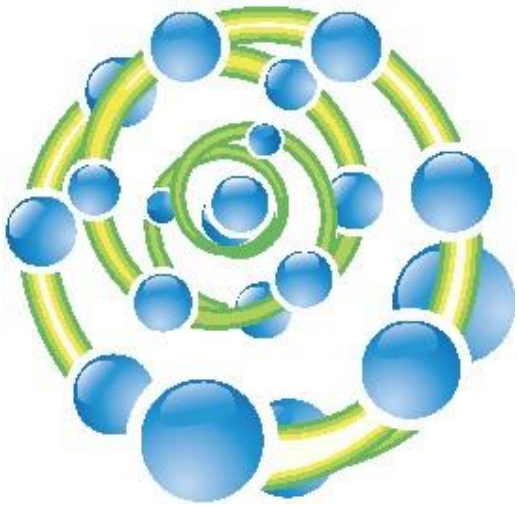
Innovation in VET

Slovakia



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A. Introduction

A list of 22 short-term deliverables (STDs) has been drawn up to indicate the concrete actions which are required at national level for the first four years (2011-14) of implementation of the Copenhagen declaration. They were adopted within the Bruges Communiqué on enhanced European Cooperation in Vocational Education and Training (VET). The thirteenth STD reads as follows: 'Encourage partnerships for creativity and innovation (VET providers, higher education institutions, and design, art, research and innovation centres)'. The ReferNet has monitored it and the results were summarised by Cedefop as presented in Table 1 in Annex A.

Although several activities in support of innovation are indicated in Table 1 and innovations were stressed in many governmental strategy papers ([1]), the expected breakthrough did not occur. Translation into practice suffered from lacking time and financial means for implementation. Now, a substantial improvement is expected from financial instruments in the 2014-20 programming period and from respective documents backing European structural and investment funds ([2]).

Nevertheless, Slovakia was currently placed 21st out of 28 EU countries, scoring far below the EU average (59% of the relative performance to the EU), according to the Innovation Union Scoreboard 2014 report commissioned by the European Commission ([3]). The country was classified as 'Moderate innovator' belonging to the third of the four different performance groups based on the average innovation performance. The group of moderate innovators includes Member States where the innovation performance is between 50% and 90% of the EU average ([4]).

Table 2 in the annex summarises the scores in time series. In 2006-13, the growth rate 1.49% was below the EU28 average (1.66%). Even more, it is the third lowest growth from the post-communist members of EU (after Croatia and Poland with 0.77% and 0.88% average growth, respectively) and far below the best performing Estonia with 3.74% growth.

([1]) E.g., 2005 governmental strategy Minerva, 2008 Modernisation programme Slovakia 21, 2011 Minerva 2.0 Slovakia into first league (with 26 specific initiatives to improve education, science and innovative businesses), and later also National Reform Programmes submitted to the European Commission on yearly basis.

([2]) See 2014-20 Partnership agreement for Slovakia at http://www.partnerskadohoda.gov.sk/, summary in English at http://ec.europa.eu/contracts_grants/pa/partnership-agreement-slovakia-summary_en.pdf; crucial for regions are NUTS III regional innovation strategies 'Regionálna integrovaná územná stratégia (RIÚS)' already in progress of development.

([3]) Hollanders, H. and Es-Sadki, N. (2014) Innovation Union Scoreboard 2014, available at http://ec.europa.eu/enterprise/policies/innovation/files/ius/ius-2014_en.pdf.

([4]) The following post-communist countries belong to the group of 'Moderate innovators': Croatia, the Czech Republic, Hungary, Lithuania, Poland and Slovakia. Estonia and Slovenia belong to the second best group of "Innovation followers" with innovation performance above or close to that of the EU average. Bulgaria, Latvia, and Romania belong to the fourth group of 'Modest innovators' with less than 50% of the EU average according to Innovation Union Scoreboard 2014.

Slovakia achieved its best result in 2012, but deteriorated and lost one place in ranking in 2013 ([5]).

The measurement framework of the Innovation Union Scoreboard comprises three main types of indicators with 25 indicators analysing the performance of the EU innovation system in eight innovation dimensions ([6]). Slovakia performed in all but one dimension below the EU average, as visible from the Table 3 in Annex A.

A high score in the first dimension Human resources (thirteenth place with 0.614 over the EU28 average with 0.583) is caused by favourable data bound to the structure of the system, in particular a high share of people with upper secondary education (second place) and new doctorate graduates per 1 000 population aged 25-34 (seventh to ninth place with 1.9 over EU28 with 1.7). However, it must be stressed that these quantitative data do not necessarily reflect good quality and innovativeness. In contrast to the aforementioned favourable data there is a loud criticism of the quality of graduates ([7]) and extreme lagging behind the EU in attracting non-EU doctorate students (twenty-fourth to twenty-fifth place). An extreme difference in the score concerning doctorate students (seventh to ninth places vs. twenty-fourth to twenty-fifth places) must be taken seriously and together with criticism of the quality of education seen as a warning signal questioning the performance in Human resource dimension. Much more relevant data concerning innovativeness are visible in the dimensions Research systems (twenty-second in EU28) and Intellectual assets (twenty-fifth in EU28). A strong weakness is visible in Patent Cooperation Treaty (PCT) patent application, PCT patent application in societal challenges and License and patent revenues from abroad, maybe due to very low investment in research and development ([8]). Lagging behind the EU in these two dimensions is much more relevant for assessing innovativeness and for future competitiveness than the positive data in the first dimension. A strong decline in performance in all the aforementioned patent related indicators is alarming ([9]).

Furthermore, an alarming situation is visible in a detailed picture offered by regional data ([10]). Slovakia is heterogeneous in performance having its regions in three different groups: the Bratislava region belongs to the second best group (57 Regional Innovation followers), West Slovakia and Central Slovakia belong to the third group (68 Regional Moderate innovators) and East Slovakia to the last performance group (31 Regional Modest

([5]) Ibid, p. 80.
([6]) Ibid, Annex C: Definitions of indicators, pp. 86 – 90.
([7]) See ReferNet Slovakia reports, e.g., 2013 VET in Europe – Country report, chapter 2.4 National challenge; available at http://www.cedefop.europa.eu/en/publications-and-resources/country-reports/slovakia-vet-europe-country-report-2013.
([8]) Innovation Union Scoreboard 2014, Annex A, pp. 82 – 83.
([9]) Ibid, Annex B: Growth performance, p. 84 – 85.
([10]) Hollanders, H. et al. (2014) Regional Innovation Union Scoreboard 2014, available at http://ec.europa.eu/news/pdf/2014_regional_union_scoreboard_en.pdf.

innovators) ([11]). No region in Slovakia belongs to the best group (34 Regional Innovation leaders). An overview about the heterogeneity in performance of regions is offered in 'Performance maps per indicator' ([12]). For each one of the 11 indicators regional performance differences are shown in a geographical map indicating the performance relative to the EU (below 50%, 50-90%, 90-120%, over 120%). While three of four NUTS II regions in Slovakia scored at least once in all the aforementioned classes, i.e., also in the best one with performance over 120% of the EU28 average, East Slovakia scored in almost all indicators below 50% ([13]).

No doubt, an innovation strategy is needed to combat regional disparity, but also to increase competitiveness and to progress in transition to the knowledge based economy. In November 2013, the government approved the Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS 3) ([14]) covering the 2014-20 period. The following seven themes were identified: Three research and development priorities (Material research and Nanotechnology, Information and Communication technologies, Biomedicine and Biotechnology), four technological priorities (Industrial technologies, Sustainable Energy, Environment and Agriculture) and one social priority (Selected areas of social sciences with respect to the most pressing problems of the Slovak society) ([15]). It was therefore suggested to adjust curricula to RIS 3 specialisation – '[…] it is necessary to support teaching of mathematics, natural science and engineering [...] to support a professional specialisation at primary schools ([16]) through the development of polytechnic education' ([17]).

Although there were some measures in support of RIS 3 identified with regard to regional schooling and also higher education ([18]), no agreement has been reached yet about the Action Plan. Nevertheless, a European Social Fund (ESF) project was successfully introduced reflecting the recommendations of RIS 3.

([11]) Ibid, p. 4.
([12]) Ibid, Annex 3, pp. 52 – 62.
([13]) When looking at 11 geographical maps showing the performance relative to that of the EU (below 50%, 50 - 90%, 90-120%, over 120%), Bratislava region scored (2,4,4,1), i.e. two times below 50%, 4 times between 50% and 90%, 4 times between 90% and 120% and one time over 120%. West Slovakia scored (6,2,2,1), Central Slovakia (4,4,2,1) and East Slovakia (9,2,0,0).
([14]) This document was adopted by the government in November 13, 2013 under the title 'Prosperity through knowledge: research and innovation strategy for smart specialisation of the SR'. It is available in English at http://www.google.sk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0CE4QFjAD&url=http%3A%2F%2Fwww.economy.gov.sk%2Fext_dok-en_ris3%2F142231c%3Fext%3Dorig&ei=IfdaU7b7IMeP7AbQoYDYBw&usg=AFQjCNFBx6E4g0kkr8g72QQO1Z78l7dq-g&sig2=x6Ty4CLq3lYqt98lZsB9UQ.
([15]) Ibid, p. 38.
([16]) It means lower secondary education in this context.
([17]) Ibid, p. 46.
([18]) Available in Slovak at http://www.eu2020.gov.sk/data/files/4347_priloha_1813.docx.

B. Innovation example – ESF national project ([19])

B.1. Background

B.1.1. Basic information on the initiative

The national ESF project 'Supporting Vocational Guidance of Basic School Pupils, Designing Polytechnic Education Focused on Development of Working Skills, and Working with Pupils with Gifts in Technology' ([20]) was launched in 2013 and run by the State Institute of Vocational Education (ŠIOV, Štátny inštitút odborného vzdelávania).

The main project idea is to make VET more attractive and to reflect labour market needs; hence more attention should be paid to lower secondary pupils. As can also be seen from the (quite complicated) title, the "polytechnic education" is stressed: Adjusted curricula should equip ISCED 2 graduates with improved specific practical skills relevant to the labour market.

Lower secondary schools interested in introducing polytechnic education into their profile will be equipped with state-of-the-art technology to support education/learning within two educational domains: 'Man and Nature', and 'Man and the World of Work'. A precondition for this is the adjustment of their school educational curricula. Schools are required to offer more time from disposable hours, left by the state to the discretion of individual schools, for the aforementioned educational domains within additional lessons of science and technology. In contrast to 49 pilot schools spread over seven NUTS III regions ([21]) that participate in all the project activities ([22]), additional schools benefitting from the project, called 'affiliated schools' (451 schools), are offered a partial support. They are not newly equipped but can participate in all training activities to be able to implement a polytechnic principle into their curricula in the future, if still interested and appropriately equipped.

Furthermore, all 500 schools are offered specialised education for teachers and career choice services, including a newly created online instrument, and assistance concerning newly created contests and competition opportunities for gifted lower secondary pupils interested in VET.

([19]) The ESF project number ITMS 26110130549, Operational Programme Education, Priority Axis 1 Reform of the Education and Vocational Training System, Measure 1.1 Transformation of Traditional School into Modern One; see more at http://www.asfeu.sk/en/agency/.
([20]) A dedicated website is at www.zsodborne.sk.
([21]) The richest Bratislava region was excluded, as not qualifying for required ESF convergence objective.
([22]) See more below in subchapter 'Implementation arrangements'.

B.1.2. Rationale

Slovakia is among the most industrialised countries and the most open economies in the EU. It is heavily depending on the export of goods manufactured predominantly in machinery and electrical sectors. Although Slovakia has favourable labour cost per hour of EUR 8.5 compared to EUR 23.7 in EU28, it has been growing more than in the EU28 average, as visible in the annexed Table 4.

The Slovak labour force is productive (see the annexed Table 5), but the prospective of wages growth and the importance to keep competitiveness compared to the other post-communist EU members in the future, clearly indicate the need to increase its productivity.

The country needs to replace the ageing labour force in the two main sectors of economy to protect its production capacity. It also needs to attract investors interested in production of goods and services that require more sophisticated production processes.

The RIS 3 governmental strategy indicates the need to improve young people's knowledge, skills and competences relevant for the country's smart specialisation and the need to start with specific interventions at the age of lower secondary education. This resulted in the decisions:

- on specific intervention in support of mathematics, science and technology education/learning in regional schooling;
- on the need to offer a special attention to education and career choice, in order to make young people sensitive to sectors important for the national economy in times of their educational and career choices.

These decisions also correspond to the 2012 Manifesto of the Government: 'In order to raise pupils' interest in technical fields of study, the Government will more vehemently promote teaching of mathematics and natural sciences. The Government will support a more robust involvement of the business sector in the entire school system in order to boost its competitiveness and sustainability in the global environment' ([23]).

B.1.3. Initiators and stakeholders involved

This innovation has been initiated by the Ministry of Education, Science, Research and Sport and ŠIOV responsible for preparing and running the ESF project containing this innovative activity. In the seven NUTS III regions, 451 schools are affected at least by some

([23]) 2012 Manifesto of the Government of the Slovak Republic, subchapter 'Regional schools', available at http://www.vlada.gov.sk/manifesto-of-the-government-of-the-slovak-republic/.

activities of this project, while 49 pilot schools are fully covered by all activities. Municipalities founding the aforementioned 49 pilot schools are the most important partners of ŠIOV. Although not officially involved and not financially contributing municipalities founding the affiliated schools can also be seen as the involved stakeholders.

Professional associations identified by legislation as 'subjects of coordination' with regard to respective VET fields and programmes and important local employers were instrumental for:

- identifying secondary schools that were further asked to recommend active lower secondary schools for cooperation with secondary schools and companies (see Activity A.2.1.2 and Action 3.1.1);
- developing background documents for creation of the 'Occupations through the Eyes of Children' Catalogue (see Activity A.2.1.3).

The State School Inspection is a stakeholder with a specific status important for the final evaluation of the final results and for the monitoring of the activity's impact in the future.

B.2. Implementation

B.2.1. Implementation arrangements

The following are the project activities containing a VET relevant innovative component as explained in the official project description:

Activity 1.1.1 is targeted at the provision of innovative education/learning equipment in workshops and laboratories and at its alignment with developing pupils' talents. It is focused on the pupils' education and career choice decisions to strengthen their assertion into the labour market in the future.

Activity 1.1.2 is targeted at the provision of assistance to pedagogical staff of pilot schools and on the monitoring of the impact of the introduced innovations on pupils' skills as well as on their attitudes towards relevant professions.

Activity 1.1.3 is targeted at the creation and delivery of three accredited educational programmes of continuing education of pedagogical staff (60 hours) focused on introduction teaching innovations within two educational domains in lower secondary level (i.e. Man and Nature and Man and the World of Work). Also, it aims to support pupils in their future education and career choice. These programmes target lower secondary level teachers of the subjects of Biology, Physics and Technology, covering the two aforementioned educational domains. In total 1 000 people should be retrained, with 1 500 certificates from training programmes covering the following:

- Man and Nature domain focusing on Physics;
- Man and Nature domain focusing on Biology and Chemistry;
- Man and the World of Work domain focusing on Technology.

Some trainees will receive more certificates corresponding to their professional orientation and the lessons taught in school.

Activity 2.1.1 is targeted at the elaboration of a new methodology and subsequently of manuals and accredited new continuing educational programmes on career guidance and counselling for specialists in the involved schools responsible for serving pupils in this field. A new methodology should contain a specialised screening instrument for identification of 'VET potential' of individual pupils. An accredited training programme of minimum 30 lesson-hours is to be offered to respective specialists from all 500 schools. This new methodology and instrument envisage five specific tools adjusted for class/age of pupil, with identification of pupils´ preference and 'potential' in the first two levels and adding education and carrier choice related components in higher levels (in a way developed and recommended by specialists´ within this project). For assisting schools in implementation of the new methodology, monitoring the progress and evaluation of results 7 specialists (one in each involved NUTS III region) are to be appointed.

Activity 2.1.2 is targeted at the integration of work experience in the school life of pupils and at the provision of specialised extracurricular activities: e.g., meetings with a world of work representative, visits in open-door days, full class excursions in work places.

Activity 2.1.3 is targeted at the provision of up to date information on professions (or working positions) demanded on the labour market. A catalogue of VET related professions is to be elaborated and periodically updated, offering to lower secondary level pupils pieces of information on labour market needs and professions/working positions, working tasks and requirements in a language adjusted to their age and culture. In 2014, 5 000 publications should be issued (10 pieces for each of 500 schools involved) with a second revised and updated edition in 2015.

Activity 3.1 is targeted at the work with gifted lower secondary level pupils. Within Activity 3.1.1 pupils below 15 year-olds should participate in competitions similar to skills competitions for older students: ZENIT (electrotechnics, machinery and programming), 'Construction by Our Pupils' Hands', Young Mechatronic, Young Ecofarmer). Traditional competition SOČ ('Stredoškolská odborná činnosť – Secondary Schools Professional Activity') organised for decades for gifted upper secondary school students is to be expanded down for 500 lower secondary schools under title ZOČ ('Basic Schools

Professional Activity'). Within ZOČ lower secondary school pupils are invited to work on projects that must contain a theoretical and practical component, completed by a presentation within a competition newly affiliated to the national round of SOČ.

In contrast to the aforementioned competitions expanding from upper secondary level to lower secondary level, a 'School of My Profession - Škola mojej profesie' is a fully new competition. Within a JUVYR national exhibition ([24]) lower secondary school pupils will be annually given an opportunity to present their practical skills based on assignments elaborated by secondary VET schools and related to some profession ([25]).

VET competitions of teams composed of members of lower secondary (general) and upper secondary (VET) schools are to be piloted as a fully new activity. A 'polytechnic principle' should be stressed within this new competition supported by the involvement of the world of work professionals to improve pupils' attitude towards VET and the world of work.

Specialised training programmes for people involved in running competitions (organisers, task developers, trainers and consultants, task assessors) should be developed and offered.

Activity 3.1.2 is targeted at the increase of the pupils' motivation to participate in the newly introduced competitions by:

- specialised training meetings for pupils before competitions;
- introduction of competitions at national level for best competitors;
- excursions abroad;

as well as of pedagogical staff by:

- specialised workshops for pedagogical staff before competitions;
- offering for free continuing education for pedagogical staff interested in the professional development in the field of working with gifted individuals.

B.2.2. Incentives/financing/funding

The ESF ([26]) covers 85% of the project's total costs and the state covers the rest 15%. The costs of three main Activities A1, A2, A3 are EUR 12 084 787, EUR 3 535 330 and EUR 1 800 155, respectively. The total costs of the project, together with the management costs, are EUR 19 999 972.

([24]) JUVYR (standing for Junior and Production) is the exhibition organised on yearly basis (in the last week of November) by ŠIOV, within which representatives of VET schools demonstrate their skills.
([25]) See more bellow in the subchapter reporting about implementation and results achieved.
([26]) The ESF project number ITMS 26110130549; see more about the project at www.zsodborne.sk.

Municipalities founding pilot schools contributed to the project results by additional funding to fulfil requirements needed for arranging new equipment in schools.

B.2.3. Cooperation arrangements

Municipalities founding aforementioned 49 pilot schools signed a Declaration of support specifying their support to their own pilot school. Adjusting classrooms (or workshops) in pilot schools for intake of new equipment was a precondition for supply. Costs of this adjusting (e.g. water and electricity supply adjustments), if needed, were borne by municipalities. This is why these Declarations were required. No other specific cooperation agreements were needed. Cooperation between the project managers and benefitting schools, teachers and pupils was set by the project description.

B.3. Results

B.3.1. Positive outcomes and lessons learned

As already indicated, this project contains several VET relevant innovative components:

Within Activity 1.1.1, 49 pilot schools were equipped with 126 new specialised classrooms and workshops opened in total. Twenty-eight large schools created two classrooms (Biochemistry, Physics) and one workshop (Technology – metal and wood processing machinery; and diverse electricity, water and gas facilities used in households decomposed in order to understand their construction principles) and 21 schools opened Physics classroom and Technology workshop.

Figure 1. **Map of 49 pilot schools**

Source: Gabriela Horecká, Project manager, www.zsodborne.sk

Within Activity 1.1.2, assistance to pedagogical staff of pilot schools has been offered and monitoring of progress of the impact of introduced innovations on pupils' skills and their attitudes towards relevant professions started.

The 2013/14 was the first project year within which schools started to make use of innovative approaches. Comparison of questionnaires' results for pupils (administered in autumn 2013 and at the end of the school year to about 6 000 respondents from classes five to nine of pilot schools) indicates improvement in both understanding and positive attitude towards both educational domains Man and Nature and Man and the World of Work.

Within Activity 1.1.3, three continuing education programmes for pedagogical staff were developed and accredited by the Accreditation Council of the Ministry of Education, Science, Research and Sport (15 credit points each) ([27]).

Within Activity 2.1.1, a document titled 'Analysis of problems resulting in low interest of lower secondary schools pupils in VET', containing also analysis of international experience in promoting transition from school to the world of work in Austria, Germany and Switzerland, has been prepared. This analysis backed the development of new career guidance and counselling methodology and subsequently the assignment settings for development and delivery of an online instrument assisting pupils (and their parents) in education and career choice.

Within Activity 2.1.2, school activities aimed at interlinking the world of education and the world of work were performed based on the project schedule and in detail presented in the project website ([28]).

Within Activity 2.1.3, the 'Catalogue' has been created in an electronic version targeted at the provision of up to date information on 110 professions (or working positions) demanded on the labour market. A reduced hard copy version presenting each of 110 professions in two page description is pending.

Within Activity 3.1.1, all planned competitions have been organised according to the schedule ([29]). There were in total 586 pupils involved in 2013/14. In 2014/15, there were 527 pupils involved in the 'School of My Profession' competition held in November 2014 and 20 pupils in the 'Construction by Our Pupils' Hands' competition, which was also held in November 2014 within the JUVYR exhibition, originally created for upper secondary schools.

([27]) Credit points can be accumulated and subsequently transformed into a bonus to wage or used for career progress (attestation).
([28]) See http://www.zsodborne.sk/sources/ppt_prezentacia/Aktivita-2-prezentacia-13-11-2013.pdf.
([29]) Available at http://www.zsodborne.sk/files/termnovnk_sa_2014-2015-new.pdf.

Within Activity 3.1.2, all planned motivation activities for pupils ([30]) were conducted according the schedule ([31]). Teachers were offered targeted assistance and training before competitions. Also, a continuing education programme for pedagogical staff interested in working with gifted individuals was developed and accredited by the Accreditation Council of the Ministry of Education, Science, Research and Sport (110 lesson-hours and 25 credit points programme).

Seven regional reports feeding the final report evaluating the 2013/14 school year were elaborated on the impact of enhanced polytechnic education, the effect of new methods and forms of education, linked to the professional orientation of students and motivating competitions. A 2013/14 school year experience of pilot schools is very positive. Both pupils and pedagogical staff were very enthusiastic about the project.

B.3.2. Bottlenecks and challenges

The main barrier of smooth progress in project management was the public procurement. Procuring delivery of diverse goods and services was hampered by complicated and time consuming rules.

There are two challenges confirming the initial concerns:

- to change the attitudes of pupils and students towards VET needs long lasting intervention due to the negative experience of families with the extreme volatility of the labour market in the 1990s and due to the fear from specialisation in education choice;
- the cooperation of the world of work is decisive in particular with regard to fighting the fear of families concerning specialisation adjusted to the labour market needs and concerning a supply of relevant quality information, as mentioned in Activity 2.1 (to renew the 'Catalogue' and update the online education and career choice instrument accordingly).

([30]) They are itemised in the subchapter 'Implementation arrangements' above.
([31]) Details are available in Slovak at www.zsodborne.sk under the upper bar button 'Archív'.

Conclusions

Slovakia has failed so far to converge with EU leader-countries in innovativeness, despite a solid growth of economy. A detailed analysis points to an alarming lagging behind innovative countries in some indicators and a heterogeneity in the development of Slovak NUTS II regions. Innovation strategies adopted so far have not been successful enough and new interventions are considered very urgent. The 2012 Governmental manifesto and the RIS 3 strategy paper see one of opportunities for a break-through in innovations in lower secondary education. Mathematics, science and technology should be learned in coincidence with new impulses from the world of work under the umbrella of the 'polytechnic education':

There were selected 49 pilot and additional 451 benefiting schools from the municipalities of the seven out of eight NUTS III regions: Banská Bystrica region, Košice region, Nitra region, Prešov region, Trenčín region, Trnava region, Žilina region ([32]).

A 2013/14 school year experience of pilot schools is very positive. Both pupils and pedagogical staff were very enthusiastic about the project and the local authorities were very supportive. Pilot schools were successfully equipped for the introduction of polytechnic education and teachers retrained to implement innovations in curricula with the aim to making VET more attractive for lower secondary pupils.

In 2014/15, it was also envisaged:

- to raise the status of the upper secondary VET and to increase its attractiveness by focusing on specific interventions targeting lower secondary pupils;
- to further progress the interlinking of innovations in education/learning (via polytechnic education) with:
    - activities aimed at building higher status of VET (competitions and diverse out of schools activities making pupils familiar with the world of work);
    - assistance to pupils in education and career choice;
    - innovative continuing training of pedagogical staff.

Thus, a call for a new ESF project capitalising on results of this project was launched in 30 October 2014 with the aim to expanding the polytechnic education to additional 177 schools ([33]) and to developing and mainstreaming the following:

([32]) Schools from the Bratislava region were not included, but will be included in the future.

- manuals for teachers in support of innovations in curricula;
- a manual to applying the new methodology of assisting pupils in educational and career choice.

([33]) Sixteen schools from the Bratislava region, and 23 schools from the other seven NUTS III regions each, thus 177 schools in total, will participate.

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Annex A

Table 1. **STD 13 decomposed and implementation of respective items assessed in 2014**

Short term deliverable 13 'Partnerships for creativity and innovation' decomposed into nine items	**and items assessed in 2014**
Innovation strategy including VET	I
Creativity and innovation as an underlying principle in VET	I
Guidelines encouraging partnerships for creativity and innovation in VET	P
Creativity and innovation competitions open to VET learners and institutions	AP
Incentives for creativity and innovation partnerships including VET providers	AP
Innovation or creativity clusters involving VET providers	P
Knowledge exchange platforms for creativity and innovation involving VET providers	P
Cooperation to develop learning methods in VET fostering creativity and innovation	P
Skills competition(s)	AI

Source: Cedefop/ReferNet Slovakia; preliminary assessment; Note: A - policies agreed, P - policies partly implemented, I - policies implemented.

Table 2. **Summary Innovation Index in 2006-13**

GEO/TIME	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**GR***
EU28	0.493	0.506	0.504	0.516	0.531	0.532	0.545	0.554	1.66%
SK	0.296	0.302	0.304	0.312	0.299	0.304	0.350	0.328	1.49%

Source: Innovation Union Scoreboard 2014. Annex E. p.92. Tabled and calculated by authors.

NB: * GR – 2006-13 annual average growth rate of innovation performance reached.

Table 3. **Performance scores of Slovakia per dimension compared to EU28 in 2013**

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
EU28	0.583	0.539	0.558	0.417	0.550	0.564	0.549	0.595
SK	0.614	0.158	0.361	0.232	0.325	0.148	0.301	0.454

Source: Innovation Union Scoreboard 2014. Annex F: Performance scores per dimension

NB: 1 – Human resources, 2 – Research systems, 3 – Finance and support, 4 – Firm investments, 5 – Linkages & entrepreneurship, 6 – Intellectual assets, 7 – Innovators, 8 – Economic effects.

Table 4**. Regional Innovation Scoreboard Performance of NUTS II regions**

Composite indicators/ NUTS II regions in Slovakia	BA**	West	Central	East
Population having completed tertiary education	0.716	0.210	0.277	0.249
R&D expenditure in the public sector	0.441	0.094	0.158	0.210
R&D expenditure in the business sector	0.231	0.219	0.138	0.155
Non-R&D innovation expenditure	0.327	0.355	0.442	0.313
SMEs innovating in-house	0.391	0.212	0.331	0.184
Innovative SMEs collaborating with others	0.308	0.271	0.297	0.159
European Patent Office patent applications	0.133	0.053	0.019	0.114
Product or process innovators	0.428	0.277	0.370	0.213
Marketing or organisational innovators	0.393	0.178	0.217	0.156
Empl. in medium-high/high-tech manufact. + KIS*	0.869	0.705	0.545	0.490
Sales of new-to-market and new-to-firm innovations	0.674	0.579	0.529	0.235

Source: Regional Innovation Scoreboard 2014. Annex 4, page 69; tabled by authors.

NB: * Employment in medium-high/high-tech manufacturing + knowledge-intensive services; ** Bratislava.

Table 5. **Labour costs per hour (in EUR) in EU members in 2008-13**

GEO/TIME	2008	2009	2010	2011	2012	2013	GI*
EU28	21.5	22.0	22.4	22.9	23.4	23.7	110.23
Euro area (18)	25.5	26.2	26.7	27.3	27.8	28.2	110.59
Belgium	32.9	34.2	35.3	36.3	37.2	38.0	115.50
Bulgaria	2.6	2.9	3.1	3.3	3.6	3.7	142.31
Czech Republic	9.2	9.1	9.8	10.5	10.5	10.3	111.96
Denmark	34.4	35.6	36.7	37.3	38.0	38.4	111.63
Germany	27.9	28.6	28.8	29.6	30.5	31.3	112.19
Estonia	7.8	7.7	7.6	7.9	8.4	9.0	115.38
Ireland	28.9	29.5	28.9	28.7	29.0	29.0	100.35
Greece	16.7	17.1	17.0	16.2	15.0	13.6	81.44
Spain	19.4	20.5	20.7	21.2	21.0	21.1	108.76
France	31.2	31.6	32.6	33.6	34.3	34.3	109.94
Croatia	9.2	8.7	8.6	8.7	8.7	8.8	95.65
Italy	25.2	26.1	26.8	27.2	27.6	28.1	111.51
Cyprus	16.7	17.4	17.7	18.0	18.0	17.2	102.99
Latvia	5.9	5.8	5.5	5.7	6.0	6.3	106.78
Lithuania	5.9	5.6	5.4	5.5	5.8	6.2	105.08
Luxembourg	31.0	32.2	32.9	33.9	34.7	35.7	115.16

Hungary	7.8	7.1	7.0	7.3	7.5	7.4	94.87
Malta	11.3	11.5	11.9	12.2	12.5	12.8	113.27
Netherlands	29.8	30.4	31.1	31.6	32.3	33.2	111.41
Austria	26.4	27.6	28.0	29.0	30.5	31.4	118.94
Poland	7.6	6.6	7.2	7.3	7.4	7.6	100.00
Portugal	12.2	12.6	12.6	12.6	11.6	11.6	95.08
Romania	4.2	4.0	4.1	4.2	4.1	4.6	109.52
Slovenia	13.9	14.4	14.6	14.9	14.9	14.6	105.04
Slovakia	7.3	7.6	7.7	8.0	8.3	8.5	116.44
Finland	27.1	28.2	28.8	29.5	30.8	31.4	115.87
Sweden	31.6	29.5	33.6	36.4	39.2	40.1	126.90
United Kingdom	20.9	18.8	20.0	20.1	21.6	20.9	100.00

Source: Eurostat data (lc_lci_lev). Tabled and calculated by authors; * GI: 2008-13 growth index.

NB: * Industry, construction and services (except public administration, defence, compulsory social security).

Table 6. **Labour efficiency in post-communist EU members in 2013**

	Labour costs/hour (EUR)	Productivity/hour (EUR)	ALCEU*
EU28	23.7	32.1	0.74
Bulgaria	3.7	4.9	0.76
Czech Republic	10.3	13.1	0.79
Estonia	9.0	11.4	0.79
Croatia	8.8	:	:
Latvia	6.3	8.4	0.75
Lithuania	6.2	10.6	0.58
Hungary	7.4	11.5	0.64
Poland	7.6	10.6	0.72
Romania	4.6	5.6	0.82
Slovenia	14.6	21.4	0.68
Slovakia	8.5	13.2	0.64

Source: Eurostat data. Tabled and calculated by authors.

NB: * Average labour cost efficiency unit indicating average labour cost for production of 1 EUR. : - not available.