for the strategic management of the current programming period, as well as for planning and programming of the strategic development goals and policies of the Slovak Republic after 2020.

Thematic and territorial concentration of resources

The strategic objective of the National Strategic Reference Framework consisted of three priorities. Strategic priority *Infrastructure and regional availability* addressed the infrastructure of education and social services, as well as environmental, transport and health infrastructure. Most of the indicators for this priority have been fulfilled, except for interventions in the field of environmental infrastructure that have not achieved the intended objectives related to the obligations of the Slovak Republic resulting from the environmental acquis. Strategic priority *Knowledge-based economy* has not reached any of the target values of the indicators, mainly due to the delay of implementation, nor have all projected target values of the indicators been reached in the area of research and development. Strategic priority *Human resources* has been successful in reducing unemployment, except for long-term unemployment; there are still shortcomings regarding the overall integration of marginalised groups of the Roma population. Education reform still remains a challenge.

Based on the findings, the following are recommended:
- review the setting of current indicators;
- harmonise and report the same indicators in the same types of interventions;
- focus on a balanced use of resources throughout the programming period; and
- plan further support from EU sources strictly in line with identified priorities.

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Comprehensive analysis of selected thematic areas

Strategic public research infrastructure

The main generated effects mainly concerned investments in technologies that have reduced the technological backwardness of public scientific-research organisations. Their current equipment creates prerequisites for international cooperation as well as conditions for the development of cooperation with enterprises. The terms of the call have set limits to the highest co-financing intensity, which has complicated the opportunity to generate revenue for beneficiaries. The end of the projects has led to a break in the continuity of funding, and the potential of university science parks and research centres has not fully developed. For the same reason, the potential for service provision has not been used. Furthermore, there is a problem in respect of public procurement that does not take into account specifics of science and research.

Therefore, we propose considering the following measures:
- upcoming support for university science parks and research centres should stimulate cooperation with business entities with the potential to generate revenue;
- support the involvement of technologically unique research infrastructure in the European Strategy Forum on Research Infrastructures;
- transpose the European directive on public procurement in the field of research and development into national legislation;
- provide national grant resources to address major socioeconomic problems;
- strengthen support for technology transfer and specialised incubators and provide services to develop high-tech start-ups and spin-off companies; and
- set future priorities through participatory decision-making methods and the implementation of a Technology Foresight approach.

Transport infrastructure projects (motorways)

Mixed methods have been applied to evaluate this area. All three quantitative impact evaluation techniques applied confirmed the existence of positive effects of highway infrastructure. The connection to the TEN-T pan-European transport network has improved the economic and social indicators of districts, real wage growth, a decrease of the unemployment rate, an increase in the migration balance, and the number of firms and flats. The qualitative evaluation methods also indicate a positive perception of the built transport infrastructure. Most indirect social, environmental and economic benefits stemming from transport investments are also positive, except for transport-related pollution as well as high transport intensity and noise. Improved conditions for business, competitiveness and economic growth, however, are not matched by availability and

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mobility of the labour force. Mobility of the labour force is limited by the lack of affordable housing.

Future investments should use the positive potential of infrastructure and consider the following:

- complete the connection of large agglomerations and urban districts with a bigger concentration of cities;
- investments in motorways should be completed via investments removing some structural barriers that are important for further development of the region; and
- create a comprehensive, modern and well-operating system of sustainable transport in Bratislava and other cities connected by motorways.

Environment – synergy effects of the infrastructure projects

Investments in environmental infrastructure had, along with an undeniable impact on water quality and the environment generally, a variety of indirect positive impacts on further development of the municipalities, contributing to improving the life quality and convergence of the region. However, the limited use of built-up infrastructure indicates social differences and the need to coordinate environmental infrastructure with social and economic investment. A specific problem remains the situation of areas inhabited by marginalised Roma communities. The Bodva example shows that areas close to growth poles have development potential; coordinating investment in the environment and improving nature conservation allow the development of tourism and create symbiosis between the pole of growth and its surroundings. Infrastructure projects can serve as a catalyst for the development of local economies.

For further investments in environmental infrastructure, especially in the field of water management, we recommend the following:

- consider economics of infrastructure investments based on a comprehensive calculation of the return rate on investments;
- coordinate further planning of investments with strategic decisions regarding long-term development of the areas, and prioritise areas with stronger developmental potential;
- obligatory connecting of households to infrastructure should be accompanied by the economic and social measures with which to mitigate a potential impact of poverty;
- use alternative approaches in those cases wherein the cost of building new infrastructure is too high; and
- use and develop the potential of regional cooperation, especially for smaller municipalities that do not have the capacity to develop strategies, to prepare and implement projects.

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Active labour market policies

The correlation between the active labour market policies' expenditure and the unemployment rate is low. The number of job vacancies in the region, demographic developments and the quality/form of labour market services are key factors of employability. An important factor is also the personal capacity of job seekers, which can be developed through tailored labour market services. Specific labour market policies are targeted towards specific socioeconomic and socio-demographic groups in the labour market, while measures targeting people with higher education achieve higher performance. From the regional perspective, they functioned significantly better in Western Slovakia; districts in the east and south, however, had much fewer job vacancies per job seeker. Active labour market policies' performance has changed over time, depending on the economic cycle and demographic developments. The current model of employment services has a minimal impact on increasing the employment and employability of marginalised Roma communities. This environment needs a personalised approach that has not been provided thus far. Employment services are implemented by public employment offices, and there is no tendency to engage non-public providers. There were no early intervention programmes implemented during the monitored period. Human capital-centred programmes are the best-performing active labour market policies abroad, which have been significantly underfinanced in Slovakia. There are no services supporting life-long learning in the current structure of active labour market policies in Slovakia. Future application of active labour market policies is the subject of their economic and social efficacy.

The above-mentioned findings indicate the following set of recommendations:

- reconsider the structure of the active labour market policies provided. The structure in Slovakia differs from the typical one in the European Union. One should focus on educational and training policies;
- regularly analyse and evaluate the performance of active labour market policies and amend the structure provided according to labour market needs. For this purpose, one should improve database quality of the Centre of Labour, Social Affairs and Family;
- take into account region-specific developments. Regions with the highest unemployment rates need tailored services which support human capital and education while preventing all forms of discrimination in the labour market;
- promote an individualised approach. The 'case management' service must contain a strong element of social integration;
- involve non-public providers of labour market services. They are able to provide tailored specific assistance; and
- introduce programmes aimed at early intervention.

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1 Introduction

This document presents the final report of the ex post evaluation concerning the impacts of the National Strategic Reference Framework implementation. This evaluation assignment is part of Subcontract no. 93/2017 concluded under Framework Agreement no. 1122/2013 on the provision of advisory services for the development, management and evaluation of projects/programmes, as amended by Supplement no. 1 to Framework Agreement no. 1122/2013, as signed by the Office of the Government of the Slovak Republic (contractor) and a consortium of companies comprising KPMG Slovensko Ltd. (Bratislava) and stengl PLC (provider; Bratislava).

The purpose of the final report is to summarise two evaluation phases: i) thematic and territorial concentration of resources, which comprise mainly factual information on the NSRF drawn from the ITMS in geographic and thematic classification, and ii) comprehensive analysis of selected thematic areas. The comprehensive analysis is a set of four thematic evaluations with themes identified on the basis of data collected in the first phase.

The report contains the following sections:

- introduction – purpose, objective and evaluation questions;
- a brief summary of the evaluation methodology;
- findings;
- conclusions and recommendations; and
- Annexes.

The final report also includes the interim report summarising the results of the first phase. In the second phase, the following separate evaluations were carried out: I. Research Infrastructure, II. Transport Infrastructure Projects – Motorway, III. Environment – Synergic impacts of infrastructure projects, and IV. Active labour market measures. These evaluations form separate sections of the final report.

1.1 Target and scope of the assignment

The subject of the evaluation was the National Strategic Reference Framework (NSRF), which covered the support of interventions from the Structural Funds (SF) and the Cohesion Fund (CF) in the 2007–2013 programming period.

The NSRF is a strategic document setting out the national priorities co-financed by the SF and CF and contributing to the fulfilment of the vision of the economic and social development of Slovakia. The vision was set out as the overall convergence of the SR

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economy to the EU15 average through sustainable development. This intention was based on the need to significantly increase the employment, competitiveness and performance of the regions and the Slovak economy, as well as the quality of citizens' lives of the Slovak Republic. NSRF strategies, priorities and objectives were implemented through 11 operational programmes (including OP Technical Assistance, which is not part of the evaluation).

The strategic objective of the NSRF was *to considerably increase the competitiveness and productivity of the regions and of the Slovak economy and employment by respecting sustainable development until 2013* and the overall allocation of financial resources was around 11.5 billion euros (implemented by the operational programmes from EU sources, Table 1).

Table 1: **Financial allocation 2007 – 2013 of the Operation Programmes (SF and CF) in EUR**

NSRF			
Operation Programme	**Fund**	**Objective**	**EU sources (EUR)**
Regional OP	ERDF	C	1 554 503 927
OP Environment	ERDF+KF	C	1 820 000 000
OP Transport	ERDF+KF	C	3 160 154 595
OP Informatization of society	ERDF	C	843 595 405
OP Research and Development	ERDF	C, RCE	1 209 415 373
OP Competitiveness and economic development	ERDF	C	968 250 000
OP Health	ERDF	C	250 000 000
OP Technical Assistance	ERDF	-	97 601 421
OP Bratislava region	ERDF	RCE	95 207 607
OP Employment and social inclusion	ESF	C, RCE	941 301 578
OP Education	ESF	C, RCE	542 728 760
Total NSRF 2007 - 2013			**11 482 758 666**

Source: Terms of Reference, C – Convergence, RCE – Regional Competitive and Employment

Based on the outcomes of the strategy and following the strategic goal of the Slovak Republic, the NSRF was built on three strategic priorities and their objectives:
1. **Infrastructure and regional availability** to increase infrastructure density in the regions and enhance the effectiveness of related public services;
2. **Knowledge-based economy**, with the aim of developing the sustainable economic growth resources and increasing the competitiveness in industry and services; and
3. **Human resources** to enhance employment, increase the labour force quality for the needs of the knowledge-based economy and enhance the social inclusion of risk groups.

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1.1.1 Achievement of NSRF's objectives from the indicators point of view

An overview of national NSRF's performance indicators indicates significant improvement in the area of environment, energy efficiency, labour productivity, transport infrastructure, higher education and social inclusion. Less favourable is the performance of indicators in building a quality basic education system, but also in the commercial outcomes of innovation and research. The quality of education is currently one of the biggest challenges of the Slovak economy. Failure to achieve research and innovation targets has serious implications for future GDP growth and the sustainability of the public finance system under the conditions of current demography (population aging).

The main source of future economic growth in the Slovak Republic is the increase in labour productivity, in particular total factor productivity (TFP) - technological and organizational innovation. The balance of growth sources suggests that by 2060, TFP growth will have to provide up to 75% of total GDP growth per capita in the SR, another 25% will be provided by the capital inflows, while labour contribution will be negative (-40%) due to population decline. To increase labour productivity (and, in particular, TFP), it is necessary to create a functional and efficient national innovation system. A powerful economy based on education and innovation is a basic condition for maintaining the state's social services.

The NSRF had a strategic goal, which consisted of three strategic priorities and all their objectives had respective indicators. From the point of view of fulfilling the strategic objective of the NSRF based on the indicators, it can be stated that the target has been achieved. Most of the indicators, with the exception of the aggregate innovation index, exceeded the projected figures for 2013 and the indicator values have improved further in 2015 (Table 2).

Table 2: Indicators for the strategic objective of the NSRF

Strategic objective	Indicator	Baseline value	Target 31.12.2013	Achieved 31.12.2013	Achieved 31.12.2015 / 31.12.2016
Increase significantly the competitiveness and performance of the regions and of the Slovak economy and employment by 2013, while respecting the principles of sustainable development	Energy efficiency of economy (kgOE/1 000 EUR)	854,3	663,4	237,1	214,7 / 208,9
	European innovation scoreboard (EIS) (order)	22	19	20	20 / 21
	GDP per capita in PPP in relation to EU15 (%)	53,7	60,0	70,3	71,3 / 70,9
	Work productivity in relation to EU15 (%)	60,9	70,0	77,1	76,9 / 76,7
	Employment rate in relation to EU15 (%)	88,0	90,0	92,0	96,0 / 97,6

Source: Annual report on the implementation of the NSRF in 2014, Eurostat

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The indicators for the individual strategic priorities suggest that despite the positive effects achieved at the level of the strategic objective, there are still some backlogs.

Strategic Priority Infrastructure and regional accessibility consisted of 4 specific areas:

1. Support for regional infrastructure has focused on the availability of educational, social services and other civic infrastructure facilities in municipalities. This trend is reflected in the indicators. Achievement of the goal - completion and modernization of the infrastructure, has created a prerequisite for regional growth. Simultaneously running reconstruction/renewal of transport infrastructure in these areas has ensured the quality, availability and improvement of the area's serviceability, especially in eastern Slovakia where most of these resources were spent (Table 3).

2. Environmental infrastructure focused on meeting the obligations of the SR resulting from the environmental acquis. In this area, the greenhouse gas emissions were reduced to a much greater extent than was the plan. The indicators concerning the connection to the sewerage and water supply networks, with the most significant dominance of the Žilina region, did not reach the target values, which also relates to the time perspective. The monitored indicators are likely to be more pronounced in the next years. Increasing territorial coverage through environmental infrastructure clearly contributes to making the environment more attractive and improves the living conditions of the population. This area can no longer count on the massive support of EU resources, as legislative commitments have already been fulfilled. Their performance calls for further investments that will be more expensive due to the terrain. An unresolved problem remains with the waste recovery, where the implemented measures have not been sufficient to meet the target (Table 3).

3. The transport infrastructure was focused on improving the accessibility of the regions to the Trans-European Transport Networks (TEN-T). The planned construction of motorways concerned mainly Žilina, Trenčín and Prešov regions, while the highways clearly dominated Banská Bystrica region. In rail transport, more than half of the resources was spent in Trenčín region to modernize the existing corridors. This created the conditions for their integration into the European rail system and the pre-requisites to increase the share of green rail transport, although this effect has not been demonstrated, yet.

4. Existing health infrastructure has been significantly undercapitalised over the long time. The modernization of this infrastructure has focused on institutional

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and outpatient health care facilities. In terms of outputs, the planned values were exceeded.

Table 3: Indicators of the strategic priority Infrastructure a regional accessibility

Strategic priority	Specific priority	Indicator	Baseline	Target	Achieved 31.12.2015 / 31.12.2016
1. Infrastructure and regional accessibility Increasing the availability and quality of civic infrastructure and facilities in the regions	**1.1 regional infrastructure** Increasing the availability and quality of civic infrastructure and facilities in the regions - ROP	Number of technically improved educational infrastructure facilities	0	815	803
		Number of technically improved social infrastructure facilities	0	70	69
		Number of projects ensuring the sustainability of the settlement and increasing its attractiveness	0	484	582
		Length of reconstructed roads of II. and III. class (km)	0	600	1 209,76
	1.2 environmental infrastructure and protection of the environment Improving the environment and rational use of resources by completing and improving the quality of environmental infrastructure, in line with EU and Slovak regulations, and strengthening of the environmental component of sustainable development- OPE	GHG emissions (thousand tons of CO_2)	63 279	61 902	33 387
		Share of population connected to WWTP (%)	54,1	81	65,2 / 66,4
		Share of population supplied with water from public water mains (%)	85	91	88,3 / 88,7
		Waste recovery rate (%)	44	60	29,1
	1.3 transport infrastructure and public railway passenger transport Support of sustainable mobility through development of transport infrastructure and public railway passenger transport- OPT	Share of rail transport on freight (%)	28,7	30	24,12 / 24,29
		Share of rail transport on passenger transport (%)	5,5	5,9	8,72 / 9,81
		Density of higher class roads (highways and highways (km/thous. km2)	9,0	13,1	15,11 / 15,32
		Number of people killed as a result of traffic accidents in road transport (100 thous. citizens)	10,74	9,4	5,05 / 4,45
	1.4 modernization of health infrastructure Improving conditions affecting the health status of the population in both productive and non-productive age by improving the quality of the health infrastructure - OPZ	Number of supported medical facilities	0	58	80

Source: Drafts of final reports on the implementation of the operation programmes 2007 – 2013 OP, Statistics Office SR, Eurostat

Strategic priority Knowledge-based economy comprised 4 areas, as well (Table 4):

1. Informatization of the company focused on 3 main themes: eGovernment, digitization and availability of broadband Internet. Due to the significant delay in implementation, none of the objectives set out in this area has been achieved.

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2. The specific priority Research and development addressed mainly the obsolete instrumentation, insufficient infrastructure and weak links between research institutions and practice. Bratislava region, which concentrates half of the research and development capacities of the Slovak Republic, implemented large part of the funds, which creates room for further growth in this area. The positive effects of enhancing R&D infrastructure on economic growth will be manifested for several years. In terms of indicators, spending on R&D has increased significantly, but has not reached the originally planned target. Likewise, the goal of patent applications has not been met. However, this is not an optimal indicator in Slovak conditions.

Table 4: Indicators of the strategic priority Knowledge-based economy

Strategic priority	Specific priority	Indicator	Baseline	Target	Achieved 31.12.2015 / 31.12.2016
2. Knowledge-based economy Development of resources of sustainable economic growth and increasing the competitiveness of industry and services	**2.1 informatisation of society** Creating an inclusive information society as a tool for development of a highly performing knowledge-based economy - OPIS	On-line accessibility of 20 basic public services (%)	20	90	72
		Penetration of the broad-band internet (connections per 100 citizens)	4	30	23,82
		Share of ICT on the overall added value created in the enterprises (%)	5,1	10	4,87
	2.2 research and development Modernisation and improvement of efficiency of the system for the support of research and development so that it contributes to the growth of competitiveness, reducing of regional disparities, creation of new innovative (high tech) small and medium-sized enterprises and job creation- OPRD	Total research and development expenditure as % of GDP	0,51	1,50	1,18 / 0,79
		Number of EPO patent applications per 1 mil. citizens	8,1	18	9,39*
		Number of USPTO granted patents per 1 mil. citizens	1,28	2	3,62**
	2.3 university infrastructure Increasing the quality of education at universities through investments into physical infrastructure - OPRD	Percentage of population with university education aged 24-64 (%)	11,8	13	21,15 / 31,5
	2.4 support of competitiveness of enterprises and services mainly through innovation Ensuring sustainable economic growth and employment- OPCED	Share of renewable energy sources on the gross energy consumption (%)	6,7	19	12,7
		SMEs implementing their own innovations (% of total number)	15,7	18,6	15,0
		Export of high-tech technology products (percentage on total export) (%)	5,0	6,2	9,8
		Total number of foreign visitors (thous.)	1 514	1 710	4 330 / 2 027 (1 721)*
		Balance of foreign tourism (mil. Eur)	325	559,65	212,6 / 460,3

Source: Drafts of final reports on the implementation of the operation programmes 2007 – 2013 OP, Statistics Office SR, Eurostat, * value from the OP

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3. Support for university infrastructure has been linked to the unsatisfactory technical state of a large number of buildings. Thanks to it, 12 new buildings were built and 134 existing ones were renovated, but it is very unlikely that this support would increase the proportion of university graduates in such a short time.

4. During the planning period of NSRF, it was assumed that thanks to the EU's support for the resources in this area, the share of renewable energy sources in the total energy consumption will increase, even though not in the planned range. The share of innovating SMEs has fallen below the initial value. The share of high-tech products has grown significantly, especially thanks to the automotive industry. Thanks to tourism support, the attractiveness of services has increased and, although the number of visitors has increased, the foreign tourism balance has fallen below its initial value as the number of tourists has increased. Also, in this case, the indicator is not well-defined and does not allow to measure the objectives.

5. In creating the NSRF, it has been assumed that thanks to the EU's support for resources in this area, the share of renewable energy sources in total energy consumption will increase, even though not in the planned range. The share of innovating SMEs has fallen below the initial value. The share of high-tech products has grown significantly, especially thanks to the automotive industry. Thanks to tourism support, the attractiveness of services has increased and, although the number of visitors has increased, the foreign tourism balance has fallen below its initial value as the number of tourists has increased. Also, in this case, the indicator is not well-defined and does not allow to measure the objectives.

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Strategic priority Human resources determined indicators for 2 specific priorities (Table 5):

1. Under the specific priority Modern Education, the completion of the reform of primary and secondary education, with emphasis on reforming the content of education, was also envisaged. The reform has not been completed. One of the key indicators was initially planned to increase expenditure on education. However, the share of these expenditures in GDP did not even reach the initial value. A similar trend was also observed by the share of people involved in lifelong learning (LLL). In this area, the most significant decrease was recorded on the basis of the indicators.

2. Specific priority on Employment growth showed the long-term unemployment indicator, whose value was even lower than the target. There has been some progress in alleviating the risk of poverty, with the emphasis on marginalized Roma communities (MRCs), but the goal has not been met

Table 5: Indicators of the strategic priority Human resources

Strategic priority	Specific priority	Indicator	Baseline	Target	Achieved 31.12.2015 / 31.12.2016
3. Human resources Growth of employment, improvement of the quality of the workforce for the needs of knowledge-based economy and increase of social inclusion of risk groups	3.1 modern education for knowledge-based society Ensuring long-term competitiveness of Slovakia by adapting the education system to the needs of the knowledge-based society- OPEd	Human resource expenditures (Total public expenditure on education) as % of GDP	4,4	5,2	4,2
		Percentage of people involved in lifelong learning per 100 inhabitants aged 25-64	4,6	12,5	3,1 / 2,9
	3.2 fostering growth of employment and social inclusion Growth of employment and social inclusion and capacity building - OPESI	Poverty risk after social benefits (%)	13	9,2	12,3 / 12,7
		Long-term unemployment rate (%)	11,7	9,2	7,6 / 5,8

Source: Drafts of final reports on the implementation of the operation programmes 2007 – 2013 OP, Statistics Office SR, Eurostat, * data from 2014, ** data from 2011

The time scope of the evaluation covers the period from 01.01.2007 to 31.12.2016. From a geographical point of view, the evaluation is relevant to the whole territory of the Slovak Republic, as within the framework of the EU Cohesion Policy the Bratislava region was an eligible area for the Regional Competitiveness and Employment target; with regard to the Convergence target all other regions of the SR were eligible for support.

In the 2007–2013 programming period, the NSRF covered all operational programmes under the Convergence target and the Regional Competitiveness and Employment

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target. The European Territorial Cooperation programmes were not included in the NSRF and the European Agricultural Fund for Rural Development and the European Fisheries Fund were not part of the SF. Therefore, the evaluation does not cover the Rural Development Program, the Operational Program Fisheries, cross-border cooperation programmes, and does not concern the Technical Assistance Operational Program (due to its nature).

1.2 Purpose and aim of the evaluation

The purpose of the evaluation was to identify, analyse and, where possible, quantify the impacts/effects of support within all of the SF and CF strategic priorities, as well as assess the extent to which the strategic objective of the NSRF was met.
The first phase of the evaluation focused on the overall mapping of financial support in the thematic, regional, programme and timing breakdowns and roughly assessed the fulfilment of objectives. The second phase of the evaluation paid special attention to four selected areas whose financial support constituted the most significant share of resources. These areas overlapped with the strategic priorities of the NSRF and contributed crucially to the fulfilment of the strategic goal. They comprised transport infrastructure, research and development, environment, and employment.

The objective of the evaluation was also to provide knowledge and recommendations that can be used for strategic management of the current programming period, as well as for planning and programming of the strategic development goals and policies of the Slovak Republic after 2020.

1.3 Evaluation questions

The first phase of the evaluation provided answers to the main evaluation questions:
- **How were NSRF resources spent in terms of the territorial breakdown (NUTS III), operational programmes, types of projects, thematic focus, time, and other criteria?**
- **What are the basic benefits (outputs or results) of these resources in the regional and thematic breakdowns?**

The results of the first evaluation phase served as a basis for further specification of the second phase of the assignment. The second phase comprehensively analysed the selected thematic areas and answered the main question and a set of three sub-questions (with additional supplementary questions), as follows:

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- **What are the socioeconomic effects in the regions caused by the implementation of interventions in the fields of transport infrastructure, the environment, research and development, and employment?**
  - What were the impacts of major infrastructure projects, in relation to the basic socioeconomic indicators (unemployment, salaries, housing, number of enterprises or foreign-owned enterprises, migration, etc.) at the level of the affected districts?
    - Does the region's connection to the international motorway network have positive social and economic effects?
    - Are these effects in metropolitan, urban and rural regions the same?
    - How does major transport infrastructure contribute to regional convergence?
    - What is the impact of environmental infrastructure on the social and economic development of the microregion?
    - Do investments in environmental infrastructure have synergy effects and where is the developmental potential for the future?
- **What is the value for money of selected national projects at the level of individual districts in the field of employment (e.g. job creation costs in the relevant context)?**
- **What were the impacts of major Research and Development Infrastructure (RDI)?**
    - How does Research and Development Infrastructure (RDI) contribute to the development of regional public–private cooperation networks?
    - Under what conditions can RDI create models for sustainable functioning after 2020?
    - What is the current and possible contribution of RDI to economic development?

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2   Methodology

The first phase of the evaluation used mainly non-experimental design and quantitative data collection and analysis instruments. The basic structure of this phase was determined by the breakdown of support by topics that were broken down into 86 categories of expenditure[1] in 17 main topics. For the purpose of evaluation, they are grouped into nine main topics, while topics I and VII are further divided into two thematic areas[2]:

I. Research and technological development, innovation and entrepreneurship

I.a Research, development and innovation

I.b Business support, tourism and culture

II. Energy

III. Environmental protection and risk prevention

IV. Transport

V. Information society

VI. Education and human capital

VII. Investing in social infrastructure

VII.a Healthcare

VII.b Housing infrastructure and other social infrastructure

VIII. Improving access to employment

IX. Improving the social inclusion of disadvantaged people

Financial data from the information technology monitoring system (ITMS) served as the main data source. When assessing the effects, attention was focused mainly on those sectors in which SF/CF funds accounted for a significant share of the total financial resources spent in the respective sector in the years 2007–2015. At the same time, the total amount of SF/CF invested was decisive.

Besides financial data, mainly disbursed SF/CF sources (without corrections), programme indicators, and statistical data — context indicators (which are standard and sector-specific) were used for regional comparison at the NUTS 3 level. The available statistics are also compared in time series over equally long periods, i.e. 1998–2006 and 2007–2015. The analysis did not take into account the impact of interventions of the

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[1] Annex II:- Categorisation of Funds assistance for 2007–2013, Table 1 (Codes for the priority theme dimension), Commission Regulation (EC) No *1828/2006* of 8 December 2006 setting out rules for the implementation of Council Regulation (EC) No 1083/2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and of Regulation (EC) No 1080/2006 of the European Parliament and of the Council on the European Regional Development Fund

[2] The division does not include categories where no sources were spent and in compliance with the assignment does not mention the sources spent for Technical Assistance

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shortened programming period 2004–2006, given the narrower focus of the interventions and the significantly lower amount of financial resources.

The sectoral breakdown analysed the share of resources targeting individual regions, i.e. which of the regions (NUTS 3) concentrated most of the resources from the respective area of intervention. At the same time, indicators were also analysed in the relevant area, in terms of both their relevance and achievement of their target values. The indicators have also been analysed in the context of their setup and use in the 2014–2020 programming period. More detailed description is provided in the interim report.
In the second phase, covering the evaluation of the four thematic areas, a wider range of quantitative and qualitative tools were used. A more detailed description of used tools is included in the Methodology chapter of individual evaluation reports.

The evaluation of the *Strategic public research infrastructure* has mainly utilised qualitative data collection and analysis tools. The survey addressed all 14 university science parks (USP) and research centres (RC), with the questionnaires being sent to all of them. Subsequently, in-depth interviews were conducted. The questionnaire survey enabled us to collect both quantitative and qualitative data. The data obtained were subject to a comparative analysis, based on which recommendations were proposed for the future implementation of EU-supported interventions.

Based on the data provided in the questionnaires and from the in-depth interviews, a SWOT analysis of the research infrastructure was developed. It represents a cumulative overview of the strengths and weaknesses as well as the opportunities and threats of the built parks and centres. Based on personal interviews and discussions with representatives of all parks and centres, scenarios for the possible development of the supportive environment were created. The aim of the scenario creation was to model the possible development of USP and RC support and their possible impact.

In the field of Transport Infrastructure Projects – Motorways, a quasi-experimental design was applied to the impact assessment using three counterfactual impact assessments: Difference in Differences, Fixed-Effect (FE) regression, and a new Synthetic Control Method (SCM).

These mathematical/statistical methods used the existing set of statistical data at the district level as reported in the period from 1997 to 2016. Data included the number of enterprises, the number of foreign enterprises, the number of constructed flats, the balance of internal migration of the population, the unemployment rate, and average salaries. The methods compared the sample with the intervention and without the intervention (control sample) in the pre-test and post-test periods. The control sample

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was created according to the used method. The intervention meant the construction of a highway connected to the international network TEN-T.

Qualitative methods supplemented the explanation of computed quantitative changes. A methodology based on a combination of the Investment Projects Holistic Assessment (IPHA) and Regional Socio-Economic Appraisal (RSEA) was applied.

The IPHA used a panel of experts (ca. 20 experts and from different areas) for the initial telephone conversation. Subsequently, a structured questionnaire was sent to the panellists, in which, on the basis of their knowledge, they estimated the impacts of the selected project on regional cohesion. Ultimately, specific deviations from the baseline were mapped and in-depth interviews were conducted with a selected sample of experts. Besides the panel, in the relevant cases, the snowball tool was used to identify directly in the field some other respondents for semi-structured interviews.

Applying the RSEA approach involved the identification and mapping of a wide range of infrastructure impacts at two levels:
• the primary socioeconomic impacts, which are being reached due to access to the new infrastructure and which cannot be captured and statistically processed through the quantitative analysis; and
• secondary social, economic and environmental impacts resulting from investments in transport infrastructure.
The RSEA analysis was the basis for identifying the priorities for the post-2020 programming period.

The identical methodical approach (with different content/focus and in different regions) was also used in the evaluation of the area Environment – synergy effects of the infrastructure projects. The evaluation was carried out in two parts. The first, the pilot part, was conducted in the form of a telephone survey. In the second part, as in the evaluation of transport infrastructure, semi-structured interviews were carried out.

The evaluation of the Active Labour Market Policy (ALMP) measures was implemented through logistic regression and qualitative research. When analysing the results of the implementation of ALMP tools, two databases of the COLSAF data were used. The first database contained individual data on the registration of individual job seekers, with the second containing data on the job seekers assigned to respective ALMP measures. The analysed data were for the period 1.1.2010–31.12.2016. Prior to the analysis, the database was cleaned and formal and logical control of data was carried out.

In the logistic regression, the dependent variable was determined as job seekers' rate of repeated registration with the COLSAF after he/she had completed some of the

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measures. Three factors were chosen as independent variables: the job seeker's socio-demographic variable (gender, age, education), the length of the job seeker's participation in the measure (in days), and the labour market situation in the year wherein the job seeker finished his/her participation in the measure. The analysis also took into account the level of development of the districts and the changing situation in the labour market due to the demographic development during the period 2010–2016. Overall, eight ALMP measures promoting employability and increasing employment were the subject of analysis.

The quantitative part of the evaluation (logistic regression) was complemented by the financial effects of individual measures. The qualitative part used mainly interviews that provided more detailed explanation of the results.

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3 Findings

3.1 Thematic and territorial concentration of the NSRF resources

3.1.1 Resource allocation

As for financial resources, the share of SF/CF was 1.9% in cumulative gross domestic product (GDP) between 2007 and 2015 and the share of SF/CF in respect of total public expenditure during this period was 4.62%. The expenditures of the SF/CF have a different share in each topic of support. The total share of SF/CF regarding the active labour market measures was almost 70%, while transport support created 48% of total public funding, but much less for other sectors (6.5% of education, 4.9% of social inclusion, 0.6% of healthcare). Significantly higher, almost 80%, was the share of SF/CF in capital investment (excluding supraregional and national projects, it was up to 92%), where the share of capital expenditure in education was around 60% and in healthcare 12.4%.

The highest share of total NSRF resources concentrated on support for the construction and modernisation of transport infrastructure (34%) connected to the trans-European transport corridors. The construction of motorways took place in the period of 2007–2015, especially in Žilina and Trenčín regions, which meant the highest proportion of disbursement in these regions. The Prešov, Košice and Banská Bystrica regions, as the least developed regions, disbursed almost a third (32%) of resources invested in all eight regions. The Prešov region dominated in the use of resources in more than half of all analysed topics.

Almost half of the NSRF funds (up to 49%) were finally settled in 2015. The highest share of disbursed sources in 2015 comprised OPIS (88.5%), followed by OPESI (73.7%) and OPIS and OPRD (58%).[3]

3.1.2 Achievement of NSRF indicators

SF/CF were used to increase the employment, competitiveness and performance of regions and the Slovak economy, as well as the quality of life of Slovak citizens. Another important theme of the NSRF was the support of direct job creation. The NSRF had a strategic goal which consisted of three strategic priorities.

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[3] Source: ITMS, OLAP cube.

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Strategic priority Infrastructure and regional availability addressed education and social services infrastructure and transport and health infrastructure in line with the plan. However, indicators of environmental infrastructure interventions, which are key to complying with the obligations of the Slovak Republic resulting from the environmental acquis, have not been achieved, as well as commitments in respect of waste recovery.

Strategic priority Knowledge-based economy has achieved the planned indicators for the specific priorities of Higher education infrastructure. The performance indicators for interventions covering the fields of company computerisation, research and development as well as competitiveness were less successful.

Strategic priority Human resources has succeeded primarily in the reduction of unemployment, with the exception of long-term unemployment, while the indicator of specific priority on modern education has not achieved the set targets.

3.1.3 Basic benefits of SF/CF by theme

Research and technological development, innovation and entrepreneurship have been supported mainly by capital investment in all regions. Support was provided for the construction of seven university science parks, seven research centres, 72 centres of excellence, eight competence centres and 91 industrial research and development centres. Support was given to applied research conducted by the public and private sectors. Investment in infrastructure and applied research should be reflected somewhat later, particularly in scientific and commercial outcomes.
Topics related to natural and cultural heritage, tourism, and rural regeneration have mainly supported investment in physical infrastructure in cities, municipalities, tourism and culture.

Energy support has been primarily aimed at increasing energy efficiency and the production from renewable energy sources (RES). The share of energy from RES increased, but the share of SF/CF in this growth cannot be quantified due to the missing data.

Environmental protection and risk prevention areas have invested resources primarily in water treatment, but also in the management of domestic and industrial waste. The number of inhabitants connected to the sewerage system and drinking water distribution has increased significantly. Waste management continues to be a challenge. Funds designed to protect against floods have invested mainly in districts that have been the most affected in the past by floods.

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In the area of **transport**, support has focused on transport infrastructure, especially road infrastructure. In total, 69.71 km of new highways, and 26.8 km of new 1st class roads were built. Modernisation was completed on 127.76 km of motorways and express roads and 643.61 km of roads of the 1st class; moreover, 1,209.76 km of 2nd and 3rd class roads was renovated. The majority of the economic benefits resulting from the completed transport infrastructure will materialise in the period 2025–2030. In the framework of ecological transport promotion, modernisation of the railway corridors took place.

In the framework of the **information society**, 1,546 e-services were introduced, more than one third of the memory and fund institutions' content was digitalised, and access to broadband internet was enabled for 976 municipalities. The number of integrated service locations increased from 1,200 to 1,693 and the number of potentially connectable inhabitants increased from 276,000 to 452,000. The share of households with a computer increased from 55.4% to 80.5%. The share of households with internet access grew from 24.3% to 50.4%.

Support for **education and human capital** has been directed primarily towards regional and higher education, with an emphasis on educational infrastructure. Overall, 634 elementary schools, 76 secondary schools and 71 kindergartens were built or renewed.

Technical infrastructure for research and development has improved. However, the expected improvement in PISA test results was not met. Testing results are still strongly dependent on the socioeconomic background of tested pupils. Improvement of the situation was achieved in the placement of graduates in the labour market, and the percentage of the population with the third level of education has increased.

Investments in **social infrastructure** were directed towards the healthcare sector, wherein 29 general and specialised hospitals and 51 outpatient healthcare facilities were renovated and modernised. These investments have helped to improve the availability of quality healthcare facilities in less developed regions.
Another area of social infrastructure was that of **housing infrastructure and other social infrastructure**, which supported social inclusion by building, reconstructing, modernising and equipping 59 community centres and similar facilities. However, the situation in Roma settlements remains substandard in terms of infrastructure and access to services.

In the context of **improving access to employment**, 88,144 jobs were created. Approximately 1,510,000 people participated in the supported activities. Over the period under review, the gap between the regions with the highest and lowest employment rates has fallen from 16.1% to 15.5%.

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Improvement of the **social inclusion of disadvantaged people**, implemented mainly through national projects, has been carried out through social work in nearly 300 localities. The number of field social workers and their assistants reached almost 900 people and the number of clients comprised 93,000. Fieldwork has become one of the most stable services at the local level. The number of children's homes exclusively with professional families and groups in family houses and flats has increased, as well as the number of professional parents.

3.2 Socioeconomic effects of interventions in the regions

Further details of the evaluation are mentioned in the respective thematic evaluation reports, which are part of this final report.

3.2.1 Strategic public research infrastructure

Total investments in supported projects accounted for 394.48 million euros, with the largest amount of resources invested in construction activities and purchases of R&D technologies and/or equipment. Only a small proportion of funds were used to cover salaries of R&D staff and promotion activities. Most of the investments were directed towards Bratislava, Žilina and Košice self-governing regions (80%), where a total of 11 USP and RC were supported. On the contrary, in Prešov, Trnava and Nitra self-governing regions, only one project per region was supported. Thanks to support, more than 185,000 m^2 of floor space was reconstructed or built for scientific and research purposes (Table 6).

Table 6: Area, staff, expenses

Park/centre	Area (m²)	R&D staff (FTE)	Others (FTE)	Annual operating costs (euros)
CAMBO	14,388.2	n.a.	n.a.	500,000
Park STU	85,744.7	43.0	16.0	325,000
ALLEGRO	400.0	12.0	4.0	100,000
Nové materiály a TT	4,000.0	45.0	8.0	600,000
Promatech	5,000.0	62.0	8.0	306,000
Technicom	11,425.4	n.a.	n.a.	470,000
VC ZA	1,740.3	24.2	1.3	364,000
Park ZA	3,600	31.0	5.0	600,000
AgroBioTech	6,674.7	38.0	13.0	340,000
Imunologicky aktívne látky	4,860.0	9.0	10.0	500,000
BIO SAV	18,553.0	205.8	89.9	350,000
UV UK	13,132.0	17.0	12.0	511,000
MEDIPARK	6,186.9	2.9	0.3	n.a.
BioMed	9,980.8	49.0	5.0	610,000

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Source: author's survey (note: all data given are those for 2017)

In general, more than 850 researchers and 530 other staff members are directly engaged in working within the supported infrastructure. A further 100% increase of R&D staff is expected over the five-year horizon. Moreover, substantially higher numbers of researchers indirectly benefit from supported comprehensive projects.

Construction and equipment/technology were funded by ESIF. Launching such complex infrastructure into operation, the founders (universities, Slovak Academy of Science) had to cover expenses using their own funding. Unfortunately, there was no mechanism with which to bridge the transition phase from construction to full operation. Although this financial status had a negative impact on the sustainability of individual projects, all respondents were expecting balanced budget management in 2018. Models of the operation of centres/parks differ from one another. All parks/centres are beneficial to their founders by making available unique technology/equipment to all scientists. The initial setting of the launched call did not allow generating income during the implementation and sustainability phase. The major problem of the built infrastructure is the initial setting of support (coupled with state aid and income generation) during the implementation and sustainability phase. The limitation set for the highest aid intensity (95%) applied by parks/centres has blocked their manoeuvring capabilities in the economic use of infrastructure to work with industry.

Joint R&D projects with the founders' other parts as well as firms are seen to be the most important activities of the supported parks/centres. These kinds of collaborative projects are being funded by the Slovak Research and Development Agency (APVV), the Science Grant Agency (VEGA) or Horizon 2020. It seems that joint collaborative projects are the only way in which parks/centres can legally cooperate with the industry. Unfortunately, calls launched by APVV and VEGA are irregular and with a low budget[4], but are significantly more effective in terms of administration.

Because of the above-mentioned limitations related to income generation, parks/centres are not able to provide some basic services that are common in the EU, such as property-related services (e.g. rental of meeting rooms, broadband and phone services), SME support services (e.g. venture capital, marketing, training), innovation development services (e.g. R&D support, technology transfers, rent of unique equipment/technology), as well as networking support (e.g. organising events). However, in the future, Slovak parks/centres plan to provide these services by default.

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[4] For instance: call announced on October 3, 2017, had a total allocation for the entire implementation period only 33 mil. Eur, which is disproportionately lower than for funding allocated within OP.

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Table 7: The most common services provided in European countries and planned in the SR

Services	EU (%)	5 years foreseen (%)
Lab facilities/lab equipment for rent	58.1	50.0
Auditorium/conference room	91.9	71.0
Meeting rooms	93.5	78.5
Event planning	59.7	71.4
Marketing and promotions	56.4	50.0
Restaurant	62.9	21.0
Sports facilities	40.3	28.5
Kindergarten	27.4	7.0
Accounting, legal and related services	62.9	50.0
Business development/support services	79.0	43.0
Assistance with other venture/seed capital funds	77.4	21.4
IP consultancy, patent attorneys, etc.	66.1	57.0
Management support services (consultancy, etc.)	75.8	42.8
Networking	83.9	71.4
Training courses	61.3	64.2

Source: EC (2014) and author's survey

The regulative frame of income generation has significantly affected the creation of partnerships. Despite restrictions, all parks/centres build up prospective partnerships, although to a limited extent; therefore, their impact on the private sector and regional development is not visible. Cooperation takes place mainly between parks/centres and domestic-based R&D organisations as well as international bodies. Due to high investment in unique technology, involvement in the ESFRI may be considered an important issue in the near future.

Parks/centres currently cooperate with the regional/national bodies that manage innovation programmes, SME development and start-ups programmes, and to a lesser extent they are involved in the Slovak Chamber of Trade and Commerce's activities. They contribute to local economic development by creating jobs (specifically those with high added value) as well as through high-quality technology. The emergence of new high-tech companies is expected in the future.

All parks/centres, despite their short existence, have carried out various R&D projects whose results have been published in respected scientific journals. In this respect, the most effective are mainly the AgroBioTech Research Centre, the TECHNICOM University Science Park, the STU Bratislava University Science Centre, and the BioMed Martin Centre for Biomedicine, which published 62% of all publication outputs (the total number of publications is 842)[5].

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[5] Note: A detailed investigation of the publication outputs of the CAMBO, Promatech and USP BIOMED SAV showed that they have published up to 50, 41 and 530 outputs listed in WOS, respectively. The reason for

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Conditions with which to support commercialisation of the results of implemented projects were created by establishing a systematic frame in technology transfer and intellectual property rights. Some of the parks/centres established technology transfer offices, brokerage centres or incubators.

Up to 80% of parks/centres indicate that they have a well-developed technical infrastructure. Additional/complementary investments to technological upgrades will encourage smart specialisation as well as enhance collaboration capabilities with a variety of stakeholders. It is important to emphasise that parks/centres are largely in line with the priorities defined by the so-called domain platforms under the umbrella of national RIS-3. The only technological area that has not been sufficiently developed seems to be automation, robotics and digital technologies, which requires more complex and systematic support.

3.2.2 Transport infrastructure projects – motorways

The quantitative evaluation applied three methods to examine wider economic and social benefits of motorways for the Slovak districts connected to the Trans-European Transport Networks (TEN-T): (1) Difference in Differences (DiD), (2) Panel Regression with Fixed Effects, and (3) Synthetic Control Method.

The Difference in Differences (DiD) method compared two periods. The pre-test period covered the years 1997–1999, while the post-test years comprised 2000–2016. Values of the dependent variables were examined in two samples: in matched and unmatched ones. The unmatched sample examined 10 treated districts (connected to the 55 untreated ones which are not connected to the TEN-T). The matched sample examined 10 treated districts and 10 districts matched via the propensity score matching (PSM) procedure.

Unemployment rates and wage levels became significant in the unmatched sample. The pre-test, however, indicated important differences in unemployment rates between treated and untreated districts in the period 1997–1999. It means that the two samples had very different compositions.

The matched sample compared districts with similar levels of development. The pre-test indicated no statistically significant differences between treated and untreated districts in

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the discrepancies is that some authors did not refer to the ITMS code. This indicates that publishing activity may be significantly higher for all parks / centres.

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the period 1997–1999. The disparity in real wages in treated versus untreated districts increased from 7.1% in the period 1997–1999 to 14.6% in the period 2000–2016 (t-test: sig. 0.001). The growth in real wages was the only treatment effect significant at the 0.05 level in the matched sample (Table 8).

The construction of a motorway seemed to have little effect on the number of firms per 1,000 population. As for the foreign-owned firms, their numbers actually increased by higher rates in unconnected districts than in connected ones. This fact, however, relates to cross-border trade and tax optimisation strategies by foreign firms in some districts on the southern border of Slovakia[6]. The districts connected to the TEN-T reported a high increase in internal migration after 2000. The migration balance changed from a negative to a positive one. The same districts also reported a deep drop in unemployment rates. The sample of 10 districts, however, was small and the above-mentioned effects were not significant at the 0.05 level.

Table 8: Results for unmatched and matched districts (DiD)

Sample	Samples matched by PSM		Unmatched samples	
	Pre-test	Post-test	Pre-test	Post-test
Average wage (euros)				
Control sample	245.55	275.14	251.28	291.43
Intervention sample	263.08	315.19	263.08	315.19
Difference in %	+ 7.1	+ 14.6	+ 4.7	+8.2
Unemployment rate (%)				
Control sample	18.88	15.33	19.38	16.07
Intervention sample	13.84	11.78	13.84	11.78
Difference in %	- 5.04	- 3.55	- 5.54	- 4.29
Migration balance (per 1,000 population)				
Control sample	0.10	-0.45	0.03	-0.38
Intervention sample	0.46	0.43	0.46	0.43

Source: authors

The fixed-effects (FE) model is a generalisation of the DiD model where there are more than two groups and periods. The DiD and FE regression rest on some common assumptions. In the absence of treatment, the change in the treated outcome would have been the same as the change in the untreated outcome, i.e. changes in the economy, lifecycle, etc. (unrelated to treatment) affect the two groups in a similar way.

Table 9: Results for effects of the motorway infrastructure (FE model)

Intervention effects	Increase in %	Significance level

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[6] The highest numbers of foreign firms per 1000 inhabitants were found for rural districts on Hungarian border (Komárno, Nové Zámky and Dunajská Streda.

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Firms per 1,000 population	18.4	0.2
Flats per 1,000 population	44.9	0.8
Average real wage (euros)	1.5	8.2

Source: authors

The FE estimation results suggest that connection to the TEN-T network had a positive and significant impact on the number of firms and flats per 1,000 population ($p = 0.002$ and 0.008 respectively). Wages in treated regions were 1.5 percentage points higher than in untreated regions ($p = 0.082$). Coefficients for migration and unemployment were of the expected sign, but not significant at a reasonable significance level (Table 9).

The FE model indicated positive, albeit much lower, effects of the TEN-T on wages than did the DiD model. DiD operates on aggregated data and may under- or overestimate the size of the treatment effect if there is a downward or upward trend in the dependent variable. The FE model provides more detailed insights into developments in the treated unit over time. An advantage of DiD over FE is that data averaging in DiD may remove some random effects in the sample (e.g. high annual changes in numbers of finished flats).

The synthetic control method (SCM) creates a weighted average of untreated units ('synthetic districts') that best reproduces characteristics of the treated unit over time, prior to treatment. The impact of treatment is quantified via a comparison of performance by the treated versus synthetic cohorts after treatment. The synthetic cohort is a counterfactual statistical unit, i.e. a synthetic clone of the treated cohort. The SCM is the best method for quantification of wider economic and social benefits of motorways in small samples.

The most significant results were detected for wages and unemployment rates. Average real wages increased in seven, the number of firms in eight and the number of flats in three out of 10 districts connected to the TEN-T in 2000–2011. Unemployment rates decreased in six out of 10 districts. The migration balance improved in seven out of 10 districts.

Average annual growth in real wages was 2.3% higher in districts connected to the TEN-T than in the synthetic districts. In districts of Zvolen and Nitra, real wages grew by 8.0% more than in their synthetic counterparts.

The impact of treatment (connection to the TEN-T) increased with the length of the post-test period. The most significant effects were detected for metropolitan and urban regions previously unconnected to the TEN-T. The most significant wage increases were detected in three out of four metropolitan/urban regions (Nitra, Banská Bystrica and

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Zvolen) in comparison to their synthetic counterpart after connection to the TEN-T. The migration balance variable was impacted by a confounding event — significant immigration to the rural backgrounds of Bratislava and metropolitan districts in the city of Košice.

The large transport infrastructure enhances agglomeration effects in metropolitan regions. Spatial proximity supports joint use of labour and knowledge resources, and the combination of production capacities of firms in metropolitan regions. The large transport infrastructure, however, may also induce distributive effects. The SCM indicated that the motorway rendered the districts of Považská Bystrica and Žiar nad Hronom worse off in terms of the migration balance, real wages, and flats after connection to the TEN-T. The above-mentioned districts tended to lose their population to the closest metropolitan regions (Trenčín and Žilina in the case of Považská Bystrica, and Banská Bystrica in the case of Žiar nad Hronom).

The qualitative analysis mapped 15 areas of positive or negative impacts related to the construction of large transport infrastructure. The most significant impacts included:

- **A larger spatial area for development of business activities.** The quality transport infrastructure improves access to markets and clients.
- **Development of industry.** The transport infrastructure supports the development of manufacturing industries. Manufacturing industries are important factors for diminishing regional disparities in Slovakia.
- **Improved conditions for foreign direct investment.** The quality transport infrastructure improves accessibility of regions and, in many cases, is a necessary condition for the arrival of foreign investors.
- **Improved employment opportunities.** Shorter commuting time widens spatial areas prospective for employment.
- **Support for tourism development.** Tourism is an important source of economic growth in lagging behind regions. Relatively low-cost investments in tourism industries help to decrease regional unemployment and have positive impacts on diminishing regional disparities.
- **Social impacts.** The transport infrastructure interconnects rural and urban areas, helping to decrease social inequalities and promoting the development of social networks.
- **Improvements in road safety.** The large transport infrastructure may increase transport intensity but, at the same time, also promote road safety. The numbers of deaths and serious traffic accidents have decreased in places in which motorways and bypasses were built.
- **Improvements in urbanisation.** The development of large transport infrastructure promotes urbanisation and improves the quality of life in urban areas.

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The large transport infrastructure also had some negative impacts:

- **Increases in housing costs.** Improved accessibility of major urban areas supports immigration to (cheaper) suburban areas. Increased transport intensity results in higher levels of pollution, noise and traffic jams. Over time, increased housing costs tend to slow down immigration to major urban areas.
- **Quality of life.** The large transport infrastructure may promote spatial optimisation of the national healthcare system. The optimisation may have negative consequences for low-income households with no cars.
- **Rural development.** Improved transport infrastructure promotes rural development but, at the same time, increases public service burdens on some local governments. Many new immigrants to suburban areas tend to maintain registration with their original municipalities. It means that their taxes remain to be collected by their original municipalities but, at the same time, public services are consumed in actual places of life (e.g. education, healthcare).
- **Environmental burdens (pollution and noise).** Bypasses decrease environmental burdens in some municipalities. The large transport infrastructure, however, increases transport intensity. The total volume of pollution increases as well. The environmental burden is closely related to population health. The burden generates substantial economic and social costs, particularly in urban areas.

Some areas of economic and social development thus far have not been significantly impacted upon by the construction of large transport infrastructure. Most districts under analysis were only recently connected to the TEN-T. The areas with no significant changes included:

- **Lower costs and better assortment of consumer goods** (no significant changes in price levels).
- **Competitiveness.** Improved accessibility should broaden markets with goods and services and promote innovations and technological advancement.
- **Structural economic change.** In some regional economies, the large transport infrastructure may promote a structural shift from manufacturing to services.

3.2.3 Environment – the synergy effects of infrastructure projects

The major environmental investment in the assessed Bodva microregion is the project approved by the European Commission in May 2014, as funded by the CF Operational Programme Environment. The project was supported within priority axis 1 *Protection and Rational Use of Water*, under the objective *Convergence*, and is entitled *Drinking Water Supply and Sewage System for Municipalities in the Bodva Microregion.* The overall

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reported disbursement of the project is 38,954,894 euros. This particular investment was the most significant. The project budget was several times higher than the sum of the other 12 projects with environmental objectives implemented in this region and supported by other OPs in the period 2007–2013 (Table 10).

According to the project documentation, the drinking water supply part of the project planned to build 71,827 km of water pipelines, provide some 2,000 water supply connections and, subsequently, connect up to 7,938 inhabitants. The sewage and surface water cleaning part of the project was designed to provide public sewerage connection to at least 85% of existing pollution sources in the project area. It planned the construction of 66,403 km of sewerage pipelines with the connection of 10,333 Population Equivalent (PE). The project also included reconstruction of the two existing wastewater treatment plants in Moldava nad Bodvou and Šaca in order to increase the capacity of both facilities to 24,000 PE. The project implementation period lasted from January 2014 to October 2015.

Table 10: Projects supported in municipalities belonging to the Bodva microregion

OP ŽP						
Town/village PO/measure	Env. Protection 1.1	Floods 2.1	Air Qual. 3.1	Waste Mgmt. 4.1	Environment 5.1	Total
Buzica						
Drienovec				555,829		555,829
Moldava n/B.			321,878			321,878
Turňa n/B.				171,638		171,638
Veľká Ida						

ROP						
Town/village PO/measure	Education 1.1	Soc. Services 2.1	Culture	Settlements 4.1	4.2	Total
Buzica				344,753		344,753
Drienovec		784,108		396,726		1,736,663
Moldava n/B.	1,950,362	306,566		1,394,144	407,664	4,380,614
Turňa n/B.				676,708		848,347
Veľká Ida	792,402					792,402
Total						**9,152,124**

According to the information provided by the monitoring report (October 2017), in total, 71,179 km of new drinking water pipes were built, connecting 1,831 inhabitants, while the final length of sewerage pipelines reached 65,421 km with 4,225 PE connected. Reconstructed sewage treatment plants in Moldava nad Bodvou and Šaca provide wastewater collection and treatment for the planned 24,445 PE. The owner and operator of the infrastructure is the regional water company *Východoslovenská vodárenská*
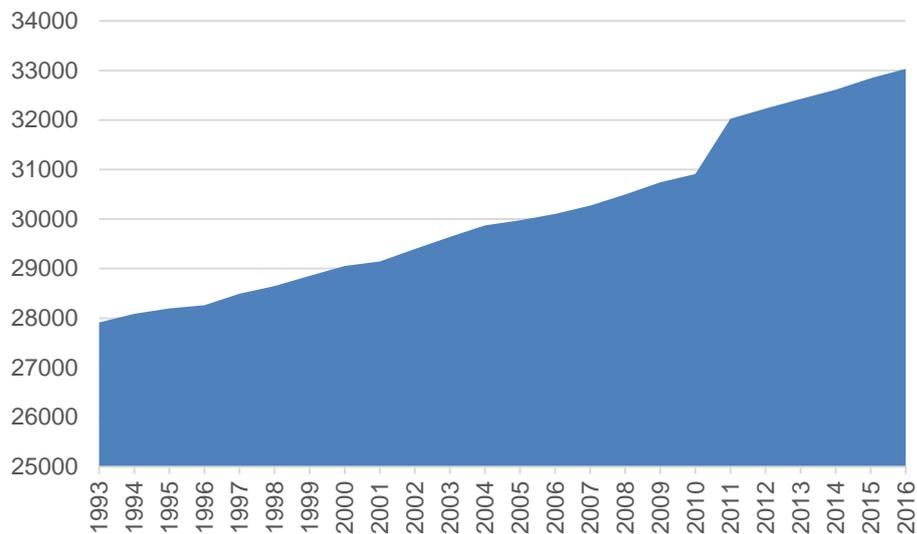
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spoločnosť, Ltd. (the applicant), yet the main beneficiaries of the project are cities and villages and/or citizens living in the microregion.

The potential and development of any given microregion are determined by a number of factors. Among the most important that we find are the state of the industry and services, transport infrastructure, and human and social capital. Another important factor in creating structural conditions for balancing regional disparities is the distance of a locality from the growth poles.

Within the context of the Bodva microregion, it is Košice that acts as the regional centre and the most important pole of growth. The distance of the municipalities in the microregion from this pole varies from 25 to 45 km, which means a travel timespan of 20 to 50 minutes. We see here fundamental differences when comparing the situation in the Bodva microregion and the municipalities that are more than 100 km away from the city. Cities and villages in the microregion have become attractive for daily commuting to Košice and/or started to form a recreational zone of the city. The railway infrastructure is somewhat less accessible, with only seven out of 24 municipalities connected. Yet, the distance of other municipalities which lie outside of the railway network of the passenger trains is anywhere from 2 to 10 km only, with a timespan of 2 to 10 minutes. As there is a growing trend to limit public transport, the transport exclusion of the population is increasing, affecting especially the rural and mainly the poorer segments of the population.

The advantage of the Bodva microregion is a strong natural capital, increasing the attractiveness of the region as a place for housing and creating potential for tourist industry development. Human, natural and social capital of the regions play an important role as an endogenous source of regional development. The important factor in the development of the microregion is the favourable age structure of the population, together with the level of education. In the last 20 years, we have seen a gradual increase in the population in the microregion of Bodva (except for eight municipalities predominantly with a population of below 500, Graph 1). The migration increase is the major factor in the overall population growth. Migration trends of the Bodva microregion (as a whole) have always been positive with the exception of the years 2001 (-0.31‰) and 2006 (-1.06‰).

![KPMG logo]

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Graph 1: Population trends in the Bodva microregion

Approximately half of the municipalities of the microregion are settlements with a Roma ethnic minority (i.e. Nižný Lánec (47.4%), Drienovec (45.9%), Veľká Ida (42.6%), Turňa nad Bodvou (36.8%)). The age structure of the Roma population substantially differs from the age structure of the majority of the population and has a dominant share of children and young people as well as a significantly lower proportion of older people. The general trend throughout the country is that the proportion of working-age people is declining and the population is getting older. The problem of an ageing population also affects larger municipalities with good transport accessibility to Kosice and without a concentration of the Roma minority. The index of ageing in the surveyed area shows extreme differences, varying from 25.52 in Veľká Ida to 344.44 in the village of Chorváty.[7] Therefore, the local municipalities struggle to build environmental and technical infrastructure, which is perceived in their view to be a basic prerequisite for maintaining and attracting people of a working age.

Qualitative research focused on the effects of investment in environmental infrastructure indicates a number of findings. The project contributed to the achievement of the objective - the water and sewerage connections in the microregion municipalities have formally reached 85% coverage. The municipalities are thus covered by the infrastructure, with the exception of areas with the Roma ethnic minority dwellings.

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[7] Share of post-productive population in percentage. Pre-productive population includes people of age 0-14, for post-productive people it is age limit over 55 years for women and over 60 years for men.

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Investment in water and sewerage has created basic prerequisites for improving the quality of the environment in the Bodva microregion. It has been an important stimulus for the development of individual and collective housing, which is perceived to be a basic precondition for further development of the municipalities. At the same time, investments in transport and environmental infrastructure increase the local attractiveness of smaller municipalities in the area (a trend closely interlinked with the increasing real estate prices in Košice).

The project planned to connect 7,938 inhabitants to the completed water infrastructure. Yet, two years after the end of the project, there are only 1,831 people connected. In spite of the information from local authorities on the gradual increase of this number, the situation with household connection and water consumption indicates that the construction of the infrastructure does not automatically mean its economical operation.

The water consumption per capita/day was up to 200 litres in the early 1990s, dropping by 21% between 1996 and 2013, and is now approaching the hygienic minimum. The most significant problem with the unwillingness to connect to the newly built infrastructure, as reported by local governments, can be found in the localities with poorer people in towns and villages, namely older people. A specific situation is in the areas inhabited by the Roma ethnic minority, wherein the social and economic situation requires specific approaches from local governments. Besides problematic connections, it is also decreasing water consumption, which affects economic profitability and sustainability of the pipelines' operations.

3.2.4   Active labour market policies

Databases of the Central Office of Labour, Social Affairs and Family (COLSAF) contain a significant share of missing data. The available data do not indicate whether a job seeker found a job. The data only indicate whether a job seeker returned to or dropped out of the COLSAF registry. Dropping-out need not necessarily mean that a job seeker found a job. One third of the total job seekers dropped out of the registry for other reasons. The logistic regression analysis therefore concentrated on job seekers' rate of repeated registration with the COLSAF. Repeated registration was the dependent variable (0 = no, 1 = yes). Specific independent variables were of different importance due to the fact that a job seeker re-registered with the COLSAF one year after his or her inclusion in some of the instruments of the active labour market policies (ALMP). Educational levels and improved employability prospects (due to demographic changes) were of major importance for repeated registration. The degree of regional development and the number of job vacancies also were very important factors of employability.

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The rate of return was computed for specific measures of ALMP at the national level. Firstly, the ALMP costs per job seeker were computed. Secondly, the ALMP success rate was computed as a share of job seekers with new jobs in the total number of dropouts. Thirdly, profitability of the ALMP was computed for each newly employed job seeker (total sum of taxes, social and health insurance payments, plus spending-related VAT). The rate of return was the ratio of ALMP costs to profitability per employee.

Success and return rates could not be computed at the regional level. Specific Slovak regions account for quite diverse population dynamics and labour market dynamics. The above-mentioned rates were impossible to derive from the national data. Impacts of ALMP on the regional labour markets can be evaluated only via the variability rates for repeated registrations by the job seekers.

Evidence from the evaluation of specific ALMP measures is summarised in Table 11. The ALMP are labelled according to the measures set out in the Act on Employment Services 5/2004.

Table 11: Evidence from the evaluation of specific ALMP

ALMP	Evaluation
Sec. 49	- Important in periods of economic crises and a lack of employment opportunities - The 2013 amendment of the 5/2014 Act redefined terms of support and impacted spending through the ALMP - Rather high costs per employed/self-employed job seeker (6,028 euros) - Rather long rate of return (28.1 months)
Sec. 50i+j	- High costs per employed job seeker (11,114 euros) - Very long rate of return (58.1 months) - Low employability of job seekers in the labour market - Important for finding jobs and generating employment records for members of the marginalised Roma communities
Sec. 51	- Low cost for one employed job seeker (1,950 euros) - Short rate of return (nine months) - Popular with the target group (graduates) and employers - High success rate (share of job seekers who found a job). The success rate was determined by composition of the target group (secondary and tertiary graduates) - Low efficiency for youth from the disadvantaged environments
Sec. 52	- Low costs per employed job seeker (1,345 euros). Low per capita costs were determined by overall low costs of the ALMP - Short rate of return (6.2 months) - Low success rate (in terms of new jobs for job seekers) - This was only partially the ALMP measure. It resembled social benefits - ALMP were stigmatised in respect of being 'Roma ALMP'

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Sec. 52a	- Low costs per employed job seeker (3,106 euros) - Medium rate of return (14.1 months) - Low success rate (in terms of creating new jobs and retaining existing ones) - ALMP were frequently used for employing and training handicapped people in the open labour market
Sec. 54	- Medium costs per employed job seeker (4,287 euros) - Medium rate of return (19.3 months) - The success rate was determined by composition of the target group - ALMP were implemented via the National Projects. The projects flexibly reacted to the actual labour market development - Popular with employers
Sec. 54 REPAS	- Low costs per employed job seeker (940 euros) - Short rate of return (4.3 months) - High success rate (share of job seekers who found a job). The success rate was determined by composition of the target group and the ALMP's terms of support. Employment was provided under the condition of participating in the ALMP. The only ALMP aimed to support life-long learning and retraining

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4 Conclusion and recommendations

4.1 Thematic and territorial concentration of the NSRF resources

On the basis of the achieved values of the NSRF indicators, it can be stated that, with the exception of the innovation index, the target values have been reached, and even better results have been achieved in many cases. However, the findings show deficiencies in the setup of indicators.

All of the monitored indicators are affected by a number of factors that need to be taken into account when assessing them. In this context, it is also important to note that the SF/CF were only 1.9% of GDP in 2007–2015 and the share of EU resources in total public spending during this period was 4.62% and varied considerably throughout the various sectors/themes. The contribution of SF/CF to the monitored effect is conditioned not only by the share of EU resources but also by other external factors. An indispensable factor is the implementation of interventions itself, which is also influenced by administrative demands, operation of the managing authorities as well as the performance of beneficiaries.

Strategic priority **Infrastructure and regional availability** involved a wide scope of sectors, encompassing educational infrastructure, social and health infrastructure, environmental infrastructure and transport infrastructure. Part of the indicators is based exclusively on outputs, particularly in the area of regional and health infrastructure, which leads to increasing the availability of different institutions but does not say much about the quality of the services provided. In the environmental field, despite the significant investments, the planned targets have not been met, which may indicate an overly ambitious estimate of the target values. An important factor is also the increase in the cost of meeting the targets. While large concentrations of the population in more favourable geographical conditions are already connected to water supply and sewerage systems, more demanding investments that will connect smaller populations with much longer necessary infrastructure are not yet implemented. The segregated settlements remain a challenge.

Strategic priority **Knowledge-based economy** includes the sectors of computerisation, research and development, university infrastructure, and the competitiveness of enterprises and services. In computerisation, none of the indicators have been reached, mainly due to the delay in implementation. Even research and development did not reach all of the planned target values of the indicators. It appears that the indicator on patent application is not a suitable solution, not only because of the duration of the entire

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process, but also because these patent applications are mainly submitted by large multinational companies whose research centres are not located in the SR. Moreover, the values of this indicator are published by Eurostat with a long delay. Therefore, a more appropriate indicator is the share of total and corporate expenditure on GDP and the share of innovative companies. Similarly, it is questionable to measure the quality of higher education through the share of people with higher education.

In the **Human resources** priority, focusing on education and employment, infrastructure investment has grown significantly, but there are still shortcomings in the overall integration of marginalised groups of the Roma population, including the inclusion mechanisms within the educational system. Rational educational reform remains a challenge. This area is directly linked to science and research, wherein the current pace of development is considerably lagging behind. On the contrary, thanks to the combination of a number of factors (demography, economic development) and the support of EU funds, the employment sector has been quite successful.

The results of the projects are not always easy to quantify, but it is important to correctly determine the appropriate indicators and their target values. From the point of view of interventions, it seems necessary to focus attention on result indicators. Only then will it be possible to quantify the relationship between investments and effects. The achievement significantly exceeding the target values of the indicators or, on the contrary, their non-fulfilment may have several causes:

- Indicator values are not set correctly because there are no analyses with which to support them. The goals are sometimes too ambitious, sometimes very low; the indicators are not adjusted during the implementation to reflect the actual situation;
- Significant delays in the implementation of interventions could have caused some effects that did not occur at the time of evaluation (ICT, R&D);
- The set indicators are not consistent with the intervention logic. For example, the indicators on energy savings or thermal insulation are repeated, but the intervention has a different focus;
- In some cases, indicators are in contradiction to the intervention goal. For example, the number of jobs created is universally used in nearly all OPs; however, due to new technologies and innovations, the number of jobs decreases. A different interpretation of the indicators across the OP made it impossible to aggregate the results;
- Incorrectly set indicators are quite common: output indicators are set at the level of impacts or results;
- There is partial or total overlap of the same indicators, but they are differently formulated (the most frequent number of participants); and

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- Different indicators are set for the same topic/measure. The system does not allow aggregation or comparison of the effectiveness of individual interventions.

In terms of NSRF implementation and sectoral situations, challenges still remain in areas that are mutually influenced and closely related: science and research, education, labour market, Roma integration, and population ageing. The structure of expenditure and the status of the NSRF indicators available at the end of 2017 indicate that Slovakia has been able to build up a substantial part of the basic physical infrastructure needed for further development at the national level. Attention should be now focused on its effective use. This need also relates to the fact that extensive growth sources are almost exhausted. However, Slovakia is still poorly prepared to move on to vigorous growth, which is based on research, development, and technological and organisational innovations. In particular, a well-developed national system of development and innovation and a better business environment (innovative and regulatory infrastructure) are lacking.

The research and development area is closely interconnected with education; the primary challenge is the quality of elementary education. Unsatisfactory results in the field of education influence scientific and research potential and have a significant impact on the structure of the workforce and the labour market. Unemployment was a very topical issue at the time of the preparation of the NSRF. At present, with the exception of the long-term unemployment rate, which is still above the EU average, unemployment is no longer a priority issue. However, the Slovak labour market currently suffers from structural unemployment problems, one of which is that the labour force supply does not correspond to the demand. A quality system of life-long learning and good-quality public employment services can contribute to tackling structural unemployment and exclusion from the labour market.

In the future, it will be possible to predict a negative trend in employing low-skilled people. The Slovak economy is largely industry-oriented, wherein a strong automation trend is expected. Demographic developments also indicate that Slovakia will increasingly face a labour shortage. The population of the economically active age will be reduced and the pressure on securing and financing the social services of the state will increase.

Educational, employment and regional disparities are linked to the problems of socially excluded groups. Although from the point of view of income poverty, the Slovak Republic belongs to those countries with the lowest risk of poverty within the EU, the poverty and social exclusion of marginalised Roma communities remain unresolved. Addressing regional and social disparities calls for further investment in regional and local infrastructure (transport, environmental, social, health, etc.), particularly in the 12 least developed districts.

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In line with the conclusions presented, we recommend that the Managing Authorities for the current programming period as well as in the next period:

- During the preparation of the annual report of the current OPs, examine the setup of current indicators so that they are determined in accordance with the intervention logic of each OP, are relevant, specific, measurable and achievable, are corresponding to the respective level of outputs and results, with the correctly set target values, which are supported by analyses, and do not overlap each other except where it is desirable to allow for aggregation. If necessary, the process of changing the indicators should be initiated and fully justified (especially for the indicators included in the OPs' performance frameworks);

- In the framework of interventions of the same type, irrespective of the source of their funding, harmonise and report the same indicators (e.g. OP Environmental Quality and Envirofond or EEA Grants); at the same time, the values of the indicators should be reported in the same units as those reported by the Statistics Office SR or another statistical entity;

- Focus on the most continuous and balanced use of resources throughout the programming period in order to maximise the multiplier effect;

- Plan further EU support strictly in line with identified priorities and narrow it down to specified priority topics.

4.2 Strategic public research infrastructure

Parks/centres have already generated several effects. These include investments in technologies that have reduced the technological backwardness of public R&D organisations. The current technology/equipment creates prerequisites for participation in the ESFRI and has contributed to expanding options for international cooperation. The need for investment in technology has declined significantly, but there is still a problem with procurement procedures that do not take into account the specificity of the R&D.

University Science Parks/ Research Centres have also contributed to an increase in the overall scientific activity of universities and the Slovak Academy of Science (increased number of published papers). Technologies are available to a broader spectrum of R&D experts as well as students. However, continuity of funding during the sustainability phase has been weak, which has affected overall activity. Therefore, the potential of parks/centres has not been fully developed. Similarly, cooperation with countries with an excellent research base has not been developed, yet.

The new infrastructure has created conditions for developing more intensive cooperation with a variety of businesses. Due to the conditions set up for the support and the options

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chosen by the beneficiaries, it worked mainly on the basis of joint projects financed by public sources (e.g. APVV, Horizon 2020). For the same reason, the potential for service provision has remained underdeveloped.

Some of the parks/centres incorporated technology transfer centres and business incubators to support the establishment of high-tech firms from an academic base. This activity was also limited due to the terms and conditions of the call set for the most aid-intensive regime, which resulted in standard services not being provided by incubators (e.g. renting technology).

Parks/centres were supported in specific domains that represented the most promising areas at that time. All of them are in line with defined domains under national RIS-3, but do not cover all areas with high application potential.

On the basis of the conclusions above, we propose considering the following measures:

- upcoming support should stimulate cooperation with business entities. Diversification of revenues will also support the long-term sustainability of large R&D infrastructure;
- in order to make better use of existing capacities, it is necessary to support the involvement of certain technologically unique parks/centres in the ESFRI and prepare schemes of scientific cooperation focused on mobility for scientists and the use of large research infrastructure;
- it is crucial to precisely transpose the European directive on public procurement in the field of R&D into national legislation;
- the development of parks/centres requires the provision of national funding (including overheads and salaries), and the projects should contribute to the solution of selected major socioeconomic problems;
- specific measures should also cover technology transfer centres, specialised incubators that provide services to high-tech start-ups and spin-off companies, human resources development and building up links to industry as well as the sharing of experience and applied approaches and the creation of tools linking parks/centres and businesses; and
- suggest further specialisation through participatory decision-making methods and implementation of the Technology Foresight approach.

4.3 Transport infrastructure projects (motorways)

This research applied three quantitative impact evaluation techniques so as to identify the wider economic benefits of motorways in the Slovak regions. The connection to the

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TEN-T network of motorways generated significant benefits of motorways in terms of increased wages and, to a lesser extent, a decrease in unemployment rates and an increase in the migration balance and the number of firms and flats per 1,000 inhabitants.

The qualitative evaluation methods also found positive perceptions of the newly built transport infrastructure. There are some structural barriers to regional change, but the transport infrastructure is a necessary condition for economic development of the regions. Most indirect social, environmental and economic benefits stemming from transport investments also are positive, except for the transport-related pollution and high transport intensity and noise. Improved conditions for business, competitiveness and economic growth sometimes are not matched by availability and mobility of the labour force. Mobility of the labour force is limited by the lack of affordable housing.

Evidence from quantitative and qualitative methods indicates that the positive effects of motorways outweigh the negative ones to a wide extent. Future investments in transport infrastructure should therefore consider the positive effects of motorways. The investment recommendations for motorways include the following:

- Future investments should complete the motorway line connecting large agglomerations with urban districts between Bratislava, Žilina, Martin, Poprad, Prešov and Košice, and complete the southern line of motorways between the cities of Zvolen and Košice.
- Investments in motorways should be completed via investments which have removed some structural barriers. The most important structural barriers include investments in education, training, social investment mobility of the labour force, and affordable housing. These barriers limit regional development and prevent synergy effects in transport investments.
- A complex, modern and well-operating system of sustainable transport remains a challenge in Bratislava and other cities connected by the motorway. The sustainable transport system should decrease transport burdens, travel times and air pollution in metropolitan areas. These areas will have to comply with more stringent environmental regulations in the future.

4.4 Environment – synergy effects of the infrastructure projects

Investment in environmental infrastructure had, along with undeniable impacts on water quality and the environment generally, a variety of indirect positive impacts on further prospects and development of the municipalities. It makes them more attractive and contributes to improving the life quality and, subsequently, convergence of the region.

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The microregion of Bodva has a comparatively more favourable position than those of municipalities in the least developed regions of Slovakia (e.g. in border areas with Ukraine). Yet, problems of household connection to the infrastructure and its low use indicate increasing social disparities within the region and the need for coordination of environmental infrastructure investments with other social and economic measures, such as employment support and pressure to increase wages.

The problem still remains in the areas inhabited by marginalised Roma communities, with a tendency to create a system of one or more public water sources serving the whole community and operating through prepaid cards.[8] At the same time, in the case of Roma communities, sewerage construction significantly lags behind. According to the interpretation of the European Directive, agglomerations of more than 2,000 inhabitants must have a sewerage system. The European Commission here says that the existence of an agglomeration refers de facto to the situation of "population and/or economic activities that are sufficiently concentrated for collecting and discharging urban waste water or to the point of its final discharge", but "the boundaries/delineation of the agglomeration may but may not correspond to the boundaries of the administrative unit".[9]

Another important aspect of future investment planning is to take into account demographic trends and the inherit development potential of cities and villages. In less populated rural settlements and places, with an increased share of low-income households (mainly marginalised Roma communities), we face the problem of the inability to pay for utilisation and such investments are thus not profitable and economically advantageous. At the same time, any investment must also take into account the integration potential — infrastructure projects co-financed by the EU sometimes, paradoxically, help to preserve the current state of Roma segregation. Besides the investment and operating costs of the newly built systems (so-called economies of scale), extremely low water consumption of low-income households has a number of negative consequences with impacts on population health, social inclusion, and other areas.

As the Bodva example shows, the territories close to the growth poles have a fairly good developmental potential. The coordinated investment to improve the quality of the environment (mainly air quality in this case), nature and landscape protection and tourism industry development may lead to the creation of a symbiosis between the pole of growth and its surroundings. Support for infrastructure projects can serve as a catalyst for the development of local economies. Here we may see a space mainly for smaller

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[8]This approach, according to information available, has been first time introduced in village Dobšiná, and is often perceived by authorities in municipalities as a good one for securing access to drinking water. Yet, it is rather controversial approach which not addressing access to the water in a complex way.

[9] Draft Document On "Terms and Definitions of the Urban Waste Water Treatment Directive (91/271/EEC)"

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and decentralised approaches to local economic development, which should be linked to the measures supporting regional development through developmental partnerships.

Smaller municipalities do not possess the capacity to analyse developmental opportunities and strategic priorities. Collaboration within the microregion — the involvement of local actors and the public to manage and make decisions on strategies and prioritise and develop activities in the region — is essential for a better understanding of local community needs. Experience with the cooperation set up within the Bodva microregion points to the importance of such collaboration and the contribution of bottom-up-based approaches. Environmental projects are linked with networking and multi-municipal cooperation and strengthen regional cooperation, which may have acceleration potential.

When considering further investments in environmental infrastructure, especially in the field of water management, we therefore recommend the following:

- To reconsider economics of infrastructure investments based on a comprehensive calculation of the return rate on investments, taking into account negative and positive externalities, demographic trends and the social situation of the population;
- To coordinate any further planning of these investments with the preparation of strategic decisions for the long-term development of these areas and for prioritisation of regions with stronger developmental potential;
- The forthcoming legal regulation introducing mandatory household connections (in localities wherein infrastructure is available) needs to be accompanied by the economic and social measures with which to mitigate the potential impact on poverty households;
- To use alternative approaches in those cases wherein the cost of building new infrastructure is too high due to geographical, geomorphological and other factors, and to concentrate on small-scale and economically more feasible solutions (e.g. root-based wastewater treatment, individual solutions); and
- To continue to use this investment for strengthening regional cooperation, especially for smaller municipalities that do not have the capacity to develop strategies, prepare projects and implement them. Upcoming changes in the governmental approach to mitigating regional disparities in the least developed regions of Slovakia, the newly established *Government Council for Less Developed Regions*, and further steps at the governmental level should be coordinated with the concerned local authorities and their motivation, as well as with the possibilities of supporting progressive and well-justified solutions.

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4.5 Active labour market policies

The ALMP are complementary tools for job generation. The market forces are key sources of job generation. The correlation between ALMP spending and unemployment rates is quite low. The number of job vacancies, demographic developments, personal talent of job seekers, and quality and assortment of labour market services are key factors of employability. Analysis of job seekers' personal talent and tailored labour market services can improve the quality of regional labour market services.

The ALMP target groups were important for the performance of the ALMP. Specific ALMP targeted specific socioeconomic and socio-demographic groups in the labour market (graduates, young people, disadvantaged job seekers, long-term unemployed, people aged 50+ years, handicapped people). The ALMP targeting people with higher educational levels and/or a higher volume of human capital achieved above-average performance.

As for regional performance, the ALMP performed much better in the west of Slovakia than in the south and east of the country. Regions (districts) in the east and south, however, had very low numbers of job vacancies per job seeker. These districts also accounted for specific socioeconomic and socio-demographic structures of job seekers. The districts had high shares of job seekers with primary and lower secondary education.

ALMP performance changed over time, depending on the economic cycle and demographic developments. It was much easier to find a job in 2016 than in 2010. There was a visible shift in the structure of the ALMP applied to the Slovak labour market in the period 2010–2016. The ALMP based on Sec. 49 (support for self-employment), Sec. 50i+j (support for regional employment) and Sec. 51 (support for graduate employment) decreased, while ALMP based on Sec. 52a (community works through volunteers) and Sec. 54 (national projects and programmes) became more important. The shift in the ALMP structure reflected changes in the Slovak labour market. The changes reflected not only an economic boom and demographic developments (population ageing), but also Slovakia's international commitments (e.g. in the field of youth employment). The shift in the ALMP structure was reflected in higher profitability of the ALMP. Taxes and social/health insurance payments collected from new jobs increased over time.

The future application of the ALMP will be subject to their economic and social efficacy. As for economic efficacy, the resources must be allocated to ALMP with better cost–benefit ratios. The ALMP aiming at long-term support for human capital should increase in importance. There are no ALMP supporting life-long learning (LLL) in the current structure of ALMP in Slovakia. The fact is reflected in an extremely low share of the

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population (29–64 years old) participating in LLL (SK = 2.9%, EU28 = 10.8%)[10]. The onset of the Fourth Industrial Revolution underpins the importance of the support for LLL. Increased deployment of robots and software may have dramatic consequences in respect of the disappearance of jobs in many professions. The Slovak Republic has the highest share of jobs endangered by automation (33%)[11] among the OECD member countries. Comprehensive, reliable and relevant information on job seekers in the COLSAF databases is very important for making high-quality strategic decisions.

Availability and economic efficiency of ALMP targeting the marginalised Roma communities (MRC) are questionable in Slovakia. However, the ALMP targeting the most disadvantaged job seekers (e.g. MRC members, handicapped people) are very important in terms of social efficiency. The only ALMP measure associated with the MRC is community work. Improvements in the labour market and the general lack of a labour force have had a limited impact on the employability of MRC members thus far. MRC members are often unable to react to job offers. Furthermore, they are not ready to manage work tasks without external help. The current model of labour market services has a minimal impact on increasing the employment and employability of MRC members. MRC members need an individualised ALMP service, which has not been provided by the public ALMP service thus far.

The quality and form of public services in the field of employment remain problematic. In many countries the non-public providers of labour market services are able to provide tailored assistance, specific to the type of disadvantage and the living circumstances of the job seeker. The non-public provision of labour market services has positive impacts on public expenditure. The provision of labour market services remains in the realm of the COLSAF in Slovakia. There is no significant segmentation of the job seekers.

The right methods of profiling (based on a job seeker's life circumstances) may increase the efficiency of assistance. Specialised organisations (mostly non-public ones) can provide assistance to the most disadvantaged job seekers. Profiling-based assistance may have a better impact for assisted individuals. It may also increase the efficiency of public spending on labour market services.

There were no early intervention programmes aimed at the early prevention of unwanted events in the period 2010–2016 in Slovakia. Foreign experience indicates that early intervention programmes can limit expenditure on unwanted events. Some of these events originate in the lack of prevention.

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[10] Source: Eurostat (2018): Lifelong learning, 2011 and 2016 (% of the population aged 25 to 64 participating in education and training)
[11] Nedelkoska, L., and Quintini, G. (2018): Automation, skills use and training, OECD Social, Employment and Migration Working Papers, DELSA/ELSA/WD/SEM(2018)3.

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The above-mentioned findings indicate that demographic developments would have significant consequences for the future ALMP. Demographic developments will impact upon both the volume and the structure of the disposable labour force. Slovakia is likely to achieve its target of higher education: at least 40% of people with higher education in the age group of 30–34 years by 2020. The share of the labour force with higher education in the total labour force has increased in Slovakia. There, however, can be some mismatch between the structure of qualifications and the labour market demands. It is therefore important to implement programmes aimed at building human capital via LLL. Many international studies indicate that human capital-centred programmes are the best-performing ALMP. Such ALMP have been significantly underfinanced in Slovakia. Short-term training and re-training would remain important for solving the current demands of the Slovak labour market.

The Slovak government cannot significantly modify demographic developments. The Slovak government can assist in improving the education of job seekers. Improvements in educational levels can be achieved via significant investments in programmes aimed at (i) building human capital and (ii) improving qualifications of job seekers.

The above-mentioned findings indicate the following set of recommendations:
- to reconsider the structure of ALMP in Slovakia. The structure of ALMP in Slovakia is different from that in the EU member countries. Slovakia has a low share of ALMP aimed at education and training;
- to analyse and evaluate the performance of ALMP (on an annual basis);
- to amend the structure of ALMP according to the labour market needs;
- to improve the quality of the COLSAF database. Technical recommendations include (i) the prevention of filling illogical information, (ii) the removal of duplicate registrations, and (iii) decreasing the share of missing data;
- to take into account some regional developments. Regions with the highest unemployment rates need more ALMP (i) assisting the formation of human capital and education (education and training) and (ii) preventing all forms of discrimination in the labour market;
- to promote an individualised service. The 'case management' service must contain a strong element of social integration;
- to include non-public providers of labour market services. These providers are able to provide tailored assistance that is specific to the type of disadvantage and the life circumstances of a job seeker. The providers can also apply job seeker profiling according to the job seeker's life circumstances; and
- to introduce programmes aimed at the early prevention of unwanted events.

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