

**TRAIN4INNO**

# **National report POLAND**

*Continuous vocational training for innovation in SMEs*

*Leonardo da Vinci learning partnership nr 2013-1-IT1-LEO04-04203 4*

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# 1. INTRODUCTION

Polish economy is currently in the phase of development oriented at effectiveness; however, the phase of transition to the economy driven by innovation is visible. Hence, the features of the contemporary economy and labor market are mobility and adaptiveness shaped, i.e. on the basis of the model of lifelong learning, which is supplemented by life-wide learning<sup>1</sup>.

In the contemporary economy, innovation plays a greater role in the process of increasing competitiveness, both on the level of a micro enterprise and the whole economy, also in single regions. The adopted *Strategy Europe 2020* puts emphasis on: increasing the level of employment, increasing expenditures for R&D, improvement of education in the society (building the economy based on knowledge), battle with social exclusion and poverty. This strategy attributes a great role to the SME sector (similarly to the previous one).

It must be emphasized that the SME sector plays a key role in Polish economy. In 2012, SMEs constituted 99.8% of all enterprises (ca. 1.79 mln SMEs). Enterprises in Poland generate almost 75% of Polish GDP (73%-71.8% in 2011). In the structure of GDP contribution, SMEs generate 48.5%, in which the smallest ones generate 29.7%. In 2012, the number of people working in enterprises in Poland equaled 8.9 mln, where 6.3 mln worked in SMEs. On average, in 2012 the number of people employed in enterprises in equaled 6.5 mln. Persons employed in micro, small and medium enterprises (more than 3.9 mln) constitute more than a half, i.e. 60.3% of all persons employed in enterprises<sup>2</sup>.

Although the SME sector plays such an important role in Poland, it is characterized by a really low level of innovation which is caused by many internal and external factors. The first group includes mainly factors connected with mental attitudes, manifested by general reluctance of entrepreneurs to make changes in the entities they manage, which is determined by their passive attitude or is a result of the necessity to make investments, which is quite risky (according to entrepreneurs) in the period of crisis and uncertainty of the future. External conditions result from the existence of factors which usually limit conducting innovative activity by SMEs (e.g. hindered access to capital, insufficient level of knowledge about company management, limited scale of demand for new products on the market or unfavourable assumptions of the innovation policy).<sup>3</sup>

## 1.1. Podlaskie voivodeship<sup>4</sup> - characteristics

Podlaskie voivodeship was established in 1999 as a result of the administration reform in Poland. The characteristic feature of the region is location in the border part in the north-eastern part of Poland. The result of such a location is overlapping of different elements and conditions - historical, environmental, social, cultural and economic. Podlaskie accounts for 6.5% of the country territory. It is populated by 3.2% of residents of Poland. The territory of the region is sparsely populated. In 2012, 59 people populated 1 km<sup>2</sup>, whereas 123 is the average for the country.

In the category of the level of economic development Podlaskie is among the weakest developed EU regions (255<sup>th</sup> place out of 271 regions). In Poland, it is also classified as one of the weakest voivodeship. In 1999, GDP per capita in comparison with the average one in the country equaled 72.7%. After 10 years, the distance to the average in the country increased. In 2011, GDP per capita was 71.8% (14th place in the country)<sup>5</sup>.

Podlasie is a typical agricultural region with predominance of the processing industry. The voivodeship is characterized by weak diversification of the industry and strong dependence on the dominant branch. The key branches of the region include: food industry (production of food items and drinks); tobacco industry; production of items made of wood, cork, straw and wicker; manufacture of products made of rubber and plastic; manufacture of metal products (including derivative departments). Three main branches generate ca. 60% of marketed production and hire almost a half of employees. When the number of entities operating in the voivodeship is concerned, the dominating sectors are: commerce, building industry and industrial processing<sup>6</sup>.

Podlaskie belongs to the regions which for a few years have faced the decreasing trend in the number of population. In 2000-2013, the population of Podlaskie diminished from 1,221,128 to 1,194,965, i.e. by 26,163 people (by 2.1%).

Apart from a negative rate of natural increase, there is also a negative net permanent migration rate, both internal and abroad. In 2000-2013, visibly more people moved out permanently from Podlasie to different regions in Poland, in comparison with the number of people who came to Podlasie. Furthermore, a net abroad migration rate is also negative. In 2000-2013, almost each year the number of people going abroad outnumbered immigrants coming to Podlasie.

Employers have problems with finding adequate employees despite the fact that the work potential in the region is used only to a small extent, which is confirmed by low rates of professional activity (in 2014-55.8%, including 64.4% of men and 47.8% of women), employment rate (50% including 42.8% for women and 57.7% of men), unemployment rate (10.5%, 54k of the unemployed) and the population of professionally inactive persons (408k, including 284k of women)<sup>7</sup>.

According to the data of the National Census of 2011, the greatest percentage of people in Podlaskie have education on the level of post-secondary school, vocational secondary school and general secondary education (30.1%). On the second place, there is education on the level of junior high school (*gimnazjum*), basic and lower (26.7%). 16% of people have higher education. Podlaskie is the voivodeship with the lowest percentage of people having vocational education in all Poland. According to the Human Capital Balance of 2014<sup>8</sup>, 46% of respondents participated in courses or training (on average in Poland - 19%). In the case of working population, this percentage is even higher - 46% (in Poland - 25%). The situation of the unemployed is much worse - 21% (11% in Poland) participated in courses or training in the last 12 months. This demonstrates that Podlaskie, alike all Poland, copes with lack of adjustment of the needs of the labor market and professional skills which results from insufficient quality and adequacy of the educational offer.

Lifelong learning of employees and employers is pivotal from the point of view of improving innovation of Podlaskie enterprises and the whole region. It results from the analysis of the rates indicating the level of innovative development that Podlaskie voivodeship belongs to the least developed regions in Poland in this sphere. The expenditures for R&D in relation to GDP in Podlaskie are visibly different than in Poland (Table 1).

**TABLE 1. EXPENDITURES FOR R&D (% OF GDP) IN 2006-2012**

Specification	2006	2007	2008	2009	2010	2012
R&D expenditures (% of GDP)						
Podlaskie	0.25	0.20	0.26	0.21	0.32	0.57
Poland	0.56	0.57	0.60	0.68	0.74	0.89
R&D expenditures per capita						
Podlaskie	51	46.5	62.7	55.6	86.2	115.8
Poland	154.6	175.1	202.2	237.7	270.4	372.5

Source: Main Statistical Office data.

Expenditures for R&D in relation to GDP are almost twice lower than on average in Poland, whereas the same expenditures per capita in Podlaskie are three times lower than the average for Poland.

In 2013 expenditures on innovation in Podlaskie industrial enterprises conducting innovative activity per capita equaled 1.7 mln PLN, whereas in Poland - 3.5 mln PLN, in Dolny Slask voivodeship - 6.2 mln PLN, in Mazowieckie - 4.2 mln PLN and in service providing enterprises - 0.4 mln PLN (3.4 mln PLN in Poland and 8.7 mln PLN in Mazowieckie).

Among fundamental reasons of a low level of expenditures on R&D (in the country and in the region), there is an insufficient connection of science and business and little interest of entrepreneurs to carry out R&D activities, which consequently leads to dependence of financing R&D upon budget financial means (ca. 60%). Such a model of financing R&D differs significantly from the model described in the Lisbon Strategy in which 2/3 of expenditures shall be financed from private sources and only 1/3 from public sources<sup>9</sup>.

## 2. LEARNING AND INNOVATION

### 2.1. LEARNING

#### 2.1.1. CVT system and policy

Polish VET system, for which the Minister of National Education is responsible, is provided at upper secondary and post-secondary non-tertiary levels. VET at higher education level is in the scope of responsibility of the Minister of Science and Higher Education.

1. At upper secondary level, students can gain vocational qualifications in a 3-year basic vocational school or in a 4-year upper secondary technical school.
2. At post-secondary non-tertiary level graduates of general and technical upper secondary schools can gain vocational qualifications in a post-secondary school where learning process does not last longer than 2,5 year.
3. Adult learning and CVET. Existing basic vocational and technical schools for adults since 1st September 2012 are being replaced by more flexible system of VET courses for adults organized mainly by IVET schools, continuing education centres and practical training centres. VET for adults is organized mainly in out-of-school forms, such as:
  - a) vocational qualification courses. Completing a vocational qualification course allows to take an external examination confirming vocational qualification, conducted under the same conditions and according to the same rules as for IVET students.
  - b) occupational skills courses – courses for separate units of learning outcomes specified in a given qualification.

c) other courses related to occupations included in the classification of occupations and specialisations meeting labour market needs, including courses conducted in cooperation with labour offices.

### **Distinctive features of VET in Poland (both IVET and CVET)**

In order to improve the quality and the attractiveness of vocational education and training, specific tools were introduced:

- The classification of occupations in VET - a kind of register in which occupations possible to acquire within IVET and CVET have been defined. Each occupation is made of 1, 2 or 3 qualifications. There are 200 occupations and 252 qualifications in the classification.
- One VET core curriculum for all occupations (since 2012). Separate vocational qualifications within specific occupations are described in the core curriculum for vocational education as a set of expected learning outcomes: knowledge, occupational skills, as well as personal and social competences.
- Two optional curricula for VET – subject centered curricula or modular curricula – modular curricula are based on vocational tasks, called “modular units”. Such curricula combine theory with practice. The modular curricula can be easily modified, depending on the needs of the labour market.
- Vocational qualification courses (since 2012),- a short and flexible way to acquire separate vocational qualification in CVET and take external exams confirming qualifications. After acquiring all qualifications (1, 2 or 3) required in a given occupation students receive the diploma confirming vocational qualifications.
- Extramural examinations in VET as a validation tool – the possibility to confirm knowledge, skills and competences acquired in different learning contexts, including professional experience (non-formal and informal learning). Extramural examinations are designed for persons who want to confirm their education level or vocational qualifications without going to school/attending courses.

In Polish legislation, continuous learning has a narrow definition: "education at schools for adults, as well as acquiring and supplementing general knowledge, skills and professional qualifications outside schools by persons who have completed obligatory education"<sup>10</sup>. Continuous learning may be realized in the following forms: formal, informal and non-formal (incidental, self-education)<sup>11</sup>.

Formal education is education in the school system - primary schools, junior high schools (*gimnazjum*), basic vocational schools, secondary schools, vocational secondary schools, post-secondary schools, universities and PhD studies. It affects the level of education.

Non-formal education is understood as all organized educational activities that are not school education, i.e. they are not provided by formal educational institutions. It comprises all kinds of additional education and training outside the school system. It does not affect the level of education. It is usually provided in the form of courses, training, instruction (at a workplace or not), seminars, conferences, lectures, private lessons (e.g. foreign languages), as well as "remote" learning (e.g. e-learning).

Informal education (self-education) is independent learning in order to gain knowledge and improve skills. It should occur without a teacher's assistance and outside organized school and out-of-school forms. The methods of self-education include: family, friend and co-worker support, printed materials, software and the Internet, educational programs broadcast on TV or on the radio, visiting museums with a guide, visiting research centers and using information resources available there.

The responsibility for continuous learning in Poland is mainly borne by the Ministry of National Education and the Ministry of Labor and Social Policy, therefore the legal grounds are included in different documents. They include mainly:

1. Act on the system of education as of 7 September 1991.
2. Act on promotion of employment and institutions of the labor market as of 20 April 2004.

Rules and conditions concerning vocational qualifications of adults and general educational development are formulated in some legal acts issued by both ministries, e.g.:

1. Regulations of the Minister of Education and Science as of 11 January 2012 on continuous learning in non-school settings.
2. Regulations of the Minister of National Education as of 7 February 2012 on the core curriculum of educating in professions.
3. Regulations of the Minister of Labor and Social Policy as of 14 May 2014 on detailed conditions of execution, modes and methods of providing labor market services.
4. Regulations of the Minister of Labor and Social Policy as of 14 May 2014 on grants from the National Training Fund.
5. Regulations of the Minister of Labor and Social Policy as of 11 April 2014 on occupational preparation of adults. Act as of 27 August 1997 on occupational and social rehabilitation and employment of the disabled.
6. Labor Code.

In the Polish system, lifelong learning **in school settings (formal)** may be organized as full-time, extramural and remote in different schools for adults and other facilities (public and private) on the basis of curricula for a given level. It leads to acquiring qualifications and being awarded diplomas specified in relevant provisions by the Ministry of National Education. Continuous learning in school settings carried out by public facilities is gratuitous.

Lifelong learning is organized and carried out by<sup>12</sup>:

- schools for adults - education for adults is conducted in all types of schools on ISCED levels 2-4, in compliance with the provisions of the act on the system of education as of 1991. Schools for adults are meant for persons who have not attained the desired level of education in the time and conditions planned for education of children and young persons. Such people have an opportunity to supplement general education and gain new occupational qualifications. Adults may participate in full-time education, remote education and prepare themselves for final exams;
- continuous learning facilities, practical training facilities, supplementary education and vocational education centers whose statutory obligations is to organize and conduct continuous learning (on the basis of core curricula effective in the whole country) both in a full-time form and in the form of preparing for final exams. In Poland there are 136 continuous learning centers, 137 practical training centers and 24 vocational education centers;
- higher education facilities, Polish Academy of Sciences scientific and research units conducting post-graduate studies to allow students to supplement or improve their qualifications and knowledge essential to perform an occupation (e.g. pedagogical, managerial or medical studies, etc.), to gain qualifications in related occupations or complete doctoral studies;
- Association of Polish Crafts - adults may complete education in an occupation at a company if they want to be a journeyman, qualified worker or master.

Having completed a level of education, students of a primary school, junior high school or secondary school receive a diploma certified by the national authorities and a diploma certifying occupational qualifications. Graduates from secondary schools receive a diploma of completing a secondary school. Representatives of handicraft chambers hold exams for journeymen and masters and issue relevant certificates.

A reform of vocational education introduced in September 2012 a new gratuitous form of education - qualification vocational courses instead of vocational schools for adults. On such courses, adults (at least 18 years old) may obtain 251 qualifications irrespective of their previous education (Regulations of the Minister of National Education as of 23 December 2011). Such courses provide education in 162 professions attributed to 7 areas of education. The core curriculum for each occupation has the same structure and consists of the same elements. Completion of a given course enables a person to take an exam in scope of a given qualification. Each course is conducted in accordance with a program which is in compliance with the core curriculum provided by the Ministry. Having completed a qualification course, a person receives confirmation of course completion. Then, the person takes an external exam confirming a qualification in an occupation and receives a diploma confirming the qualification, which issued by a regional examination board. If a person obtains all qualifications for a given occupation (one, two and sometimes three - K1, K2, K3) and has secondary education, he or she can be awarded the title of a technician.

Qualification vocational courses may be conducted by: public schools providing vocational education for given occupations, non-public schools having the rights of public schools and providing vocational education for given occupations, continuous learning facilities, practical training facilities, supplementary education facilities and vocational education centers, institutions of the labor market specified in Article 6 of the act as of 20 April 2004 on promotion of employment and institutions of the labor market (*Dz. U. z 2008 r. Nr 69, poz. 415, as amended*) which provide education and training, entities conducting activity connected with education on the basis of the act on freedom of business.

Continuous learning **in non-school settings** (informal) may be provided as: training, workshops, conferences, seminars, correspondence courses or e-learning. It is not supervised by any central authorities; thus, it is hard to indicate its general goals or priorities. First of all, it responds to current tendencies, a general policy of continuous learning and needs of the labor market. The enrolment criteria are specified by educational facilities, usually on the basis of course objectives. The costs of informal learning are usually covered by participants. The only two exceptions are courses financed by the European Social Fund and courses for the unemployed financed by the Labor Fund. Financial means for informal continuous learning usually come from state funds, Labor Fund, structural funds or the costs are covered by participants or their employers<sup>13</sup>.

Informal vocational and continuous learning is organized by:

- public educational facilities (centers of continuous learning and practical training), centers of supplementary education and vocational education) organizing short training programs and different occupational courses;
- centers of supplementary education and vocational education run by branch associations;
- higher education facilities, Polish Academy of Sciences research units, research facilities organizing training, seminars, workshops, etc.
- labor market institutions, including voluntary labor corps;
- private training companies;
- enterprises (employers);
- associations, foundations, corporate bodies and natural persons.

The weakness of Polish system of continuous learning is lack of a system of validation and recognition of qualifications/abilities gained during informal learning. Different sectors apply their own solutions. For example, external exams held by regional examination boards enable adults to obtain a diploma of completing junior high school or general secondary school without attending them. However, external exams confirming occupational qualifications are available only for persons who have graduated from specific vocational schools. In the planned reform of vocational education connected with the national qualification framework, occupational exams will have a unified form, irrespective of the fact if education has taken place in school or non-school settings<sup>14</sup>.

One of the tools of the labor market which should contribute to dissemination, increasing an access to and improvement of the quality of training services is the Register of Training Services (RTS)<sup>15</sup>. RTS was established in 2004 by virtue of the provisions of the act as of 20 April 2004 on promotion of employment and institutions of the labor market. According to these provisions, each training institution interested in conducting training programs for the unemployed and persons looking for a job financed by state funds is obliged to be registered in RTS. The entry to the register can be obtained upon submission of an entry application at a Voivodeship Labor Office of proper jurisdiction for the registered office of a company. Institutions that do not apply for public funds for training the above mentioned groups are not obliged to be registered. The registration process is gratuitous. An institution receives a document confirming the entry with the date of registration and registration number. The Register is kept in the IT system.

The report prepared by the Ministry of Labor and Social Policy as of 31 December 2013 mentions that there were 12 619 registered training institutions (13 833 together with local offices and branches). Among all registered institutions, 94.5% declared themselves to be non-public and only 5.5% public. Training services are mainly offered by institutions run by natural persons. In 2013, in the total number of registered institutions:

- 54% were institutions run by natural persons as their economic activity;
- 27.7% were associations, foundations, companies and other corporate bodies;
- 9.2% were other organizational forms such as: centers of continuous learning and practical training, centers of supplemental education and vocational education centers, higher education facilities/colleges, secondary schools, research and scientific centers, research-development centers;
- 8.9% represented other organizational forms including workplaces.

In order to ensure high quality of continuous learning in 2003 Poland introduced a system of accrediting facilities and centers offering continuous learning in non-school settings<sup>16</sup>. Obtaining accreditation confirms that a facility fulfils certain requirements and adopted criteria of quality.

The following entities can apply for accreditation: public and non-public centers of continuous learning and practical training, centers of supplementary education and vocational education, entities conducting educational activity in accordance with the rules specified in the provisions of the law on economic activity providing that they have started their activity at least one year before the day of requesting a local department of education for accreditation. Accreditation may refer to the whole or a part of education. Before awarding accreditation, special attention should be paid to the didactic personnel and their qualifications, methodology and teaching materials.

### 2.1.1. CVT in the strategic and programming documents

With article 67 and 68 of the act on promotion of employment and institutions of the labor market, there was a possibility of establishing a company's training fund using the owned financial resources. The fund's function was to finance or part-finance costs of continuous learning for employers and employees. The income of the training fund included: employers' payments in compliance with the provisions of a collective labor agreement or the rules of the training fund, not lower than 0.25% of the payroll fund. The payments were included in the costs of business which implies lower taxes which was an incentive for establishing a training fund<sup>17</sup>.

In reality, not many employers created such funds and the reason was an alleged lack of knowledge about them (mainly among SMEs) and lack of training needs in an enterprise (mainly micro firms with up to ten employees).<sup>18</sup>

The amendment of the act on promotion of employment and institutions of the labor market that came into effect on 27<sup>th</sup> of May 2014 introduced a new instrument of developing human resources - National Training Fund (NTF) which finances continuous learning of employees and employers<sup>19</sup>.

NTF is a part of the Labor Fund allocated for continuous learning of employers and employees undertaken by an employer's consent or on an employer's initiative. The aim of NTF is to prevent a loss of employment by working people who have competences inadequate to the needs of a dynamically changing economy. Increasing investments in the staff potential should improve the companies' and employees' position on the competitive labor market.

An employer endeavoring to obtain financing for the costs of continuous learning must contribute at least 20% and the rest, 80% is covered by the Fund. In the case of micro enterprises, i.e. employers employing up to 10 people, 100% of continuous learning costs is financed. However, the maximum financing by NTF cannot exceed 300% of an employee's average remuneration in a given year per participant. NTF support is granted in compliance with the rules of *de minimis support*.

NTF resources received from district labor offices might be spent by an employer on: identifying an enterprise's needs in scope of continuous learning that will be financed, courses and post-graduate studies by an employer's consent or on an employer's initiative, exams allowing for receiving diplomas confirming acquisition of abilities, qualifications or occupational authorization, doctor or psychologist examination required for undertaking education or work after training completion, accident insurance in connection with undertaken education.

In compliance with the provisions of the act mentioned above, in the first period, i.e. 2014-2015, NTF funds will be allocated for supporting continuous learning of persons at the age of 45 and more. In district labor offices' opinion, the use of the available funds would have been higher if these funds could have been spent also on different age groups. The restriction to the group 45+ is a great barrier in expending the funds<sup>20</sup>.

Among barriers hindering continuous learning of persons working in Poland, there are unfavorable working conditions as regards, e.g.<sup>21</sup>:

- a large scale of time limited employment. In 2013, the highest scale of employment in this form which does not guarantee continuity of work was reported in Poland (28.6%). High percentage was also recorded in Spain (23.2%), Portugal (21.4%) and Holland (20.3%)<sup>22</sup>;
- relatively high percentage of persons working on shifts (29.9%, whereas in EU - 17.4%) which has a negative effect on educational initiatives.

Because continuous learning is a priority in EU activities and strategies until 2020, Poland as a member state has undertaken to conduct a deep reform of continuous learning. A far-reaching vision of development of continuous learning on the national level is first of all included in key strategic and programming documents which include:

- Perspective of Lifelong Learning;
- Long-term Development Strategy of Poland. Poland 2030;
- Development Strategy of Poland 2020;
- Development Strategy of Human Capital;
- Development Strategy of Social Capital;
- regional operational programs.

The most important regional strategic and programming documents which determine directions of education in the context of improving innovation of Podlaskie enterprises, especially SMEs include:

- Podlaskie Voivodeship Development Strategy 2020;
- Regional Operational Program of Podlaskie Voivodeship 2014-2020;
- Development program for smart specializations and entrepreneurship in Podlaskie 2015–2020+.

A concept for a long-term policy of development of Podlaskie voivodeship is described in *Podlaskie Voivodeship Development Strategy 2020 (PVDS)* updated in 2013. It takes into consideration a new paradigm of the regional policy in which, e.g. support means be strengthening and making use of endogenic potential.

PVDS is a document strictly connected with numerous documents and which is strategic on the European scale (e.g. Strategy Europe 2020) and on the national scale (e.g. Long-term Strategy of Regional Development 2030, National Strategy of Regional Development 2020, Medium-term Strategy of Country Development 2020, Plan of Area Development of the Country 2030).

The Regional Operational Program for Podlaskie Voivodeship 2014-2020 is an important financial tool allowing to complete PVDS goals. It was adopted by the voivodeship parliament in April 2014 and then accepted by the European Commission in February 2015. Its main goal is growth of competitive economy created on the basis of regional specializations<sup>23</sup>

From the implementation point of view concerning activities improving innovation of enterprises, including changes in the educational system, including lifelong learning, the key document is the documents entitled *Program of development of smart specializations and entrepreneurship in Podlaskie voivodeship 2015-2020+*.

### 2.1.2. Participation in CVT - data

To assess lifelong learning in Poland in comparison with other countries, the report will use Eurostat data gathered in the Labor Force Survey and the Adult Education Survey which take the level of participation of population in education and training in a year (last 12 months before the survey) into account<sup>24</sup>.

Although Poles have high educational aspirations which are demonstrated by widespread participation in formal education (including higher education), participation of adults in education and training significantly decreases after completing this process. In Poland, the percentage of people at the age of 25-64 in education is very low.

In 2014, this percentage equaled 4.1%, whereas the average for all twenty-eight EU member states was 10.6%. The EU objective until 2020 is 15% in accordance with the European agenda on adult learning adopted in November 2011 (it concerns people declaring participation in education or training in the last four weeks before the survey).

Very low rates were recorded in Greece (3%), Hungary (3.3%), Croatia (2.5%), Bulgaria (1.7%) and Romania (1.7%). The highest rates of adult continuous learning were reported in Denmark (31.4%), Switzerland (31.2%), Sweden (28.6%), Norway (19.7%). Relatively good rates (between 10% and more than 17%) were recorded in Holland (17.7%), Great Britain (15.9%), Austria (14.2%), Luxembourg (13.8%), Slovenia (12.2%), Estonia (12.3%) and Spain (10.1%).

The Labor Force Survey data shows that educational activity of adult Poles in 2011-2014 decreased and reached the level of the year 2003, so the time before Poland's accession to the European Union, although EU structural funds significantly increased funds for continuous learning.

According to the Adult Education Survey data, Poland is in the group of countries in which less than one fourth of people in the last 12 months participated in formal or non-formal education, whereas the average for all 28 EU member states equals 40.3%. In Sweden 72% of adults participated in education, in Germany and France - 50%, Slovakia - 42%, Hungary - 41%, Czech Republic - 37%. The research reports only two cases of educational activity rates lower than in Poland - Greece (12%) and Romania (8%).

Detailed data regarding the scale of participation of people at the age of 25-64 in education in Poland show that in comparison with 2006, in 2011 the rate of participation for this age group in any kind of education increased by 2.4 percentage points, which is evidence of growth in educational activity of Poles. More and more people participate in non-formal education (increase from 18.6% in 2006 to 21% in 2011) and informal (increase from 25.4% to 29%). The rate of participation in formal education did not much change - 5.5% in 2006 and 5.4% in 2011.

It must be pointed out that the percentage of adult Poles participating in formal education (5.4%) is close to the EU average (6.2%). However, participation in non-formal education (courses, training, different activities of similar character) is much worse: in 2011, 21% of adult Poles participated in it, whereas the average for EU-28 was 36.8%. Hence, it is visible that the weakness of Poland is not a low level of educational activity in general, but mainly a low level of participation in courses and training, which are shorter and more flexible forms of developing competences<sup>25</sup>.

Approximately six out of ten adults did not participate in any form of education in 2011, even in the form of self-education which does not require any financial costs. Persons who do not participate in any type of education are equally men and women.<sup>26</sup>

Enterprises which want to be competitive on the market must develop and educate their staff. Simultaneous training and development of employees is becoming more and more appreciated by modern companies as an activity not only needed for enterprises, but even essential<sup>27</sup>.

The data included in Table 2 demonstrates that Poland is differentiated among other EU countries by the lowest involvement of enterprises in continuous learning of their employees. In 2010, it concerned only 22.5% of all enterprises taking part in the research, whereas the EU average was 66%. It means that the level of involvement of Polish enterprises in staff development is three times lower than the average level for EU-28, four times lower than in Denmark, Austria and Sweden. Poland is also behind Greece and Romania, which have lower educational activity of adults than Poland. Because employers give the strongest impulse for occupational development, the level of engaged enterprises is not only unfavourable, but it is a barrier for this process<sup>28</sup>.

When we compare the data concerning organization of training in 2005, it is visible that in Poland, unlike in other EU member states, the number of enterprises providing their employees with training decreased (from 35% in 2005 to 22% in 2010), irrespective of their size.

A similar fall in educational activity of enterprises was only reported in Romania (by 16 pp - from 40% in 2005 to 24% in 2010), Great Britain (by 10 pp: from 90% in 2005 to 80% in 2010). It means that Polish enterprises are categorized into the group in which enterprises in this period significantly limited their investment in the staff.

The participation of entities providing continuous vocational education increased along with the size of an enterprise. Among large enterprises, 74.8% of all entities provided training; among medium enterprises - 41.4% and small - 15.9% (whereas in Great Britain - 78%, 69% in Germany, 68% in the Czech Republic, 65% in Slovakia). In general, engagement of Polish companies in staff development is low and activity of small companies in this scope is inconsiderable.

CVT does not include micro enterprises which are even less active in scope of staff development and which constitute 94.8% of all enterprises in Poland and hire 37.2% of employees. If we included this group of enterprises in the total involvement of entrepreneurs in staff development in Poland, it would be even lower, which would make employees' chances for professional development even smaller<sup>29</sup>.

**TABLE 2. PERCENTAGE OF ENTERPRISES PROVIDING CONTINUOUS VOCATIONAL TRAINING FOR THEIR STAFF IN POLAND IN COMPARISON WITH EU (%)**

Country	Total		Small enterprises (10-49 employees)		Medium enterprises (50-249 employees)		Large enterprises (250 employees +)	
	2005	2010	2005	2010	2005	2010	2005	2010
EU (28 countries)	60	66	55	63	78	81	91	93
Belgium	63	78	58	74	86	94	99	99
Bulgaria	29	31	24	27	44	49	61	80
Czech Republic	72	72	66	68	93	90	100	97
Denmark	85	91	83	89	96	98	99	100
Germany	69	73	65	69	81	82	87	96
Estonia	67	68	62	64	85	83	96	97
Ireland	67	:	61	:	86	:	100	:
Greece	21	28	16	24	39	46	70	83
Spain	47	75	43	72	68	90	89	97
France	74	76	69	72	98	95	100	98
Croatia	:	57	:	53	:	73	:	86
Italy	32	56	29	53	58	77	86	91
Cyprus	51	72	45	68	80	88	100	100
Latvia	36	40	31	37	56	54	76	82
Lithuania	46	52	40	48	64	67	88	89
Luxembourg	72	71	68	66	85	86	95	100
Hungary	49	49	42	43	77	74	90	95
Malta	46	54	40	49	65	73	87	90
Netherlands	75	79	71	75	88	89	96	97
Austria	81	87	79	85	91	96	99	99
<b>Poland</b>	<b>35</b>	<b>22</b>	<b>27</b>	<b>16</b>	<b>55</b>	<b>41</b>	<b>80</b>	<b>75</b>
Portugal	44	65	39	61	70	86	91	97
Romania	40	24	36	20	50	36	74	64
Slovenia	73	68	67	64	85	84	97	95
Slovakia	60	69	56	65	74	84	92	90
Finland	77	74	73	70	89	91	94	90
Sweden	78	87	74	85	95	96	100	99
United Kingdom	90	80	89	78	92	93	96	98
Norway	86	97	86	96	88	99	95	100

Source: EUROSTAT [accessed: 20.02.2015].

Low potential of Poland in scope of conditions for staff development is confirmed by, e.g. CEDEFOP analyses<sup>30</sup>. On the basis of a comparison of work organization, instruments for staff development and innovation index, five segments of European countries have been differentiated (Table 3).

Poland, Bulgaria, Latvia, Lithuania, Hungary, Romania and Slovakia were placed in the segment of low potential for staff development, which means that the method of work organization, the scope of instruments of human capital development, scope of innovation do not make good conditions for development of employees' competences<sup>31</sup>.

**TABLE 3. POTENTIAL FOR STAFF DEVELOPMENT: SEGMENTATION OF EUROPEAN COUNTRIES**

High potential for staff development	Stable potential for staff development	Moderate potential 1 (significant possibilities for development, moderate innovation)	Moderate potential 2 (insignificant possibilities for development, moderate innovation)	Low potential for staff development
Denmark, Germany, Sweden	Belgium, Luxembourg, Holland, Austria, Finland,	Estonia, Malta, Norway	Czech Republic, Ireland, Greece, Spain, France, Italy, Cyprus, Portugal, Slovenia, Great Britain	Bulgaria, Latvia, Lithuania, Hungary, <b>Poland</b> , Romania, Slovakia

Source: *Learning and Innovation in Enterprises*, CEDEFOP, Luxembourg 2012, p. 45.

The percentage of enterprises providing training in the total number of enterprises oscillated between 17.3% and 28% and was not much different from the average for Poland (22.5%). The highest percentage was recorded in Zachodniopomorskie (28%) and the lowest in Łódzkie (17.3%) (Table 4). The lowest level of training activity is reported by small enterprises, in which only 16% of entities organize such activities. Podlaskie belongs to the regions with very low percentage of companies training their employees - 19.8%. In the sector of small enterprises, only 11.8% educate their employees.

In 2010, 77.5% of enterprises did not provide their employees with any training. When the size of an enterprise is analyzed, it is visible that the smaller an enterprise, the less training. In the group of small enterprises, 84.1% did not provide any training, medium enterprises - 58.6% and large enterprises - 25.2%.

The main reason for lack of training is that the employees' current qualifications and skills meet the requirements of an employer - 81.4% of enterprises which do not provide any training. The next reason was a strategy of employing persons with a required level of qualifications - 69%. These arguments dominated in all enterprises irrespective of the

type of conducted business and size. The least important reason was a difficulty in assessing training needs in an enterprise.

**TABLE 4. ENTERPRISES PROVIDING AND NOT PROVIDING TRAINING IN POLAND (%)**

SPECIFICATION	providing training		not providing training								
	in % of the total of enterprises		in % of enterprises not providing training								
			the existing skills and competences of the persons employed corresponded to the current needs of the enterprise	the preferred strategy of the enterprise was to recruit individuals with the required skills and competences	difficulties in assessing the enterprise's training needs	lack of suitable training offers on the market	high costs of training	higher focus on IVT than CVT	major training effort realised in previous years	high workload and limited available time of persons employed	other reasons
<b>POLAND</b>	<b>22.5</b>	<b>77.5</b>	<b>81.4</b>	<b>69.0</b>	<b>8.9</b>	<b>10.4</b>	<b>43.5</b>	<b>38.5</b>	<b>15.9</b>	<b>24.4</b>	<b>24.2</b>
<b>Podlaskie</b>	<b>19.8</b>	<b>80.2</b>	<b>67.9</b>	<b>50.0</b>	<b>12.2</b>	<b>12.3</b>	<b>37.3</b>	<b>31.6</b>	<b>15.9</b>	<b>27.9</b>	<b>35.1</b>

Source: Vocational training in enterprises in Poland in 201. GUS, Gdańsk 2012, p. 155 and the following.

**TABLE 5. ENTERPRISES PROVIDING AND NOT PROVIDING TRAINING IN THE SME SECTOR IN POLAND (%)**

SPECIFICATION	providing training		not providing training								
	in % of the total of enterprises		in % of enterprises not providing training								
			the existing skills and competences of the persons employed corresponded to the current needs of the enterprise	the preferred strategy of the enterprise was to recruit individuals with the required skills and competences	difficulties in assessing the enterprise's training needs	lack of suitable training offers on the market	high costs of training	higher focus on IVT than CVT	major training effort realised in previous years	high workload and limited available time of persons employed	other reasons
<b>ENTERPRISES EMPLOYING 10-49 PERSONS</b>											
<b>POLAND</b>	<b>15.9</b>	<b>84.1</b>	<b>81.9</b>	<b>68.1</b>	<b>8.8</b>	<b>10.6</b>	<b>43.1</b>	<b>38.0</b>	<b>15.2</b>	<b>24.4</b>	<b>23.8</b>
<b>Podlaskie</b>	11.8	88.2	66.6	49.6	12.5	13.0	35.8	30.4	15.4	27.2	34.9
<b>50-249 ENTERPRISES EMPLOYING 50-249 PERSONS</b>											
<b>POLAND</b>	<b>41.4</b>	<b>58.6</b>	<b>78.8</b>	<b>74.2</b>	<b>9.4</b>	<b>9.6</b>	<b>46.1</b>	<b>41.4</b>	<b>20.2</b>	<b>24.2</b>	<b>26.6</b>
<b>Podlaskie</b>	42.1	57.9	74.5	49.1	9.3	8.9	43.0	38.5	18.7	31.7	37.1

Source: Vocational training in enterprises in Poland in 2010. GUS Gdańsk 2012, p. 155 and the following.

In all voivodeships enterprises not providing training declared that the reason for this is that the employees' current qualifications and skills meet the requirements of an employer. In this case, Warmińsko-Mazurskie had the highest percentage of such a response (88.8%, in the country 81.4%). This reason dominated in small enterprises in all voivodeships and in medium enterprises in some voivodeships. In large enterprises, in the vast majority of voivodeships, the main reason for not providing training was a strategy of employing persons with a required level of qualifications (76.9%). In most voivodeships, the most rarely mentioned reason was lack of a proper offer of training on the market - 10.4% of enterprises not providing any training.

When a form of training is concerned, the prevailing one is a course form conducted by 91.1% of all enterprises providing training. This regularity was visible irrespective of the type of business, size of an enterprise and voivodeship. Most enterprises used external courses - 88.6%, whereas internal courses were conducted by 58.6% of all enterprises. Some enterprises conducted both internal and external courses. Predominance of enterprises providing external courses over enterprises conducting internal courses was visible in each size class. 84.9% of small enterprises conducted external courses, medium - 91.9% and large - 96.3%.

Other forms of training occurred in 63.1% of enterprises providing training. In this group, five training forms have been differentiated. The most popular types included: conferences, seminars, workshops, fairs and lectures – 75% of all enterprises providing other types of training. Another popular form was training at a workplace – 58.5%. The least popular form (irrespective of the size of an enterprise, voivodeship) was learning by participation in scientific circles or quality circles – only in 4.2% of enterprises providing different forms of training.

In order to find a connection between enterprise innovativeness and training of employees it must be pointed out that in the analyzed population almost one twelfth introduced in 2010 new or significantly improved products, services/methods of production or providing services. More than a half (55.3%) conducted training, usually in the form of courses – 95.5%. The highest number of changes was introduced in small enterprises – 54.3% of all enterprises, in medium enterprises – 31.9% and in large – 13.8%. However, introduction of any kind of innovation in an enterprise was not connected with an increase in the number of training programs.

It results from the research on enterprises that the most popular way to satisfy the needs of enterprises in scope of new abilities was recruitment of new employees with required qualifications and abilities, whereas continuous vocational training of the current employees was on the third place. Such a strategy was possible only under the condition of high over-demand of work resources (domination of the so called labor market of employers) in Poland.

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## 2.2 INNOVATION

### 2.2.1. Policy of innovation in relation to the SME sector

The policy of innovation in Poland is based on a wide array of instruments of a controlling (legal), programming (national and EU support) and institutional (financial and non-financial support) character<sup>32</sup>.

When controlling instruments are concerned, one of the first legal documents encouraging to undertake innovative activities was the act on supporting innovative activities as of 2005. It concentrated on creating incentives for carrying out R&D activities. The most important assumptions included: the possibility to obtain the status of R&D centers by private companies, which gave preferential tax treatment (for them and their contractors), the possibility to take a technology credit at the National Bank of Economy for purchase or production of a new technology (50% of it could have been written off under certain conditions), the possibility to deduct costs of research activity from the tax base, irrespective of the results achieved and finally to deduct costs from the tax base in the case of purchase of new technologies (from a research institute, university or R&D centers) - even up to 50% of costs (small enterprises). The act was a huge revolution and a huge step forward for innovation development. However, it is said that it is too bureaucratic and it imposes inflated conditions.

Another legal act of considerable importance is the act as of 30 May 2008 on some forms of supporting innovative activities. Its main goal is: growth in competitiveness and innovation of the economy by higher expenditures in the private sector and improving the effectiveness of management of public resources for R&D. To achieve this objective, there were three supporting elements: also the possibility of taking a technological credit (with some changes), maintenance of the status of R&D centers and tax relief when purchasing new technologies. In practice, the most popular instrument which is also best assessed is a technological credit. R&D centers and tax reliefs are perceived less positively. It means that entities have less interest in using R&D centers as an instrument of improving own innovation, which is a resultant of too high initial conditions when creating such centers and too little tax incentives for participants of service exchange under R&D centers. Low popularity of the last element is a resultant of a low level of innovation diffusion among Polish enterprises and insufficient promotion of this instrument among potentially interested parties.

Currently, Polish entrepreneurs, especially from the SME sector, have an opportunity to make use of a wide array of support instruments in scope of R&D&I. An analysis of available programs supporting innovation in 2007-2013 revealed 60 support instruments directly or indirectly aimed at innovation development. These instruments are differentiated, their characteristic features are: range (regional or national), source of financing (state budget/structural funds/other international programs), target group (entrepreneurs/other entities), form, implementing authority (e.g. Polish Agency for Entrepreneurship Development, Ministry of Economy, National Center for Research and Development, National Bank of Economy, Marshal's Offices, Voivodeship Offices; regional entities established in order to carry out supporting programs, e.g. Podlaskie Intermediary Institution). Among them, there are 25 supporting instruments carried out within regional operational programs, financed from structural funds in the financial perspective 2007-2013. Other 30 instruments are carried out within national operational programs<sup>33</sup>.

The functioning programs include activities supporting R&D&I, human capital and specialized services for enterprises (parks and technological incubators, counseling). The system of granting financial support is dominated by grants received irrespective of the risk connected with the project realization.

Hitherto, the main pillar of the system of financing R&D&I activities from EU funds was the Operational Program Innovative Economy 2007-2013 (OPIE), mainly directed at entrepreneurs. OPIE supported projects of trans-regional character in scope of technological innovations concerning products, processes and innovations of design in the manufacturing and services sector, which directly or indirectly contribute to establishment and development of innovative enterprises.

Furthermore, support directed at widely understood growth in innovation of the economy was granted by other operational programs:

- Operational Program Human Capital 2007-2014 (OPHC) - investments in occupational advancement of the staff and improvement of the quality of activities supporting development of training-counseling services in enterprises;
- Operational Program Infrastructure and Environment - considerable support for innovative investments of SMEs in, i.e. renewable energy sources;
- Operational Program Development of Eastern Poland (OPDEP) - an additional element of funding from structural funds; it strengthens performance of other programs operating in Eastern Poland in order to evoke the effect of synergy and realization of some activities stimulating economic and social development;
- Regional Operational Programs (ROP) carried out in each voivodeship as a supplement for instruments planned in central operational programs which support innovation on the trans-regional level.

## 2.2.2. Innovation in strategic and programming documents

Because innovation of enterprises is another important priority in the activities and strategies of the European Union until 2020, Poland has also undertaken to elaborate a new concept of innovation policy. A vision of a modernized attitude towards innovation is included mainly in key strategic and programming documents, which include: Strategy of Innovation and Economic Effectiveness "Dynamic Poland 2020" and Program of Enterprise Development until 2020, which is an executing document of *Strategy of Innovation*.

*Strategy of Innovation* has common objectives, tasks, rates to be achieved with other strategic and programming documents such as: Perspective of Lifelong Learning, Long-term Strategy of Country Development - Poland 2030, Strategy of Country Development 2020, Development Strategy of Human Capital, Development Strategy of Social Capital and regional operational programs.

The main objective of *Strategy of Innovation* is "highly competitive economy (innovative and effective) based on knowledge and cooperation". Achievement of this goal is possible by the following specific objectives:

- Objective 1. Adjusting the legislative and financial surroundings to the needs of innovative and effective economy;
- Objective 2. Stimulating innovativeness by increasing the effectiveness of knowledge and work;
- Objective 3. Increasing the effectiveness of the use of natural resources and raw materials;
- Objective 4. Increasing internationalization of Polish economy.

From our point of view, the fifth objective which assumes supporting development of staff for an innovative and effective economy is the most important.

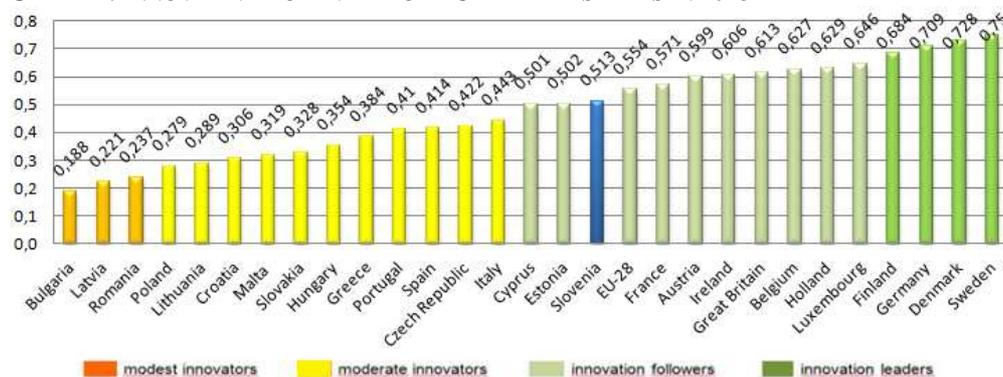
The process of improving the quality of education requires involving numerous entities that influence the system of education, especially employers play an important role according to the *Strategy*. Adjustment of competence courses and training to the needs of the market is possible only when employers (or employees) simply define what kind of knowledge and skills they expect and training companies will undertake to organize such classes (even if they are more expensive and more difficult to organize). Hence, it is essential to build cooperation between educational institutions and training institutions with business.

## 2.2.3. Innovation of Polish enterprises - data

According to the report entitled *Innovation Union Scoreboard 2014*, in comparison with other EU member states, Poland is characterized by a relatively low rate of Summary Innovation Index – SII – Graph 1. In the rank IUS 2014, it was placed as last but four with a synthetic rate of innovation on the level 0.279. Poland was assigned to the group of countries called *moderate innovators*. Romania (0.237), Latvia (0.221) and Bulgaria (0.188) were on lower positions. In comparison with the preceding year, Poland improved and was classified as a moderate innovator and it was no longer a weak innovator.

In almost each research, human resources constitute a well-assessed element for Poland, because it points out weaknesses of the innovation system, favorable for insufficient level of involvement in innovative activity of enterprises, including cooperation, especially in the SME sector.

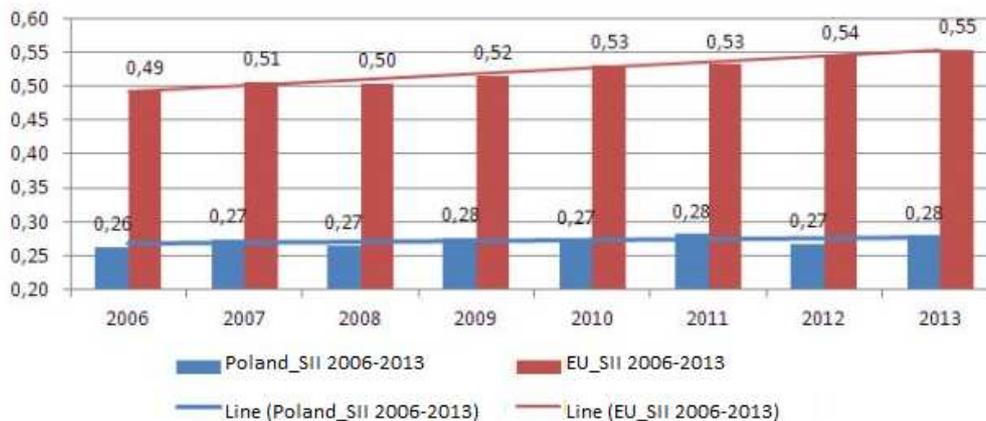
**GRAPH 1. INNOVATIVE POTENTIAL OF EU MEMBER STATES IN 2013**



Source: Innovation Union Scoreboard 2014.

The total rate of innovation for Poland in 2013 constituted 50.5% of the average EU rate, which was decisive to categorize Poland to the group of moderate innovators (last position) - Graph 1. In the last few years, the rate for Poland constituted: 53% (2008), 53% (2009), 51% (2010), 53% (2011), 49% (2012) of the average EU-28 rate. Total rates for EU member states in 2006–2013 demonstrate a visible increasing trend. Poland seems to be quite stable with a minimal pro-growth trend in comparison with different countries.

**GRAPH 2. TOTAL RATE OF INNOVATION FOR POLAND AND TREND LINE FOR POLAND AND EU IN 2006-2013**



Source: Polish Agency for Enterprise Development

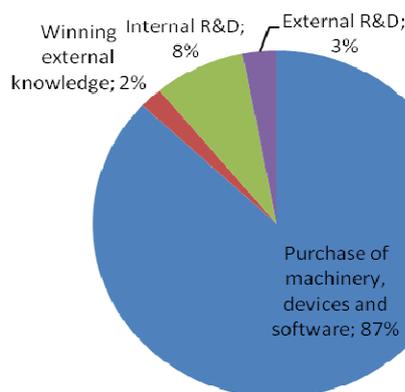
Expenditures for R&D in Poland are also significantly lower than in other countries of Central and Eastern Europe. In 2012, internal expenditures for R&D in Poland constituted 1.27% of all 28 EU member states' expenditures altogether, whereas in 2013 - 1.26%.

In 2012, Poland was on the twentieth position among EU member states as regards the rate of R&D intensity, which was 2.3 lower than the rate for EU. The preliminary data for 2013 indicates that the rate of R&D intensity in Poland is by 1.15 percentage point lower than for EU-28. In 2012, similarly to Poland, the rate did not exceed 1% in Cyprus, Romania, Bulgaria, Latvia, Greece, Croatia, Slovakia, Malta and Lithuania. The rate specified in *Strategy Europe 2020* - 3% was achieved only in Finland, Sweden and Denmark. When we calculate the value of internal expenditures for R&D per capita, in 2012 Poland was on the 24<sup>th</sup> position with 89€, whereas the average for EU-28 was 532.6€<sup>34</sup>.

An analysis of internal expenditures by the type of research conducted indicated that in 2013 the highest value fell to development works – 44.5%, basic research – 35%. The lowest value fell on applied research – 20.5%. Almost 80% expenditures incurred by enterprises were connected with development works, 17.2% – applied research, 4.1% – basic research. In other sectors, the greatest part of internal expenditures was incurred on basic research. In the governmental sector this percentage equaled 46%, whereas in the sector of higher education and the private sector of non-commercial institutions – 70.7% and 51.8%, respectively.

The structure of expenditures on innovation of Polish enterprises differs from the one in the neighboring countries and EU-15 (Graph 3).

**GRAPH 3. STRUCTURE OF ENTERPRISE EXPENDITURES ON INNOVATION IN POLAND**



Source: *Enterprise development program until 2020. Executive Programme for Innovation Strategy and Economic Efficiency*, The Annex to the Resolution of the Council of Ministers April 8, 2014, Warsaw 2014, p. 17.

Technology absorption usually ousts innovative R&D. Currently, technology absorption by investing in fixed assets constitutes the main part of expenditures incurred on innovation in Polish enterprises (87%). Expenditures connected with R&D, including external and internal R&D and obtaining external knowledge, constitute only 13% of all expenditures on innovation in the private sector. Such a structure proves that Polish companies do not base their activity on their own human capital; thus, it may explain low investments in knowledge – training employees.

It results from detailed research findings<sup>35</sup> on innovation of Polish companies, including SMEs, that in 2010-2012, the percentage of innovation active enterprises from the industry and service sector was on the level of 16.9% and 12.3%, respectively (Table 5). Innovation activities of companies were the lowest in small companies, in which only one tenth of entities reported such activities.

In comparison with the previous edition of the research in 2009-2011, there was growth in the number of innovation active enterprises from the industry (from 16.9% to 17.7%) and service sector (from 12.3% to 13.9%) in the total number of these entities. In the public sector, there was higher percentage of innovation active enterprises from the industry and service sector (25.4% and 39.6%, respectively).

Taking into account territorial division, the biggest share of innovation active industrial enterprises was recorded in Podlaskie voivodeship (23.8%), whereas the biggest share of innovation active enterprises from the service sector was recorded in Mazowieckie voivodeship (19.5%).

Effectiveness of innovation activities in enterprises is measured with, e.g. the structure of the sales of new or significantly improved products. In 2012, the share of net revenues from the sales of new or significantly improved products introduced to the market in 2010-2012 in the total sales was 9.2% for industrial enterprises, i.e. by 0.3 pp more than the share of revenues from the sales of these products introduced in 2009-2011 in 2011. The same rate for entities from the service sector in 2012 equaled 3.1%, i.e. by 0.2 pp less than in the previous period.

**TABLE 5. INNOVATION ACTIVITIES OF ENTERPRISES IN 2010-2012**

Number of employees	Industrial enterprises	Enterprises from the service sector
Innovation active enterprises		
10-49	10.4	10.9
50-249	31.4	22.9
250 and more	59.3	48.4
Total	16.9	12.3
Share of revenues from the sale of new or significantly improved products in total revenues from sales		
10-49	1.9	0.4
50-249	4.7	3.2
250 and more	11.9	5.9
Total	9.2	3.1
Enterprises which cooperated in the field of innovation activities in % of innovation active enterprises		
10-49	22.1	16.7
50-249	35.7	41.1
250 and more	58.5	57.5
Total	33.8	27.3
Enterprises which cooperated within a cluster		
10-49	9.5	13.0
50-249	10.1	19.7
250 and more	21.1	25.6
Total	13.1	18.3

Source: *Innovation activities of enterprises in 2010-2012*, GUS 2013, p. 32.

In 2012, enterprises from the industrial and service sector achieved higher revenues from the sales of products or significantly improved products new only for an enterprise, not for the market. In comparison with the previous year, in industrial enterprises there was growth in the share of revenues from the sales of innovative products new only for an enterprise in the total revenues (by 1.7 pp) and fall in the case of products new for the market (by 1.4 pp). In enterprises from the service sector these rates were maintained on the similar level as in 2011.

Both in the industry and the sector of services, a higher share of the revenues from the sales of innovative products in the total revenues was recorded in the public sector in comparison with the private sector (respectively, 16.8%, i.e. by 3.8 pp more than in 2011; 8.3%, i.e. by 0.6 pp less). A higher value of this rate in the private sector was recorded in the industry - in the case of sales of products which are new for the market on which an enterprise operates; whereas, for enterprises from the service sector a higher rate in the private sector was recorded from the sales of products new only for an enterprise.

In 2012, the highest share of the revenues from the sales of innovative products in the total revenues from sales, in enterprises from both the industrial and service sector, was achieved in entities employing 250 and more people (11.9% and 5.9%, respectively); whereas, the lowest share was recorded in small companies (1.9% and 0.4%, respectively).

The main source of financing innovation activities, irrespective of the size of an enterprise, is own financial resources of enterprises, which may prove a lack of knowledge about alternative forms of financing innovation. In 2012, these resources constituted 73.7% of all expenditures incurred on this in enterprises from the industrial sector (by 0.3 pp less than the previous year) and 69.6% in enterprises from the service sector (by 13.4 pp less).

Cooperation with other entities is an important element of enterprise operation, because it provides a greater access to knowledge and new technologies. It allows for costs reduction and risk reduction for the business; it is favorable for exchange of experiences and knowledge. Cooperation in the field of innovation activities implies active participation in joint projects with other enterprises or non-commercial institutions. This cooperation might be far-reaching and long-term and does not necessarily have to entail direct measurable economic benefits for the participating partners.

In 2010-2012, within innovation activities cooperated 33.8% innovation active enterprises from the industrial sector (32.6% in 2009-2011) and 23.7% of entities from the service sector (28.1% previously). Inclination to cooperation in scope of innovation activities was more visible in enterprises from the public sector, where there were cooperating 44.4% innovation active enterprises from the industrial sector and 59.2% of entities from the service sector (in 2009-2011- 43.3% and 46.4%, respectively). More than a half of enterprises from the industrial and service sector with 250 or more employees cooperated in the field of innovation activities. In the case of the SME sector, this percentage was significantly lower (Table 5).

When it is undertaken to analyze cooperation between enterprises in scope of innovative activities, their inclination to cooperation in scope of cluster initiatives is taken into consideration. In comparison with 2009-2011, the direction of cooperation to cluster initiatives was maintained. In 2010-2012 a greater share of enterprises cooperating within clusters in the total number of entities cooperating in the field of innovation activities was recorded among enterprises from the service sector (18.3%, whereas in 2009-2011 - 15.1%) than the share of industrial enterprises (13.1% to 12.8%). Cooperation within clusters is the most eagerly undertaken in entities employing 250 or more persons. In this size class, in 2010-2012, one fifth of industrial enterprises cooperating in the field of innovation activities belonged to a cluster and one fourth of enterprises from the service sector. SMEs demonstrate double lower activity in cooperation within clusters (Table 5).

## 3. CONTINUOUS VOCATIONAL TRAINING FOR INNOVATION SMEs

### 3.1. Institution and services to support CVT development in SMEs

Continuous learning in Poland may be organized in accordance with the rules specified in the provisions on economic activity (so called commercial rules) or the rules resulting from the act on the system of education. Training institutions may conduct their activity on the basis of different rules. The act on the system of education defines both formal school education and non-school education. It presents tasks and obligations of schools and non-school education facilities, both public and private. The act also regulates matters connected with pedagogical supervision, i.e. responsibilities of school governing authorities (institutions of self-government administration, companies/private persons), boards of education and regional examination boards<sup>36</sup>.

The market of educational services of continuous learning is created by, e.g. educational, social and branch associations; foundations; universities; higher education facilities; schools for adults; research-development institutes; centers of lifelong learning; centers of practical training; centers of vocational training and educational companies.

### 3.2. Examples of work-based CVT or learning in the workplace

In Poland and Podlaskie voivodeship learning in the workplace is important and have big expectations from employers from SMEs. In recent years are promoted and implemented innovative forms of education and in particular to companies and employees of SMEs. One of these projects was the project implemented by the Vocational Education Centre in Bialystok in partnership *"INNOVATION 50+ - testing and implementation program of innovative methods of maintaining professional activity of employees over 50"* realized in 2010 - 2013. The project developed and tested 8 counseling and training innovative tools for use in companies. Has developed an innovative training program for employees of SMEs over 50s carried out by Intermentoring method. Intermentoring is a modified version of mentoring training method. This is a mutual learning between young and older workers, kind of knowledge sharing. Innovative element is the function of the technological mentor - a young worker, who trains senior in the field of ICT. Intermentoring involves training in the areas of Internet, ICT, culture business organization, company know-how. The most significant importance is the cooperation of various groups of employees (senior and junior), through which the company is internally consistent, and thus - more efficient. The training method is based on the diagnosis of the training needs of workers by the tests and diagnostic tools and next providing training in pairs in workplace. Implementation of the training by Intermentoring method, in addition to raising the professional skills and key competencies, has a positive effect on relations between employees of the company, which is reflected in work effectiveness and innovativeness. On the other hand, Intermentoring method allows to strengthen human capital in the company, which directly influences the innovation potential of the company.

### 3.3. Best Practices in CVT and innovation in enterprises

#### 3.3.1. Project "PLATFORM B+S – innovative model of cooperation between science and business in Podlaskie voivodeship"<sup>37</sup>

Project is carried out by Bialystok Foundation of Professional Training in the period 01.07.2013-30.06.2015 in Podlaskie voivodeship. The aim is to create effective and long-lasting cooperation between science and business in

Podlaskie voivodeship by means of internships and practical training for enterprise employees at research units representing research areas strategic for the region. Especially, it is aimed to increase the effectiveness of cooperation between scientific units from Podlaskie and companies by means of internship and practical training for researchers at companies and entering into lasting cooperation between companies and research institutions by means of internship and practical training for enterprise employees at research institutions. The target group is constituted by 80 persons (30 women, 50 men), including 24 (14 women, 10 men) research workers employed at higher education facilities in Podlaskie who represent areas of research strategic for the region in compliance with the Regional Strategy of Innovation and the Podlasie Voivodeship Development Strategy, as well as the area of green technologies (Bialystok University of Technology, University of Bialystok) and 56 employees of Podlaskie enterprises who represent the above mentioned domains.

In the project, it was planned to ensure two kinds of support instruments directed at research workers from universities and at enterprise employees:

Research workers:

- participate in practical training “Creation of a cooperation platform between science and business” whose aim is to understand the needs for cooperation and entrepreneurs’ expectations and preparation of researchers to cooperate with entrepreneurs in scope of the subject matter;
- participate in internship in 8 companies. Each enterprise organizes internship lasting 4 months (60 hours per month) for 3 researchers in three domains – process, organization and marketing innovation in compliance with the program elaborated;
- elaborate strategies of innovation for each company participating in the project. Each strategy consists of three reports concerning process, organization and marketing innovation elaborated by researchers after internship completion.

Employees have an opportunity to participate in:

- internship organized by research institutions. Each company sends two employees who are responsible for organization and marketing innovations for internship lasting 2 months (60 hours per month);
- individual practical training for enterprise employees responsible for process innovation. Having identified the companies’ needs in scope of training in the domain of innovations, individual practical training for employees responsible for manufacturing technology is supposed to be purchased;
- implementation of practical training in scope of organization and marketing innovation at a company. After the end of internship at each company, implementation training in scope of organization and marketing innovations will be organized (8 hours each) for four participants – mainly the managerial staff.

### **3.3.2. Project “We support practitioners – cooperation between science and business”<sup>38</sup>**

Project was carried out by Lomza State University of Applied Sciences in Lomza in partnership with a self-government unit – the City of Lomza in the period 01.01.2013-31.12.2014. The main objective of the project was to improve cooperation between a university (Lomza State University of Applied Sciences) and enterprises in scope of innovation and technology transfer. Project support for enterprises concerned key sectors of Podlaskie economy, i.e. food industry and renewable sources.

Under the project, training for 30 researchers and associates of Lomza State University of Applied Sciences from three institutes was organized. The institutes included: Business Administration Institute, Computer Science and Automation Institute and Food Technology Institute. The aim of training was to understand the needs for cooperation between science and business. The effect of both types of training was promotion of research employees (30 people) responsible for recognition and implementation of innovative solutions in enterprises in Podlaskie.

An important part of the project was research on the needs in scope of innovation in ten enterprises from Podlaskie in two areas of innovation:

- organization and marketing,
- technology (ICT, food technology or technology of renewable energies).

Furthermore, on the basis of knowledge gained during training and results of the research on the needs concerning innovation, some activities connected with elaboration of innovative solutions by experts-researchers in two areas of innovation: organization, marketing and technology (ICT, food technology or technology of renewable energies). In each case, two innovative solutions for each of ten enterprises were elaborated and presented in the form of reports.

### **3.3.3. Project „Knowledge transfer to enterprises”<sup>39</sup>**

Project was carried out by the Foundation for development of Bialystok University of Technology in the period 01.10.2012-30.06.2014 in Podlaskie. The aim of the project was to increase the transfer of expertise from universities to Podlaskie enterprises by means of gratuitous practical training and internship raising employees' qualifications. The classes were conducted at the Faculty of Mechanical Engineering, Electrical Engineering and Civil and Environmental Engineering of Bialystok University of Technology by its researchers and didactic workers. The project target group

was enterprises from the following sectors: machine and building industry or companies providing services in these sectors (subcontracting, design, engineering and procurement, etc.) from Podlaskie and their employees.

In the project, it was planned to carry out sixteen different types of training for engineering and technical enterprises workers representing two key branches in Podlaskie, i.e. machine and building industry.

The Faculty of Machine Engineering and Electrical Engineering of Bialystok University of Technology organized internship for Podlaskie enterprises' employees from the machine and building industry.

## 4. CVTs METHODOLOGIES FOR INNOVATION

### 4.1. Work organization, working environment, learning supporting environment

The Regional Operational Program for Podlaskie Voivodeship 2014-2020 is an important financial tool allowing to complete PVDS goals. It was adopted by the voivodeship parliament in April 2014 and then accepted by the European Commission in February 2015. Its main goal is growth of competitive economy created on the basis of regional specializations.<sup>40</sup> The most important priorities:

- 1) Priority Axis I: strengthening the potential and competitiveness of the regional economy which may contribute to strengthening the potential and competitiveness of the region. Activities undertaken under this Axis will be directed at the development of smart specializations in the region. It will be achieved by developing new competitive superiority based on innovations and the economy based on knowledge. One of the specific goals is strengthening the science sector for the benefit of regional smart specializations and strengthening the importance of R&D activities in enterprises;
- 2) Priority Axis II: entrepreneurship and professional activity. It contains activities connected with adjustment of employees, enterprises and employers, especially SMEs, to changes, e.g. by raising qualifications, competences and abilities of working people and adjusting them to the needs of economy in the region;
- 3) Priority Axis III: competences and qualifications whose aim is, e.g. to popularize and improve the quality of lifelong learning and to adjust it to the needs of the labor market, as well as growth in the quality and effectiveness of vocational training. The key issue is to make even the access to continuous learning - formal, informal and non-formal for all age groups, to broaden knowledge, improving abilities and competences of the labor force and to promote flexible education paths also by means of vocational counseling and confirmation of acquired competences.

### 4.2. Innovation centers and innovation hubs.

In Poland entities acting in the area of the entrepreneurship, innovation and competitiveness support, are usually called "innovation and entrepreneurship centers". Types of innovation centers:

- entrepreneurship centers directed at a wide promotion and incubation of entrepreneurship (often in discriminated groups), providing support services to small companies and activation of the development in peripheral regions or in regions suffering from structural crisis,
- entrepreneurship centers directed at a wide promotion and incubation of innovative entrepreneurship, transfer of technologies and providing innovative services, as well as activation of academic entrepreneurship and cooperation between science and business,
- financial institutions aimed at facilitating the access to financing of activity of new and small business without credit history, giving access to financial services adjusted to the specific character of innovative business activity.

**TABLE 6. CLASSIFICATION OF INNOVATION AND ENTREPRENEURSHIP CENTERS (MAŻEWSKA & BĄKOWSKI, 2012)**

Innovation and entrepreneurship centers		
Entrepreneurship centers	Financial institutions	Innovation centers
<ul style="list-style-type: none"> <li>➤ Training- advisory centres</li> <li>➤ Centres of the entrepreneurship</li> <li>➤ Business centers</li> <li>➤ Clubs of the entrepreneurship</li> <li>➤ Consultation and advisory points</li> <li>➤ Preincubators</li> <li>➤ Entrepreneurship incubators</li> </ul>	<ul style="list-style-type: none"> <li>➤ Regional and local loan funds</li> <li>➤ Local Guarantee Funds</li> <li>➤ Seed Capital Funds</li> <li>➤ Business Angel Networks</li> </ul>	<ul style="list-style-type: none"> <li>➤ Technology Transfer Centers</li> <li>➤ Academic Entrepreneurship Incubators</li> <li>➤ Technological Incubators</li> <li>➤ E-incubators</li> <li>➤ Science, research, industrial parks, technopols</li> </ul>

According to the Report from 2012 "Innovation and Entrepreneurship Centers in Poland", from the beginning of the system transition in 1990, the number of innovation and entrepreneurship centers grew systematically to reach in 2012 the number of 812 organizations. They enclose following groups that one should distinguish:

- 40 science parks and 14 park initiatives,
- 29 technology incubators,
- 73 preincubators and academic entrepreneurship incubators,

- 58 entrepreneurship incubators,
- 69 technology transfer centers,
- 68 seed capital funds,
- 10 business angel networks,
- 86 local and regional loan funds,
- 55 local guarantee funds,
- 319 training advisory and information centers.

#### **4.2.1 Institutions support technology and Innovation in Podlaskie:**

- Science and Technology Parks in Suwalki and Bialystok
- Institute of Innovation and Technology of Technical University, Eastern Centre for Transfer of Technology-Bialystok
- Suwalki Special Economic Zone
- Center of Experimental Medicine, Research Center of Renewable Sources of Energy - Bialystok
- 17 universities providing education to 54000 of students and a high potential of academic staff.
- Clusters

#### **Białystok Science & Technology Park**

The main Innovation hub in Podlaskie is The Białystok Science & Technology Park (BPN-T) has been founded in order to extend innovation and technological advancement in the north-east region of Poland. BPN-T goal is to support creative people to turn their idea into a technology advanced business by providing them board range of facilities and services. Park assist not only newly established undertakings (so called 'start-ups'), but also existing companies. Park have two facilities:

- Technology Incubator and BPN-T Administration,
- Technology Centre.

BPN-T also take advantage of its favourable location directly next to Special Economic Zone and nearby the University of Bialystok Campus to develop science and industrial centre which will create background to strengthen cooperation between world of science and business.

The primary tasks of the BPN-T include:

- incubating start-ups and ensuring support services to innovative undertakings,
- activating co-operation between business and science & research environments,
- leasing offices, manufacture, service and laboratory space to fast growing companies and research & development organizations,
- managing investment areas,
- attract investors.

#### **Bialystok University of Technology**

Bialystok University of Technology is the largest technical university in the northeastern region of Poland. It is a modern, dynamically developing institution with 64-year-old experience in educating scientists and technologists. Students and staff of BUT works in 8 student research clubs. Research clubs involve student enthusiasts who are eager to engage in research projects implemented at the Faculty or work on their own student projects. They take part in conferences, exhibitions and fairs. In addition, they present their works in competitions, both in Poland and abroad, often winning high positions and awards.

BUT innovation and entrepreneurship centers and co-owned institutions:

- The Centre for Modern Education includes: Interdisciplinary R&D Laboratories.
- INNO-ECO-TECH Bialystok University of Technology Innovative Teaching and Research Centre for Alternative Energy Sources, Energy-efficient Construction and Environmental Protection. The main purpose of the project is the construction and installation of high tech equipment for the teaching and research centre for alternative energy sources, energy - efficient construction and environmental protection in the Faculty of Civil and Environmental Engineering, as well as improving the quality of education through the use of modern ICT solutions in academic teaching.
- Academic Incubator of Entrepreneurship and Selected New Technologies as an instrument to create conditions for the development of innovativeness in the economy and the region. The incubator allow enterprising students, academic workers, university graduates and unemployed people to get places and the necessary support to create their own businesses. The resultant business firms are able to make use of BUT's scientific and laboratory facilities, conference rooms and multimedia equipment. Businesses are able to function either as residents by renting the premises or in a non-resident mode.
- The company Institute for Innovation and Technology Bialystok University of Technology. Implementation of inventions and new technologies in production is the purpose of the company Institute for Innovation and

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Technology, established by Białystok University of Technology. The Institute will commercialise research. The Institute, which has the status of a limited liability company and 100% subsidiary of the university, begun to operate at 2011. The Institute manage orders received by researchers from toward industry, and, conversely, intends to implement ideas of the scientists. It also wants to provide consulting services in implementation: from preparing a patent application, through the production of prototype to searching for investors. The production of prototypes is conducted based on the Department of Experimental Production, which operates production.

## 5. STAKEHOLDERS INVOLVEMENT STRATEGY

### 5.1. Stakeholders involvement strategy in Podlaskie voivodeship policy

From the implementation point of view concerning activities improving innovation of enterprises, including changes in the educational system, including lifelong learning, the key document is the documents entitled *Program of development of smart specializations and entrepreneurship in Podlaskie voivodeship 2015-2020+*. The program is based on two important assumptions, i.e.:

- First of all, Podlaskie voivodeship, in order to overcome barriers of its peripheral character, suppression and low level of innovation and entrepreneurship, must approach innovation in a completely new way. Pragmatism and practical activities become priorities in relation to innovations based on theoretical knowledge. The model of innovation based on the needs of enterprises and consumers which is characterized by fast reaction to the needs of the market becomes dominant. Innovative entrepreneurship becomes deemed as the most valuable attribute of the regional economy. The aim of the program is to complete Podlaskie Voivodeship Development Strategy in scope of innovation and entrepreneurship;
- Secondly, the region of Podlaskie will not increase innovation in a longer perspective without increasing the level of entrepreneurship. Entrepreneurship cannot be built in a different way than education. Hence, *the Program* mentions support of education in development in scope of innovative entrepreneurship during all stages of education. The success will be achieved when unified programs of education are elaborated and when the subject "innovative entrepreneurship" is introduced as a regional differentiation mark. It should be financed without the time limit by all levels of the self-government which establish schools.

Smart specializations mean specified activities of entrepreneurs, researchers and scientists who participate in the regional society. Both groups make use of regional human capital (employees) on the one hand and on the other hand, they influence its quality (process of education, training, etc.). If we think about regional smart specializations, they must contribute to the highest quality of human capital on all levels and stages of education as the region loses its population potential and the society is ageing. This goal will be achieved by intervention in the following spheres<sup>41</sup>:

- 1) supporting schools and educational units in creating entrepreneurial and innovative attitudes. Education in scope of ecology, ICT, eco-innovations and different spheres of smart specializations, as well as encouraging the youth to become interested in specializations will be really important;
- 2) supporting development of an educational offer for the whole voivodship (faculties, specialized courses, post-graduate studies) for entrepreneurs working in the areas of smart specializations and their employees. Such activities should encourage cooperation of schools, universities, educational institutions and business in order to build long-lasting bonds and to develop and adjust potential and system of functioning of the school and lifelong learning sector to the needs of enterprises;
- 3) increasing the quality of human capital by conducting courses, training and practical training ordered by entrepreneurs. Ensuring the highest standards of training is especially pivotal (ordered in the region and outside the region).

Achieving the strategic objective comprises different activities undertaken by main actors of the regional innovation system based on consolidation of efforts made for the benefit of innovation and entrepreneurship development in the region, as well as effective cooperation.

The expected effects of this objective are:

- increasing the activity of schools and universities in building relations with entrepreneurs - especially those from the area of smart specializations;
- increasing the quality of human capital in the sphere of innovation;
- increasing the importance of Podlaskie voivodeship on the Polish map "Science for economy".

The Program includes numerous instruments to achieve the specified objectives which include the issue of educating employees. The most important of them are:

- "Subsidies for development of research resources and innovations" - as support in the form of non-returnable subsidies for employing personnel, for training or purchase of apparatus and equipment to create R&D resources. They will be made accessible for entrepreneurs from the region. The subsidies perform the following functions: increasing R&D personnel potential and its networking; increase in the competitiveness of Podlaskie R&D offer for

enterprises. The beneficiaries include: universities, research and scientific institutes, enterprises with the status of a research-development center having a registered office or performing its main business activity in Podlaskie or enterprises not having a registered office in Podlaskie, but performing its main business activity in Podlaskie;

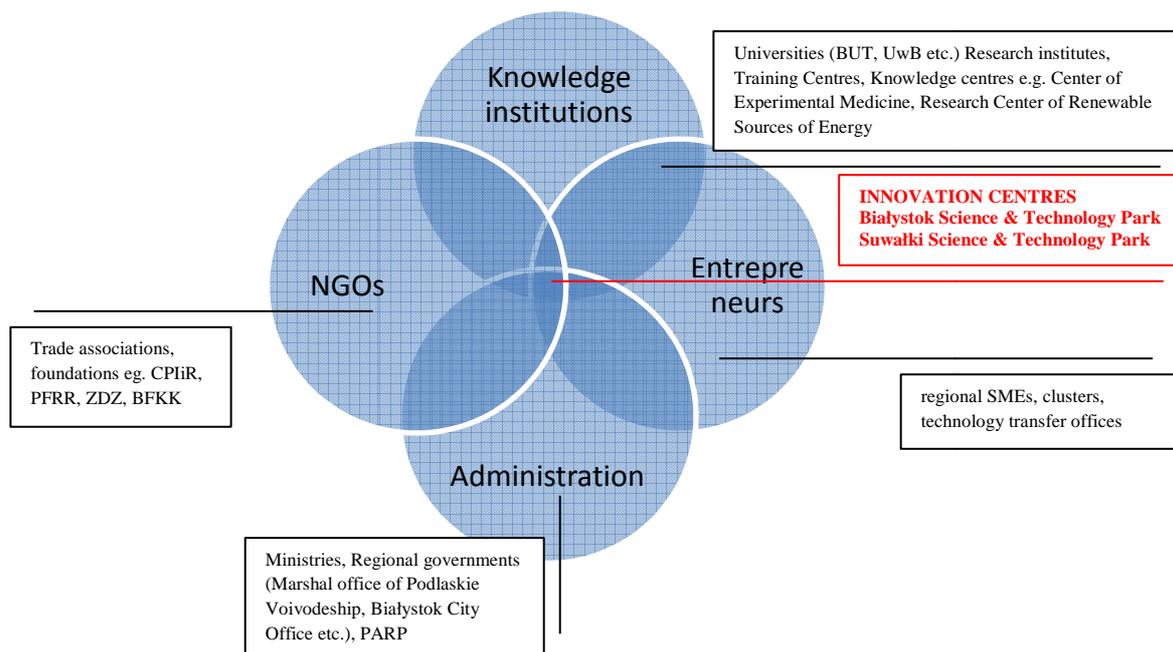
– "Podlaskie voucher for innovations" - support in the form of non-returnable subsidies for R&D activities performed by newly established micro and small enterprises which include: finding and/or implementing a new product, a model project; new manufacturing technology, significant improvement of a product or manufacturing technology, finding and/or implementing a new or significantly improved process of offering services, organizational or marketing innovations. The support may also be used to purchase R&D services and apparatus, employing R&D personnel, R&D training connected with the above mentioned R&D activities which is essential for a project. The support may also be used for the following studies connected with a new product, model project; new manufacturing technology, significant improvement of a product or manufacturing technology, finding and/or implementing a new or significantly improved process of offering services, organizational or marketing innovations: assessment of R&D potential of an enterprise, plan of development of an enterprise, predictions about the market, strategy of introducing the above mentioned new or significantly improved solutions. The service providers may be research units or enterprises having the status of a research-development center or foreign research and scientific units.

**TABLE 7. TYPES OF INTERVENTION IN THE CONTEXT OF ACTIVITIES OF QUADRUPLE HELIX (POLICY MIX)**

Intervention type	Category of partners	Main expectations of an activity
A. Supporting schools and educational units in creating entrepreneurial and innovation attitudes	Knowledge institutions	<ul style="list-style-type: none"> <li>– Adaptation of types of educational activity to innovation and entrepreneurship</li> <li>– Cooperation with entrepreneurs and administration in order to activate systems of education in scope of innovative entrepreneurship</li> </ul>
	Entrepreneurs	<ul style="list-style-type: none"> <li>– Reporting needs and joint investment in development of an educational offer</li> </ul>
	Administration	<ul style="list-style-type: none"> <li>– Financial and information support for the benefit of creating an educational offer in scope of entrepreneurship and innovative entrepreneurship by regional authorities</li> <li>– Organizing and financing educational classes in scope of entrepreneurship and innovative entrepreneurship by local self-governments in accordance with a unified regional system of education in innovation on all levels of education - it requires close cooperation and coordination on the level of the region;</li> <li>– Promoting of teaching entrepreneurship</li> </ul>
	NGOs	<ul style="list-style-type: none"> <li>– Promoting innovative and adaptive attitudes</li> <li>– Cooperation with entrepreneurs, self-governments and education for the benefit of entrepreneurship and innovation</li> </ul>
B. Supporting development of an educational offer for the whole voivodeship (faculties, specialized courses) for entrepreneurs working in the areas of smart specializations	Knowledge institutions	<ul style="list-style-type: none"> <li>– Adapting kinds of undertaken educational activities to the needs of smart specializations</li> </ul>
	Entrepreneurs	<ul style="list-style-type: none"> <li>– Creating and supporting types of education to the needs of smart specializations with educational units</li> </ul>
	Administration	<ul style="list-style-type: none"> <li>– Promotion and financial support of developing types of education adapted to the needs of smart specializations</li> </ul>
	NGOs	<ul style="list-style-type: none"> <li>– Supporting the dialogue business-science in scope of types of education;</li> <li>– Creating a supplementary offer</li> </ul>
C. Increasing the quality of human capital by conducting courses, training and practical training ordered by entrepreneurs	Knowledge institutions	<ul style="list-style-type: none"> <li>– Adjusting the offer of courses, training and practical training to the needs of entrepreneurs</li> </ul>
	Entrepreneurs	<ul style="list-style-type: none"> <li>– Creating permanent bonds of cooperation with educational units;</li> <li>– Overcoming the costs barrier of R&amp;D by joint ordering of courses, training and practical training</li> </ul>
	Administration	<ul style="list-style-type: none"> <li>– Financial and information support for adjusting the offer of courses, training and practical training to the needs of entrepreneurs</li> <li>– Financial and information support for purchase of courses, training and practical training by enterprises</li> </ul>
	NGOs	<ul style="list-style-type: none"> <li>– Being an intermediary and supporting enterprises in joint orders of courses, training and practical training</li> <li>– Creating a supplementary offer</li> </ul>

Source: *Program of development of smart specializations and entrepreneurship in Podlaskie voivodeship 2015-2020+*, Geoprofit, Białystok 2015, p. 27-28.

## 5.2. Triple (quadruple) helix model



## 6. CONCLUSIONS

On the basis of the analysis, the following conclusions can be drawn:

1. In Poland, as well as in Podlaskie, institutions of continuous learning function on the basis of different legal provisions (lack of one document, legal autonomy of institutions), which results in the existence of at least three kinds of institutions, often with contradictory interests: educational institutions, institutions of the labor market, widely understood training institutions. Also employers participate in the system of lifelong learning. They shape appropriate “educational atmosphere” in a company and organize internal training sessions regularly. Hence, there is a lack of a coordinated system of continuous education in Poland.
2. Furthermore, there is no internally cohesive and comprehensive system of financing adult education. Apart from a network of public and gratuitous schools for adults and public educational facilities which sometimes charge for education, education is financed in a dispersed way under public programs for given social groups (e.g. Labor Fund, State Fund of Rehabilitation of Handicapped People), by enterprises to a limited extent (mainly the largest ones investing mainly in short forms of education) and by trained persons (investing in longer forms of education resulting in an increase in the level of education).
3. Hitherto, public institutional and infrastructural support for continuous learning has been only little effective. The Register of Training Institutions which was supposed to improve the access to information on training institutions and their educational offer did not perform its function. The system of accrediting training programs has a very little range because of limited interest of educational institutions. Furthermore, there is lack of the National Qualification Framework whose objective should be to improve recognition of skills acquired during training. Low effectiveness of the current system of supporting lifelong learning is to a great extent a resultant of its excessive focus on providers of educational services.
4. Imperfection of the system of lifelong education existing hitherto is accompanied with low interest of Polish society in this subject in life after completion of school education. The percentage of learning people at the age of 25-64 in 2014 was on the level of 4.1%, whereas the average for all twenty-eight EU member states was 10.6%. The EU's aim until 2020 is 15% in compliance with the European agenda of adult education adopted in November 2011 (it concerns persons declaring participation in education and training in the last 4 weeks before the survey).
5. In Poland, we observe exceptionally low engagement of enterprises, especially from the SME sector, in continuous training of employees. In 2010 it concerned only 22.5% of all enterprises analyzed in the survey, whereas the EU average was 66%. The main reasons for this situation are: unfavorable work conditions and lack of institutional solutions encouraging micro, small and medium enterprises to train their employees. The barriers of lifelong learning in Poland, among working persons, mainly include: uncertainty of employment continuation resulting from the popularity of contracts for a fixed term and shift-work. It is confirmed by a higher level (on average) of these rates in Polish society than the average in EU. Furthermore, current demand of employers on competences is not stimulating

enough to increase the quality of human capital. A significant number of employers do not undertake to train their employees, because they claim that employees' competences are sufficient for performing their duties. It may be evidence of a low level of development of these companies which do not see new needs of development. Employers forget that high competences are a key factor from the point of view of building competitive predominance.

6. The analysis clearly shows that the level of innovation is low, as well as the level of innovative activities of Polish enterprises, especially SMEs. There are numerous reasons for this, both internal and external. Most often, it is said that it is a whole system of education in Poland that does not contribute to any improvements of the level of innovation in enterprises.

7. A low level of innovation activities of enterprises, especially from the SME sector, results in low demand on high competences of employees and as an effect it has a negative influence on educational activity of the population, i.e. inclination to invest in development of competences. It is confirmed by research that employers are the main motive force propelling training activity. Training and courses are mainly financed from their resources; they are organized in the work time. The majority of training sessions and courses attended by adults is connected with their work. Furthermore, main motives of learning and development are connected with work. Nevertheless, there is also reverse dependence, i.e. lack of investments of employers in high competences is a factor hindering innovation and development of enterprises.

8. Undoubtedly, there is a need for changes in the system of continuous learning in the context of improving the level of innovation of SMEs. First of all, it is essential to involve numerous entities that influence the system of education, especially employers play an important role. Adjustment of competence courses and training to the needs of the market is possible only when employers (or employees) simply define what kind of knowledge and skills they expect and training companies will undertake to organize such classes (even if they are more expensive and more difficult to organize). Hence, it is essential to build cooperation between educational institutions, including universities and training institutions with business. In order to support improvement of qualifications of adults, we should support systems other than the formal one, which nowadays because of their flexibility and reference to the natural attitude to learning become more effective than the formal system of continuous education.

9. Podlaskie belongs to the regions with a low level of development, which is caused by, e.g. a low level of innovation in SMEs (dominating in the economy). The region, similarly to all Poland, is challenged with the problem of maladjustment of the employers' needs and occupational skills of employees/candidates for work, which is caused by the insufficient quality and adequacy of the educational offer. Another important step is to popularize participation of the population in continuous learning by means of: a model of learning for adults based on practical learning; developing an educational offer, promotion and incentives for persons professionally inactive, supporting occupational training.

10. Podlaskie has undertaken to implement solutions aiming at improvement of innovation of enterprises taking changes in the system of education (also continuous education) into consideration on the basis of *Program of development of smart specializations and entrepreneurship in Podlaskie voivodship 2015-2020+*. Innovative entrepreneurship has been deemed as the most valuable attribute of the regional economy. It is also planned to support development of education in scope of innovative entrepreneurship at all stages of education, especially in the aspect of strengthening so called smart specializations. Achievement of this goal will require various activities of the main actors of the regional system of innovation. It will be based on consolidation of efforts for the benefit of development of innovativeness and entrepreneurship in the region, as well as effective cooperation in the form of quadruple helix (institutions of knowledge, entrepreneurs, administration and NGOs).

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