

Train4inno

Continuous vocational training for innovation in SMEs



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Partners



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1. Partners and local contexts

1.1 Selcuk University Advanced Technology Research Application Center (ILTEK) - Turkey

Selcuk University Advanced Technology Research- Application Center (ILTEK) established in 2005, has highly qualified staff and state of the art facilities to carry out research in the area of nanotechnology, advanced materials, and biotechnology, and contributes actively to the growth of the region and its development. The center is an international institution, dedicated to the concept of widening international co-operation as a fundamental basis for high quality research activities and has highly tightened tie with industry in the region. ILTEK has vast experience participating and coordinating EU funded projects, already running FP7-NMP, FP7-SME-2012 and FP7-INFRA-2012 areas. ILTEK coordinates the scientific and technological (S&T) R&D activities in the university with collaboration of SMEs as well as university-industry relationship, also provides the sustainability of those activities. The center encourages close cooperation with regional, national, international R&D institutions and SMEs and non-governmental organizations (chambers and associations, vocational foundations). It has national and international collaborative- research links with SMEs and government organizations.

Overview of the local context in Turkey

Turkey is a large emerging market economy. After economic crisis in 2001, the economy fastly growth over the last decade due to the period of one government without coalition. During 2003-2010, it has shifted rapidly from an economy largely based on agriculture towards to industrial economy. Turkey is now automotive parts producer, in the good position for shipbuilding, and also manufacturer of some electronic goods as well as home appliances. After launching

of Vision 2023 programme, a reasonable relationship between industry and academia has been established and 13% of public R&D is contracted or subsidised by enterprises. The most disadvantages of Turkey is the weak links to international research networks, limitation of patent applications (7%) from R&D projects carried out in SMEs as well as in universities.

Science and Innovation Strategy

The National Science, Technology and Innovation Strategy (UBTYS) aims to strengthen national R&D and innovation capacities in order to upgrade the industrial structure towards high-technology industries. GERD should reach 3% of GDP by 2023 according to Vision 2023 programme. In the strategy document, the strong STI competitive sectors are automotive, machinery, various manufacturing and ICT. The target sectors to be focused are energy, water, food, security and space. The Turkish Industrial Strategy Document and Action Plan (2011-14) and several sector-centred plans reinforce this targeted approach and the priority of the business sector.

National Science and Innovation Strategy: The vision of the National Science, Technology and Innovation Strategy (2011-2016) is “to contribute to new knowledge and develop innovative technologies to improve the quality of life by transforming the former into products, processes, and services for the benefit of the country and humanity”.

In line with these targets, within the period 2011-2016, disseminating culture of multilateral and multidisciplinary RDI cooperation, stimulating sectoral and regional RDI dynamics, encouraging SMEs to become stronger actors within the national innovation system, and enhancing the contribution of research infrastructures to the knowledge creation capacity of Turkish Research Area (TARAL) are defined as the main focus points within the national innovation system.

In order to deal with these necessities, within the National Science, Technology and Innovation Strategy (2011-2016), mission oriented approaches in areas with strong RDI capacity, need-oriented approaches in areas with a demand for gaining acceleration, and bottom-up approaches including basic, applied and frontier research are identified.

The strategic framework of National Science, Technology and Innovation Strategy (2011-2016) comprises of three vertical axes and six horizontal axes that serves to the vertical ones (Figure 1.1 on page 5).

Science base

The number of University in Turkey is close to 200, 65% of them are state universities and remained are private universities. Turkish Government were aimed to found a state university for each city, so there is a one state university in each city (81). Turkey's public research system is small (0.48% of GDP in 2010) and universities account for 80% of total expenditures. When compared the highly impacted papers, it has few articles in top scholarly journals and only a few world-class university. Public research is currently undergoing major reforms to improve the quality and relevance of public R&D, increase collaboration with the private sector and leverage private funding. Since 2011, a university index has been developed under the responsibility of TUBITAK, the Higher Education Council and TurkStat to evaluate universities' entrepreneurship and innovativeness performance based on criteria such as articles, R&D projects, collaboration, licences and spin-offs.

Business R&D and innovation

TUBITAK is main funding instrument for both Universities and industry research. After 2005, the Industrial R&D Funding Programme, has significantly increased for the strategic thematic areas i.e. IT, biotechnology, environment-related technologies, advanced materials. For supporting SMEs and spin-off companies, new innovation and research support programme was implemented in 2012.

Entrepreneurship

Entrepreneurship is a main STI policy priority and the grant programme for Techno-Entrepreneurship have been begun particularly early researchers who

are the last year for their BSc or MSc academic level. The programme provides young entrepreneurs with grants in order to steer entrepreneurship towards technology and innovation. The most challenging decision was taken as establishment of the Council for Entrepreneurship in 2012 to help entrepreneurs access domestic and foreign financing. Since the begun, every year the Techno-Entrepreneurship Project calls are regularly launched by The Ministry of Science, Technology and Industry. Efforts are also made to promote entrepreneurship culture in education from primary schools to universities. Now, most of the universities have the Techno-Entrepreneurship programmes.

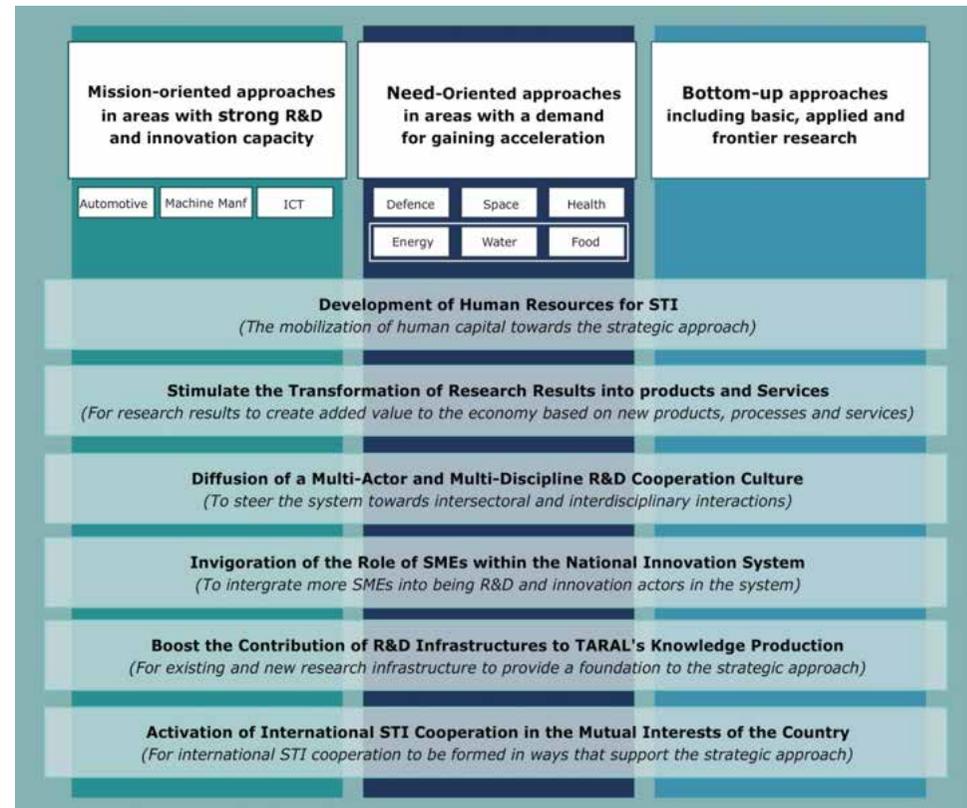


Figure 1.1 - The Strategic Framework of UBTYS 2011-2016

1.2 FIBS - Forschungsinstitut für Bildungs- und Sozialökonomie - Germany

Founded in 1993, the Institute for Education and Socio-Economic Research and Consulting (FiBS) is a private research and consulting institute working at the national as well as international levels on the economic aspects of education, innovation, social policy and demography. FiBS' Director is Dr. Dieter Dohmen.

The FiBS is an interdisciplinary research and consulting institute as well as a think tank specialised in education and socio-economics. FiBS experts use research-based and practice-relevant knowledge and experiences to advise decision-makers in politics, economics and society, as well as educational and social institutions.

The research and consulting projects focus on early education and child care, school and higher education, as well as on vocational and continuing education. Studies of costs, financing, benefits and cost-benefit analysis, cost-effectiveness analysis, quality, management, benchmarking and best practices form the basis for concrete solutions. Further areas of focus are gender equality, family and generational policy, fiscal effects, tax and transfer systems, as well as demography, social and structural changes. Evaluations of education system and policies as well as impact assessment have become major topics of the work of FiBS.

The Institute's analyses, evaluations and comparative studies, its ideas, effective concepts and concrete recommendations highlight future prospects, trends and possible strategies for the sustainable development of education and social systems. Quality, equal opportunities and a fair distribution of (education) resources, not to mention the appropriate and rational utilisation of resources, are fundamental aspects of our philosophy.

We regularly assess our internal project and quality management processes to ensure optimum results. Renowned external specialists contribute their expertise and are part of our quality control system. Thanks to the international scope of many projects, its activities for EU working groups, and agencies and its engagements in professional associations, FiBS is embedded in an excellent network of experts that can be involved in its projects as needed.

Overview of the local context in Germany

Germany is one of the leading countries with regard to innovation. , though it appears that conditions become sl

In general, Germany's economic situation is comparatively good. It surmounted the economic and financial crisis relatively well and better than most other European and non-European countries.

The growth rates are modest but still positive, largely even during the crisis. Employment figures are still rising and unemployment figures are stable or even slightly decreasing. However, around 1 million long-term unemployed have serious difficulties to re-enter the labour market.

Despite these relatively well conditions of the current political, economic and social situation, Germany is facing some challenges. The uncertainties of war zones and effects on population movements, the still not consolidated capital markets, internationalization, globalization and, consequently, increasing economic competition and rising costs play an important role. Demographic developments and social changes are accompanied by increasing qualification demands, which are inter alia strengthened by technological changes characterized by digitalization, smart factories and sharing economy. Despite the current economic trend, Germany still has to prepare its economy and labour market to meet new demands and future challenges. Whereas unemployment could be reduced in the last ten years and specifically youth unemployment is among the lowest throughout the European Union (7.4 %) (BMBF 2015).

1.3 Kopernikusz Association - Hungary

Kopernikusz is a non-profit association established in May 2002 under Hungarian law.

Its aim is to promote the development of the SMEs sector in Hungary and to assist the local authorities through the organization of conferences and seminars, training courses, surveys and transfer of know - how especially, but not only, from Italy to Hungary.

Its goal is to support the Hungarian SMEs and local authorities in the challenges that they are facing with Hungary's accession to the European Union and to contribute to their development.

The Association has participated in several national and European projects.

Overview of the local context in Hungary

Population and demographics

Hungary is 93 030 km² and has around 10 million inhabitants. Approximately 99% of the people speak Hungarian as their native language. The majority are ethnically Hungarian (magyar). The largest minority group are Roma, numbering approximately 600 000 (6%), most of whom claim themselves Hungarian as well. German, Croatian, Slovakian, Romanian and others comprise less than 2% of the population.

In line with European trends Hungary's population is ageing. The number of both young people below 25 and the working-age population (25-64) are falling, while the number of people aged over 65 is on the rise. An increasing share of people over the age of 50 in the working-age population concurs with a declining number of school-aged children. That indicates a further decrease of learners in IVET and an increasing demand for CVET and other forms of adult learning.

To a small extent, immigration has offset the population decline since the early 1990s. Most immigrants are well-qualified Hungarian-speaking citizens from the neighbouring countries. In international comparison their absolute number and proportion is low and declining (especially since Romania joined the EU). Immigration from developing countries is insignificant. Emigration of qualified

people – college/university graduates and qualified skilled workers – to Western Europe, however, seems to be accelerating under the sustained crisis.

Political and socio-economic context

Hungary has been a parliamentary republic since 1989. Its main legislative body is the Parliament, currently with 386 members, elected by the people for four years. The Parliament elects the President, the representative head of the state, and the Prime Minister, the head of the government who has executive power. The government that came into office in 2010 enjoys a two-thirds majority in parliament, has drafted a new constitution and has been radically transforming the ways in which the state and its subsystems – including education and VET – function. At the end of 2011 a new Public Education Act and a new VET Act were passed. The previously decentralised education system is in the process of becoming increasingly centralised. With regard to VET, the Hungarian Chamber of Commerce and Industry (Magyar Kereskedelmi és Iparkamara, MKIK) has come to play a dominant role in the shaping of vocational education and training, with significant influence on public and higher education policy as well.

The 19 counties and the capital city of Budapest, the traditional mid-level public administration units, have less administrative power than the more than 3 000 local governments. That, however, changed from January 2013. In matters of education, for example, both local and mid-level elected bodies have a diminishing role to play; the maintenance of schools, for the most part, belongs to the central government, including such important scopes of authority as the appointment of headteachers or the financing of the salaries of teachers.

For planning and statistical purposes, seven NUTS II level regions were created in 1999 in line with EU requirements. They were subdivided into altogether 175 statistical micro-regions, i.e. regional development and statistical units based on functional relationships between the settlements. Under the new name of districts, micro-regions take on significant public administration functions from 2013, and so county-level government offices.

The economy and the labour market

Hungary's economy had been steadily growing at an annual rate of over 4% real GDP on average until the middle of the past decade. As a result, the GDP per

capita reached 63.6% of the EU average in 2006, from less than 50% 10 years before. However, the growing budget deficit and national debt combined with austerity measures introduced since late 2006 halted economic development even before the global financial crisis. Following an economic contraction of 6.8% in 2009, the economy recovered in 2010 with a big boost from exports. Currently the annual GDP is forecast to decline by 0-1% in 2012, and to show minimal growth in 2013.

The economy of Hungary is small and open, dominated mainly by micro enterprises (94.7%); 4.4% are small and 0.7% are medium-sized enterprises. In 2009 SMEs employed 71.0% of the workers but only produced half of gross value added. At the same time, primarily large enterprises – particularly foreign companies – can be credited for the economic growth that took place between 1997-2006; their contribution to the export of processing industry is also significant. In 2010 the largest share of the workforce (28.0%) was employed in the distribution and transport sector, followed by non-marketed services (23.3%), and manufacturing (20.8%). The primary sector and utilities (7.0%), construction (7.3%) and business and other services (13.5%) accounted for 27.8% of employment. Constant shortage of properly skilled workers in certain sectors, occupations and regions, as well as inadequate skills have hampered economic development. Participation in CVET is low and correlates strongly with company size. Hungarian employment rates are exceptionally low, especially among the low qualified, disadvantaged, women and elderly. In 2011 only 55.8% of the population aged 15-64 were employed, lagging far behind the EU-27 average rate of 64.3%; the employment rate of women is consistently 10% lower than that of men. The employment rate of young people between 15 and 24 years was little more than half of the EU-27 average in 2011 and less than half of the 55-64 age group worked in the same period, which is 10 percentage points lower than the EU-27 average. Low employment figures are accompanied by very high inactivity rates, which are in fact one of the highest in the European Union.

For this reason, consecutive governments have tried to attract more people to the labour market, especially those who considered staying away from work a better option. The government that took office in 2010 has been particularly active in this regard. Early retirement options have been considerably restricted, and the eligibility age for both old-age pension and also for several job-specific

pre-retirement pension schemes have been raised. Eligibility criteria for disability pension schemes have been tightened. Both the amount and the benefit period of jobseeker's allowance (i.e. unemployment benefit) have been reduced. Eligibility criteria for social assistance paid to those no longer entitled to receive jobseeker's allowance have been constricted, and its amount has been reduced. The Labour Code was changed as of January 1, 2012, introducing regulations that point towards a more flexible labour market. Within the context of economic stagnation, however, these measures have had little impact so far. The distribution of employees by main occupation groups in Hungary is markedly different from the EU-27 average (see Annex 1 Table 12). Significantly less people work in jobs that require a college/university degree but that can be accounted for by the low number of male higher education graduates (while the share of women in skilled non-manual jobs is exactly the same as the EU-27 average). Moreover, the share of men in the skilled manual group is 8% higher than the European average, in the case of women the difference is 4%. That is, significantly more skilled workers do manual jobs in Hungary than in the EU. Labour market activity and success in Hungary are still more closely linked to educational attainment than in most developed countries. In comparison with other OECD countries, for example, the relative earning advantage of higher education graduates over the average employment income of those with ISCED 3 and 4 qualifications was 210% in 2010. The OECD average is 155%. However, the relative earning disadvantage of ISCED 0-2 is only slightly lower than the OECD average (73% and 77%, respectively).

In general, high rewards are attached to educational attainment in the labour market. People with a secondary school leaving certificate (érettségi bizonyítvány) earn considerably more than those without the same qualification. Vocational qualifications have a much more modest return. The earning advantage of skilled workers without a secondary school leaving certificate (ISCED 3) over those with the lowest level of educational attainment (ISCED 0-2, with neither secondary school leaving certificate nor vocational qualification) is smaller than that of skilled workers with a secondary school leaving certificate (ISCED 4) over skilled workers without a secondary school leaving certificate (ISCED 3).⁸ That is, the labour market in Hungary, unlike in most developed countries, is not only divided by levels of educational attainment but also shows sharp divisions

within the ISCED 3-4 level. Since 2000 these differences have further increased in international comparison.

Employment rates show strong correlation with both educational attainment and age; however, there are some significant differences in comparison with the European labour market in this regard. While the employment rates of younger and older people are both below the EU-27 average (with 16% and 10%, respectively), the 25-49 age group is only 5% behind (see Annex 1 Table 15), and that can be accounted for by the relatively low employment of low qualified workers (16% less than EU-27 average). The 25-49 age group with ISCED 3-4 and ISCED 5-6 qualifications is only 3-4% below the European average rate. Unfortunately, relative employment rates in all age groups have deteriorated over the past decade, and even rates below the 50+ age group have declined. The rise of employment in that particular group is due to the fact that the eligibility age for old-age pension has been raised.

The employment rate of those with the lowest educational attainment is significantly lower in every age group than in the EU. However, it is strikingly low among young people aged 15-24: their rate of employment is 5.4% against the EU-27 average of 21.5% (see Annex 1 Table 15). That is, only one in every twenty young people with an ISCED 0-2 qualification has a job. The employment rate of young college/university graduates, however, is identical to the EU-27 average. Unemployment has been increasing in recent years. Of the total population aged 15-64, 11.2% were jobless in 2010, 11.6% among males, 10.8% among females; these figures, apart from some seasonal fluctuation, have stayed basically the same since then. Youth unemployment is higher than the EU average (2010: 26.6% 15-24 year-olds versus 20.8%) and particularly high among those with the lowest level of educational attainment (ISCED 0-2): 41.4%. This is 14 percentage points higher than the EU-27 average. Unemployment rates have increased in every ISCED group since 2007; men have become jobless at a faster rate than women.

Due to the significant expansion in higher education, the number of registered unemployed has almost doubled among higher education graduates between 2001 and 2010. Still, they only account for 5% of the total number of people without a job.⁹ The share of unemployed people with low educational attainment has decreased (from 42 to 39%), and so has that of skilled workers (ISCED

3) with no secondary school leaving certificate (from 34 to 31%).

Those without a job who are no longer entitled for unemployment benefit may receive social assistance in the amount of EUR 100-200. The ISCED 0-2 group is markedly overrepresented among the recipients; every second person who receives social assistance has only completed 8 years of primary school or less. Approximately every fourth of those who are in need of social assistance is a skilled worker (27%). College/university graduates constitute only 2% of this group, while the share of those with a secondary school leaving certificate is 14%. Total public expenditure on education as % of GDP at secondary level of education (ISCED 2-4) was a little higher in Hungary a couple of years ago than the EU-27 average (see Annex 1 Table 18). However, recent developments have turned that around. The figure for upper-secondary education has been decreasing since 2005 and the trend is the same concerning data on public expenditure per student as well.¹⁰ The trend is still decreasing, and is also characteristic of the lower and higher levels of education.

1.4 ZDZ Vocational Education Centre Białystok - Poland

ZDZ in Białystok has existed on the northeastern market in Poland for over sixty years as a private sector educational organization. Throughout this period it has rapidly developed from a small educational and training company into a market leader providing educational services. It has trained several thousand highly qualified people constituting personnel of various enterprises. Owing to the fact that the most profitable investment is investment in knowledge and skills, it has constantly striving to expand its training offer and improve its quality.

ZDZ place a great emphasis on comfortable conditions of its trainings and their usefulness, takes care of training groups not too large which facilitates interactive participation and increased efficiency of the classes. Its instructors has extensive, long- standing experience; and students can solicit their help and advice about different fields and specialties. Increased efficiency of its trainings stems from the fact that its training base is the best equipped and offers the most attractive range of trainings in the northeastern region of Poland.

Overview of the local context in Poland

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 learning¹.

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.

¹ Urbaniak B., *Imperatyw kształcenia ustawicznego w gospodarce opartej na wiedzy*, [w:] Znajmiecka-Sikora M., Roszko E., *Podstawy kształcenia ustawicznego od A do Z. Monografia*, Wydawnictwo ego, Łódź 2010, p. 16.

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 enterprises².

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)³.

Podlaskie voivodeship⁴ - 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 km², whereas 123 is the average for the country.

² *Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce w latach 2012–2013*, Polska Agencja Rozwoju Przedsiębiorczości, Warszawa 2014, p. 13 and following.

³ Niedzielski P., Stanisławski R., Stawasz E. (ed.), *Polityka innowacyjna państwa wobec sektora małych i średnich przedsiębiorstw w Polsce – analiza uwarunkowań i ocena realizacji*, Zeszyty Naukowe Nr 654, Ekonomiczne Problemy Usług Nr 70, Szczecin 2011, p. 5.

⁴ Voivodeship - a unit of administration division in Poland.

In the category of the level of economic development Podlaskie is among the weakest developed EU regions (255th place out of 271 regions). In Poland, it is also classified as one of the weakest voivodeships. 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)⁵.

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 processing⁶.

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 in 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% men and 47.8% women), employment rate (50% including 42.8% women and 57.7% men), unemployment rate (10.5%, 54k unemployed) and

the population of professionally inactive persons (408k, including 284k women)⁷.

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 2014⁸, 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, like 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 (Figure 1.4.1 on page 12).

⁵ Sadowska-Snarska C., *Problemy polityki społecznej i rynku pracy w dokumentach strategicznych województwa podlaskiego*, „Polityka Społeczna” 2014, nr 10.

⁶ Jurchuk A., *Innowacyjność podlaskich przedsiębiorstw – wybrane aspekty*, „Economics and Management” 2012, vol. 4.

⁷ Sadowska-Snarska C., *Zatrudnienie przyjazne rodzinie jako narzędzie adaptacyjności firm i pracowników w wymiarze regionalnym i lokalnym*, Białostocka Fundacja Kształcenia Kadr, Białystok 2014.

⁸ Kasperek K., Magierowski M., Turek D., *Rynek pracy w województwie podlaskim w świetle danych z badań Bilans Kapitału Ludzkiego 2013*, PARP, Uniwersytet Jagielloński w Krakowie, Białystok 2014.

Figure 1.4.1 - 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 sources⁹.

⁹ Raport monitoringowy z realizacji Podlaskiej Strategii Zatrudnienia do 2015 roku w latach 2010-2012, WUP w Białymstoku, Białystok 2014.

1.5 Conferenza della Svizzera italiana per la formazione continua degli adulti - Switzerland

The Conference for adult lifelong learning in southern Switzerland (CFC, www.conferenzacfc.ch) is an umbrella organization for general and vocational adult learning in Ticino (southern part of the Switzerland). CFC is a non-governmental and non-profit organization supported by the Ticino Canton government (Department for vocational training) and has permanent secretariat in Lugano.

It groups more than 80 private and public providers of adult education, associations, cantonal officials in charge of adult education, in-company adult learning departments and human resources staff, as well as individuals involved in adult learning.

CFC promotes the lobbying of a sustainable adult education system in Ticino region and in Switzerland, increases awareness on the importance of adult learning, and creates cooperation and networks among adult learning organizations by conducting regional, national and international projects, conferences, and informative meetings.

Key activities of CFC within the national and international projects in the field of lifelong learning relate to various target groups like adult trainers and trainees, workers and particularly low skilled workers and adults that lack basic skills, migrants, women and elderly people and etcetera. CFC's projects mainly deal with subjects such as: innovative methodologies and approaches to train adult learners, work based learning, training and retraining of low qualified and/or marginalized people, adult educational policy, professionalization of adult education and awareness rising of life long learning especially to foster vocational guidance processes.

CFC has close contacts with policy makers, adult learning providers, scientists in the field of adult education, multipliers and SMEs who are willing to contribute through their knowledge to adult educational and vocational training projects. For these reasons, one of the main objectives of the CFC in this project, is to investigate innovative approaches and strategies that could be applied to improve work based learning and strategies to promote innovation through lifelong learning in the enterprises.

Innovation in Switzerland

Switzerland is very competitive in the field of research and innovation. It is also among the countries with the highest spending on R&D in relation to their gross domestic product. The private sector bears the cost of over two-thirds of Swiss R&D expenditure, which currently amounts to nearly 3 per cent of GDP, or around CHF 16 billion. Public research funding hinges mainly on the proactive work of researchers, the principle of competition and international cooperation.

The division of tasks between the private and public sectors in the field of research and innovation has established itself over time and is based on two pillars of Swiss politics, namely subsidiarity and a liberal economy. The state is active in the areas where it has an explicit constitutional mandate. Education, research and innovation exist in a complex complementary system, in which different responsibilities and subject matters interlace.

State institutions at all political levels ensure to provide a fertile ground for excellent research and successful innovation. Among other things, they ensure the quality of education at all levels, make their public facilities available and provide a reliable political and legal environment.

In addition, government agencies at various levels invest in research. In Switzerland, basic research mainly takes place at the federal institutes of technology and at universities. Applied research and development and the transfer of knowledge into marketable innovations, however, is primarily the domain of the private sector and universities of applied sciences.

The public sector finances research according to liberal principles. This means that funds are awarded on the basis of the researchers' individual initiative on a competitive basis, where the decisive factor is the quality of the proposals submitted. Promotion of international cooperation is another cornerstone of this policy.

Under the Research and Innovation Promotion Act (RIPA), the Confederation is responsible for providing grant funding for research and innovation through the Swiss National Science Foundation (SNSF) and the Commission for Technology and Innovation (CTI). It also provides the necessary funding for the Association of Swiss Academies and supports nearly 30 non-university research institutions. Finally, the Confederation provides funding for teaching and research at institutions in the ETH domain.

The cantons in turn are committed to promoting research in their role as funding bodies of the universities and universities of applied sciences¹.

Innovation in Ticino Region

Ticino is the southernmost Swiss canton and is on the border with Northern Italy. According to the data published by the Ticino Regional Statistics Centre (USTAT), in 2010 the resident population counted about 334.000 inhabitants, and more than 21.500 companies were active in the Ticino region, the majority of these being small (or even micro) and medium sized enterprises. In Canton Ticino there are more than 181.000 jobs, mostly in the tertiary sector. Despite the limited geographical dimension, the income produced in the cantonal territory is about 13 billion Swiss Francs, i.e. about 3.3% of the whole Swiss Gross Domestic Product.

Considering the structure, economic, demographic and territorial peculiarities of Canton Ticino it is quite difficult to clearly identify the existence of an Open Innovation network, as defined by the literature.

Similarly to what is happening nationally and internationally, for at least the past 15 years Ticino has invested considerable human and financial resources in the support and promotion of entrepreneurship, particularly in terms of innovation, thereby recognizing the fundamental role of science, technology, and innovation in economic growth and social well-being (Alberton and Huber, 2012). In the first years of the new millennium the number of initiatives and projects supporting these companies increased considerably. Such activities gradually led to the establishment of the Ticino Regional System of Innovation.

¹ Source: SERI:<http://www.sbf.admin.ch/themen/01367/index.html?lang=en>

2. Learning and innovation

The innovation is the capability to translate an idea or invention into a good or service that can generate an added value and that can be replicable, transferred and salable. To be born and to be realizable, an innovative idea needs imagination, creativity, favorable initial condition and knowledge.

Education and research play a decisive role when it comes to produce, disseminate and use knowledge.

Due to the importance of the innovation to generate benefits in the Lisbon strategy, Europe 2020, there are five objectives, of which two concern innovation and education. “The ‘innovation union’ outlines a strategic approach to innovation, also emphasising the role of education and training and the need to increase skill levels to foster innovation (European Commission, 2010a). The communication on An Agenda for new skills and jobs (European Commission, 2010c) highlights the importance of increased participation in lifelong learning” (CEDEFOP 2012).

The countries involved in the partnership “TRAIN4INNO - Continuous vocational training for innovation in SMEs” to promote and increase knowledge for innovation propose a dual vocational system. The young people are facing with the companies and also they had to go to school to learn basic skills related to their work environments. This connection between school and labor market is very important because it allows a direct communication between the two parts encouraging, due to the needs, the creation of innovation. An important role is also played by the continuous vocational training. Innovation is a continuous process and people involved in it had to be always up to date, and had to be constantly trained.

The policy in the countries involved tries more and more to promote and support strategies to facilitate the access to the continuous vocational training

and the lifelong learning.

“Innovation and training policies should be combined. There is a need for increased synergies between strategies that support innovation and business development and for policy measures that promote learning in enterprises, even in its most informal forms” CEDEFOP 2012.

2.1 Continuous vocational training system policies and innovation strategies

TURKEY Vocational and Technical Education

Secondary education includes all education institutions of a general or vocational and technical character with a duration of at least four years. The objectives are to give students a common minimum overall knowledge, to familiarize them with problems of the individual and society and to seek solutions, to ensure that they gain the awareness that shall contribute to the socioeconomic and cultural development of the country and to prepare them for both higher education and a profession or for life and employment, in line with their interests and aptitudes.

Vocational education and training (VET) includes education and training programmes designed for, and typically leading to, a particular job or type of job. It normally involves practical training as well as the learning of relevant theory. Initial VET includes programmes mainly designed for and used by students at the beginning of their careers and commonly before entering the labour market. Continuing VET is made up of all the other kinds of VET, including enterprise training of employees and training provided specifically for those who have lost their jobs (OECD 2009).

The system in vocational and technical education in Turkey divided two main dimensions: theoretical in schools and practical in-company training. The activities and circumstances for Vocational training are mostly carried out by the MoNE.

VET for Adults

Open Education High Schools render services to students who cannot attend formal education for any reason, who are over the age of formal education, and who wish to be transferred to open education high schools while attending a formal high school.

Informal education provides educational services other than the formal education services in line with the general aims and basic principles of national education to citizens who have never entered or who are at a certain level of the formal education system or who have left formal education.

Apprenticeship Training and Public Education Non-Formal training provision is administered by the General Directorate of Apprenticeship Non Formal Education. Apprenticeship training is a dual training system in which theoretical training is given in vocational training centres and practical training is in the workplace. The period of apprenticeship training lasts from two to four years depending on the nature of the professions. Theoretical education within apprenticeship programmes consists of 30% general knowledge courses and 70% vocational knowledge courses. Theoretical education takes place at vocational training centres, vocational and technical education centres, or education centres offered by the enterprises for one day a week. Practical training takes place at workplaces in real production environments for five days a week.

Innovation policies and strategies

Vocational training has a crucial role in enhancing and supporting economic productivity, as it supplies workers with required and appropriate knowledge and skills for economic development. Moreover, most of the vocational training institutions are seen as constituting an important component in the development strategies particularly in developing countries, to overcome youth unemployment with the skilled and qualified human resources. Accordingly, globalization of economy, the qualified and highly skilled human resources in

global scale, increasing international competition and in the labor market are leading a need for continuous vocational training and new strategies on innovation policies. Therefore, many countries stress the need to place a greater emphasis on Technical Vocational Education and Training (TVET) and highlight the importance of providing attractive, qualified training programs and continuing training opportunities in order to enhance employability and occupational mobility; designing the TVET to conform more closely with the field of practice; adjusting the TVET closer to the requirements of the employment system and the corresponding labor market needs and preparing young people for degrees which comply with high standards while opening up forward-looking employment prospects (BIBB, 2004).

GERMANY Germany's education system and its performance

The German education systems consists of a school system that distinguishes between the Gymnasium, which is a school for the better pupils, while either so-called (integrated) secondary schools or middle and lower schools cater for the other students.

With regard to vocational education (VET), Germany has a two-tier system consisting of the rather famous "dual system", which is a combination of practical VET in companies and theoretical learning in vocational schools on the one hand and other forms of vocational schools ((Berufs-) Fachschulen) for nursing and educational occupations. Vocational education and training lasts commonly 3 to 3.5 years, though shorter and sometimes even longer forms exist for certain specialisations or combinations of learning pathways. Dual VET is the largest strand of vocational education and training, catering for more than 500,000 young people in recent year, even though figures were beyond 600,000 almost ten years ago. The school-based vocational education systems caters for around 210,000 youth.

Another around 500,000 people enter into the higher education system, which has gained much importance over the last roughly ten years, for various reasons (double cohorts leaving the school system, abandonment of compulsory military service). First grade enrolment numbers increased by 50% from 345,000

in 2007 to up to 520,000 in 2011, and will now decrease over the next years. Yet, it is important to note that almost 20% of university students are coming from abroad and that another 20% are 24 years and older, and should therefore not be considered as “normal ‘freshman’”.

Adding up, 30% of an age cohort enter higher education, 50% the dual system and 20% school-based vocational education and training.

When performance of the education system is concerned, Germany is placed somewhere close to the average, even though some improvements over the last approximately 15 years can be acknowledged. While Germany ranked slightly below average scored and the share of functional illiterates was almost 25%, it scores now above average and the share of functional illiterates went down to 18%. However, this still is a strikingly high share and, in fact, unacceptable for a country like Germany. In contrast, the share are almost zero in Japan and Korea, while average scores are higher.

A similar picture arises with regard to adult competencies, Germany scores slightly – and statistically significant – below the international average of 273. As for Pisa, the results are strongly linked to socio-economic background and have not much improved over the last decades, i.e. the results of older and younger cohorts do not vary a lot. In addition, the computer literacy of young Germans is, again, not above average, as the ICILS report conveyed.

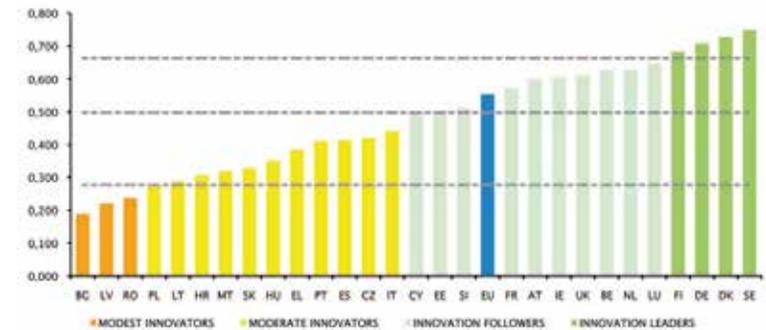
Reviewing the German innovation system on the one hand and the performance of its education situation, Germany provides a strikingly contradicting picture. While the country is one of the innovation leaders in Europe as well as world-wide, the performance of the education system is around average in many respects and indicators. The differences across studies are limited.

Germany's innovation system

Germany has a very strong innovation system, it is ranked third according to the European Innovation Scoreboard¹ (UIS), only Sweden and Denmark score better (see Figure 2.1 on page 17). A similar picture arises if other innovation indicators are concerned.

¹ Switzerland and Turkey are not included in the UIS. The UIS combines various aspects of innovation systems.

Figure 2.1 - The European Union Scoreboard



HUNGARY Learning, cvt system and policy

In Hungary since the government change in 2010 the complex restructuring of the education system as a whole is underway involving all sectors of education and training – general/public education, vocational education and training, higher education. The main changes in the public education sector which includes also VET schools are that since January 1st 2013 these schools are maintained centrally by the state and that after 28 years the external evaluation / inspection system will be re-introduced in this education sector.

In Hungary's new structure of public administration the Ministry for National Economy (Hungarian name and abbreviation Nemzetgazdasági Minisztérium, NGM) is responsible for VET and adult training. NGM is in charge of the content regulation of VET but issues relevant decrees with the assent of the Minister of Human Resources (Hungarian name and abbreviation Emberi Erőforrás Miniszter, EMMI). Other ministers responsible for certain sectors are also involved in the development of the content of VET. The National Labour Office, Directorate for VET and Adult Education (Hungarian name and abbreviation Nemzeti Munkaügyi Hivatal, Szak- és Felnőttképzési Igazgatóság, NMH SZFI) and the economic chambers assist the NGM in this development. NMH as the back-office of the Ministry for National Economy also give support in coordination, research, information and counselling tasks related to VET and adult training.

The new VET government has undertaken the complex restructuring of the VET system with the aim of better serving the demands/needs of the labour market/economy and increasing the attractiveness of VET. The policy objectives of and the actions taken by the new VET governance include increase the duration of practical training, better support the vocations in short supply, reduce the time period of training, simplify the examination requirements, further support apprenticeship training, develop external evaluation / inspection system in VET. The reforms (being) introduced refer to both the IVET sector and the adult training system. The fundamental changes affect also the main elements regulating the structure, the content and the qualification requirements of VET as well as the organisation and implementation of practical / apprenticeship training. In Hungary the provision of VET is governed by the new Act CLXXXVII of 2011 on Vocational education and training and the provision of adult training by the new Act LXXVII of 2013 on Adult Training. All state recognized vocational qualifications obtainable within or outside the school system are defined in the National Qualification Register (Hungarian name and abbreviation Országos Képzési Jegyzék, OKJ) providing a unified qualification system linking IVET and CVET. IVET and CVET are provided in two sub-sectors of education: general education and adult training.

IVET

There are two types of VET schools (szakképző iskola) in Hungary: vocational schools (szakiskola) and secondary vocational schools (szakközépiskola). Both types of schools are part of the public education system. Vocational school training can be joined on condition of completing primary education (the Grade 8) or completing the Bridge Programme of Public Education regulated under the Act on National Public Education. The Bridge Programme is dedicated to promoting the catching up of students with incomplete primary education.

Vocational secondary schools

In the model introduced after 1998, the secondary vocational school comprised four secondary-level forms preparing for Secondary School Leaving Exam (SSLE) and as many vocational training forms as defined under the OKJ. The second-

ary school grades also provided career orientation and trade-group-specific grounding training. Career orientation and grounding training in the secondary school grades, however, provided no vocational qualification. The duration and especially the proportion of time allocated to practical training were very limited. The new model has made it possible to provide vocational theoretical and practical training under a total of 37 secondary vocational school programmes in the years of preparation for SSLE besides the transfer of general knowledge. The students pass a secondary vocational school leaving exam, which replaces the first vocational training year in the given sector, and also provides qualification suitable for filling a job there. The new model started in 2013. In the coming years, the old and the new model will co-exist.

Vocational schools

The vocational education has gone through major reform during recent years. From 2013 the novel-type three year “dual” form of training that will gradually become exclusive in vocational schools. Vocational schools have three vocational training grades providing education in the general subjects needed for the acquisition of the given vocational qualification and also vocational theoretical and practical training. The number of years of vocational training defined under OKJ for a given qualification is reduced by one for students who completed vocational school Grades 9 and 10 or have a grammar school or (non-relevant) secondary vocational school leaving certificate. In vocational school, one third of the mandatory lessons of students who completed eighth grade is allocated to general education. Hungarian vocational training policy considers it as a priority task to stress the adjustment of vocational training to the labour market demands and to extend the work-based forms of learning and training. Therefore, the institution of the student contract will be upgraded and extended on a continuous basis, and companies will be encouraged to join in in VET. Some OKJ vocational qualifications are available only within the formal school system. Since most OKJ vocational qualifications can also be obtained within the framework of adult training, such VET programmes may be considered as IVET in case the participant has not earned a vocational qualification in public or higher education.

CVET

Adult education within the school system is provided by public and higher education institutions at primary and secondary levels. Such education is offered for adults who have not obtained any graduation certificate within the formal school system, or an OKJ qualification, or desire to have a higher level or more specialized qualification. With a few exceptions all vocational qualifications listed in the national qualifications register (OKJ) may also be obtained in VET offered outside the school system, in adult training. In fact, the majority of state-supported courses offered for the unemployed and other groups at risk award such a qualification. In case of training courses that award an OKJ qualification, the objectives, admission criteria, duration (minimum and maximum number of hours), content requirements and type of outcome are specified in the vocational and examination requirements (SZVK) and from 2012 in the examination requirement module of the given qualification, published in a decree from the minister of the relevant field. Adult training providers can prepare their own curricula based only on the SZVKs and the examination requirement modules. The content and objectives of 'trainings regulated by public authorities' where participants can obtain nationally or internationally recognised qualifications or licences not included in the national qualifications register. are regulated either by legislation or the relevant public authority. Such training programmes award qualifications (license, diploma, certificate of attendance issued by the training provider etc.), which qualify for performing activities defined by the authority, typically in the fields of road, water and air transport, plant and veterinary health inspection or food hygiene. Adult training outside the school system is provided by the Türr István Training and Research Institute and its 10 regional directorates (Hungarian name and abbreviation Türr István Képző és Kutató Intézet, TIKKI) which is the background institution of The Ministry of Human Resources (Hungarian name and abbreviation Emberi Erőforrások Minisztériuma, EMMI), private training companies, non-profit organizations, employers, public and higher education institutions etc. A further training is also provided by the economic chambers, called master examinations granting a higher level qualification based on the OKJ qualification obtained in IVET.

Workplace learning

Today, the focal point of the Hungarian vocational training system is the student contract. While in 2005 there were only a little over 21,000 student contracts in the country, in 2012 more than 50,000 students had the opportunity to receive their practical training at companies. These students can make use of this new arrangement of spending half of their time in classrooms and the other half at companies practicing what they have learned in school. There are two distinctive advantages to this system. First, students receive training that is academically relevant and skills that are marketable; and second, it provides students with direct employment opportunities at companies that provide training facilities for vocational education. The government tries to foster the development of the vocational training system by providing non-refundable subsidies for the establishment and development of vocational training facilities at the companies' sites. The aim would be to increase the number of students with student contracts, meaning that more students would obtain perfectly up-to-date technology-based training and would get to know the culture and the functioning of a given company

Innovation**General status of innovation**

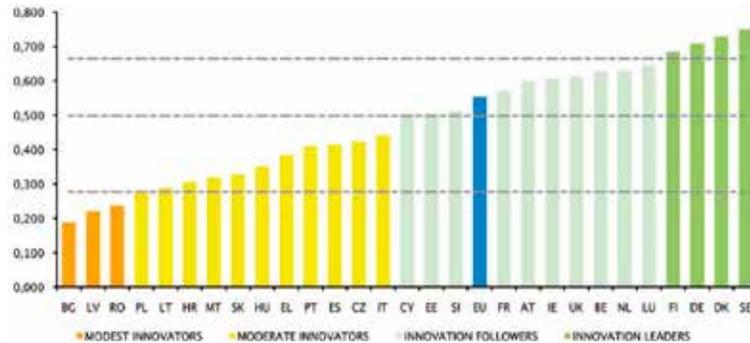
The innovation performance of the EU improved on the basis of the 2014 ranking of the Innovation Union. Hungary is among the moderately innovative countries, like the majority of the countries in the region, including Slovakia and the Czech Republic.

Hungary is a Moderate innovator. The country's innovation performance, despite some fluctuations, improved between 2006 and 2013. The performance relative to the EU increased to 63% in 2013 from around 60% in 2006. Hungary performs below the EU average for most indicators, especially for Non-EU doctorate students and Community designs. Relative strengths are observed in License and patent revenues from abroad, International scientific co-publications and Fastgrowing innovative firms. High growth is observed for Community trademarks, R&D expenditures in the business sector and Sales share of new

2.

innovations. A large decline in growth is observed for Non-R&D innovation expenditures. Other notable declines are in R&D expenditures in the public sector, SMEs innovating in-house and Community designs.

Figure 2.2 - Hungary's innovation performance in international comparison

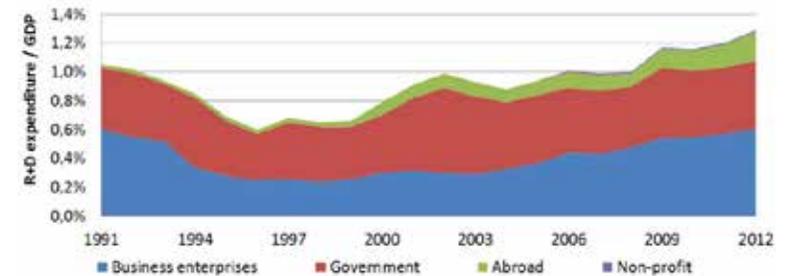


Source: Innovation Union Scoreboard, 2014

In Hungary, the GDP proportionate R&D expenditures have increased by 30% since 2008, and are expected to reach 1.44%, which is the highest level of the past twenty years. The corporate R&D expenditures started to grow from the late 1990s, and their growth has intensified in recent years, so they account for nearly half of the R&D expenditures. In addition to the corporate sources, the proportion and value of foreign funds are steadily increasing, and one sixth of the expenses are today financed by foreign actors. The proportion of public resources has not changed in recent years.

The major part of the GDP proportionate R&D expenditures is tied to the manufacturing industry, and the contribution of the professional, scientific and technical activities and the education is considerable as well. Information and communication has a share of 5.9%. Within the manufacturing industry, pharmaceuticals has the greatest weight, while the combined R&D expenditures of vehicle construction, electronics and mechanical engineering remain below pharmaceuticals.

Figure 2.3 - Sources of GDP proportionate R&D expenditure (1991-2012,%)



Source: KSH

The GDP proportionate R&D expenditures show opposing dynamics in some sectors: they are increasing rapidly in the machine building, but slowly in the food industry, while no clear trend can be demonstrated in machine building and the manufacture of computers, electronic and optical products.

The specific R&D expenditure of the pharmaceutical industry has fluctuated in recent years. The R&D expenditures of the areas of science showed a very unequal picture in 2012: within the total expenditures, the share of the technical sciences was 54.3%, while that of the natural sciences was 24.4%. The share of medical sciences was 8.6%, and that of the agricultural sciences was 5.8%. The share of the social sciences (4.3%) and humanities (2.7%) can be considered low. In 2012, two thirds of Hungary's R&D expenditures of 358.2 billion HUF was realized in the corporate sector. The total weight of the institutional sector in the R&D expenditures was close to 15%, while that of the higher education sector was almost 19%.

The R&D as a whole shows a picture of regional disproportions. In terms of the GDP proportionate R&D expenditures, the performance of Hajdú-Bihar, Csongrád, Baranya and Veszprém counties and Budapest exceed the national average. The publication data of the major knowledge centres also show a highly focused picture with the significant weight of Budapest and the large academic centres.

International collaborations play an important role in Hungary's RDI activities and help to engage in the international circulation and the development of the RDI area.

Mission and policy

A new working process has started under the coordination of the Ministry for National Economy: the aim is to build up a new national R&D&I strategy. It is necessary to understand the new paradigm and to use a modern, innovation policy approach that: a. works with the latest international tendencies (Innovation Union, OECD Innovation Strategy), b. builds on the best practices of EU countries with similar conditions to Hungary (Ireland, Austria, Finland), c. completes the strictly research and development based technology innovation approach with the broader concept of innovation. The new strategy will cover the time frame 2014-2020 and ensure and facilitate the necessary governmental initiatives to reach the qualitative and quantitative targets defined by the EU 2020 strategy.

The development works on the 2020 R&D&I strategy go in parallel with the planning of the ÚSZT and the related calls for proposals, that helps to reach synergy already in the development phase between the different strategic documents.

At the end of the first half of the 2000–2010 period, fiscal (tax policy) and supply (tender) incentives applied a sort of “R&D shock therapy” to the economy. As a result, nominal corporate R&D expenditure during a 10-year period nearly quadrupled and even doubled in real terms, resulting in a GDP-rated increase from 0.36% to 0.69%. It is, however, a warning sign that - non-corporate R&D expenditure decreased in real terms; the proportion of investments from R&D expenditure has fluctuated considerably since 2000 and overall shows a sharp decline; subsidiaries of foreign companies hold a large share of funding, which may cause vulnerability in economically turbulent times,

R&D spending per company did not increase in real terms overall (although there was strong growth in real terms among micro, small and large enterprises).

According to the data available, the funding of innovation from external sources in Hungary primarily means publicly funded innovation. The majority of direct R&D grants are awarded to small and medium-sized enterprises. On the other hand, National Tax and Customs Administration (NAV) data suggest that the majority of indirect grants (i.e. tax advantages) are given to large enterprises (which, for the most part, are in full or majority foreign ownership). It is also clear, however, that SMEs and especially those micro-enterprises that have large growth potential but utilize new knowledge in riskier circumstances have not received

a high degree of support. Differentiation with regard to level of risk assumed by companies is on the agenda of both EU and Hungarian policymakers.

SWOT

STRENGTHS

Education, training, research background:

- We have researchers who are capable of achieving globally outstanding results in certain (limited) areas of science (e.g. mathematics or physics).
- Existence of a scientific basis of established layer of elite researchers who can produce competitive scientific results of national importance, who are recognized and competitive internationally as well (sources, international citations from scientific publications, infrastructure and the use of databases).
- Internationally high-standard institutions of higher education, also in the major provincial cities.

Research and innovation environment, organisations, infrastructure and services:

- R&D knowledge centres have developed with concentrated R&D capacities in some places.
- The large foreign and Hungarian companies operating in the country have created cutting-edge work culture.
- R&D capital concentration and the modern RDI infrastructure appeared in the vicinity of the large companies. More and more promising partnerships are established between the large companies and the universities.
- Start-up companies implementing world-class development with high growth capabilities appear. Active entrepreneurial and start-up culture compared to the capacity of the country.
- High level of ICT infrastructure, basic computer network infrastructure for research purposes, outstanding high-performance computing (HPC) capacity, and resulting modeling possibilities.
- The higher education institutions engaged in basic research, as well as the research centres of the HAS performed well compared to rivals in the region in the European Union.

Research and Technological Development Demonstration Framework Programme (FP7):

- The health care industry is competitive internationally.
- High level of readiness, adaptability and ability for changing the economic structure.
- The university and college R&D potential increases, knowledge centres are created, increasing economic openness.
- Many trans-European transport routes cross the region; internationally significant logistical role.

Financing:

- The fund set up to finance RDI supports development, and EU funds are available specifically in support of RDI.

WEAKNESSES

Education, training, research background:

- The popularity of the natural science and technical professions continues to decline, hence the low number of specialists with technical and natural science qualifications; lack of supply of researchers.
- The uncertainties in the environment for education and the falling prestige of the teaching profession hinder the supply of talents and researchers.
- Lack of knowledge map in the universities.
- Very low wages to researchers in the international comparison.
- Lack of entrepreneurship in the universities and research institutes, which can be caused by the sometimes contradictory and vague legislation and, in a sense, the over-regulated system.
- The structure of education and training can hardly adapt to the new development plans. The quality of human resource needs development and should be aligned with the needs of the economic actors.

Research and innovation environment, organisations, infrastructure and services:

- The socio-economic recovery of R&D expenditures is low.
- Despite the sporadically focused R&D capabilities, the research capacities and performances are fundamentally fragmented and not sufficiently focused. In many cases, the infrastructure is outdated and fragmented, the management of the knowledge base institutions is weak, and institutional learning is slow.
- The networking of the companies is low.
- The undertakings have a very low level of or do not have any knowledge of languages.
- The capacities and competences of the universities and the research institutes are linked to the corporate and public orders weakly compared to the possibilities.
- Strategic partnerships are rare in the SME sector.
- Low number of innovative SMEs.
- There are few internationally competitive medium-size companies.
- The determination of the faculties and the training programmes of higher education do not reflect the economic needs, so young people can hardly get employment and move away from rural towns, which has a negative effect on the sustainable society.
- The innovation policy instruments ("policy mix") is not sufficiently harmonized.
- Most SMEs have shortcomings in their management and the level of innovation and intellectual property protection awareness is low.
- The demand for the protection of industrial property rights is extremely weak.
- There are no established forms or practice of communication between the SMEs and the research institutes (e.g., ordering services, use of infrastructure, etc.).
- The relations between the stakeholders of the R&D value chain are weak and cooperation is not efficient enough.
- The technology transfer processes are not effective, the domestic innovation processes operate with low efficiency; lack of common areas and infrastructure (e.g. laboratories) that can support the cooperation of the business and the public sectors.
- Few domestic spin-off, as their ascent is also hindered by several attitudinal and institutional factors.
- The participation rates of the companies in international research programmes are low.
- Excessive administrative burdens, both in terms of office work and the applications.
- The regions of the country show a picture of inequality both in terms of the R&D performance and innovation performance, and is significantly concentrated in Budapest.
- Looking at the regional presence of RDI, regional imbalance can be observed in the country.

Financing:

- Inadequate and surging funding for research, the level of institutional R&D funding is low and less tied to performance.
- The SME sector is underfunded, and the innovation and growth ambitions and abilities are weak in a global comparison.
- Low level of seed capital investment; undeveloped technology incubation processes.

OPPORTUNITIES

Education, training, research background:

- The high-quality higher education, which is currently operating in the industrial and agricultural ones, moves the big cities and their surroundings towards a knowledge-based economy, if the university knowledge centres are strengthened and can put their research results effectively into practice and education, and link them to the activities of the local economy.
- Expansion of practice-oriented training (dual training), strengthening of the education of entrepreneurial innovation management.
- Adjusting the trends of higher education to the economic needs improves the situation of trained young people in the rural university towns (Csongrád, Hajdú-Bihar and Baranya counties) and strengthens the ability to keep the population.
- Development of natural science and technical education.
- Approach, which manages more areas of science at the same time and in one system; the spreading of the vision among the young people improves the application of what they learned in practice as well as in the subsequent research and economic results.
- Strengthening talent promotion.
- Promotion of the development and maintenance of relationships among the inventors and researchers through the establishment of a central database.

Research and innovation environment, organisations, infrastructure and services:

- Harmonised operation of STI diplomacy.
- The instruments prioritised by the EU ((public) procurement supporting innovation (PcP and PPI), smart specialization, etc.) are spreading.
- Optimization of the use of available research infrastructures.
- Strengthening RDI-friendly economic and regulatory environment.
- The supply and end-product manufacturing capacities of the micro, small and medium-sized enterprises improves in the major industrial areas, and Smart production systems spread.
- Increasing the economic role of innovation cooperation and clusters.
- Strengthening of new emerging R&D-intensive industries and spread of smart technologies.
- Effective institutions and systems of institutions, operating on a territorial basis, are established to promote innovation.
- Joining the major EU cooperation programmes.
- The critical innovation mass of the big towns improves through the development of new instruments for powerful incubation (e.g. open labs, techshops) and the spreading of incubator services.
- Closer cooperation develops between the academic and the corporate sectors.
- Balancing and catch-up of the RDI performance of the convergence regions.
- Networking, innovation and knowledge-based development are given higher value in the economic development strategies, and are highly preferred by the different levels of policies (national, EU) and support systems as well.

- Through the establishment of international-class centres of excellence, the counties with a high research potential can also take part in world-edge research projects, thus strengthening the excellence and pulling effect on the surrounding areas.
- In view of the international trends, the presence of the multinational companies will further strengthen the local economy's integration into the global economy, the introduction of advanced technologies, and the spread of modern management methods

Financing:

- Utilisation of the global optimization of resource allocation, attracting FDI which establishes R&D.
- Further improvement of R&D tax incentives.
- The promotion of the innovation and R&D activities will remain an important development priority both on the European and the national levels: the resources to support RDI efforts will significantly increase during the 2014-2020 period.
- The promotion of venture capital investments will bring along more successful products and companies from the ideas; the entrepreneurial skills and attitudes change in a positive direction; the spread of a potentially successful entrepreneurial vision improves the ability of the society for self-provision.

THREATS

Education, training, research background:

- The new generation of researchers will not be sufficient (either in number or preparedness) to maintain an internationally competitive level; innovative systemic thinking and research approach are not mastered at the national knowledge centres (campuses).
- The shortcomings of the education persist; there will not be specialists of sufficient numbers and skills to join the global networks, and their lack will grow.
- Brain drain and migration of young workforce with higher level education.

Research and innovation environment, organisations, infrastructure and services:

- The role of the SME sector in RDI will stagnate and will be unable to generate serious demand or build capacities.
- Stagnant activity in the field of international RDI cooperation and programmes.
- Increase of regional inequalities and further strengthening of the dominance of Budapest, while the counties of the convergence regions are weakening or stagnating.
- The willingness to invest declines due to the unfavourable development of the factors of the global political economy; some multinational companies withdraw from the country because of cost-cutting/restructuring, thus the industry loses its potential development (especially in the automotive and the pharmaceutical industries and the services).
- Regulatory barriers to IT procurements (particularly in the public sector).

Financing:

- Lack or insufficient level of FDI based on R&D which is properly integrated in the Hungarian economy.
- With the decline in the competitiveness, the foreign companies refuse to invest in higherlevel production processes in Hungary, so the big town which currently have industrial production capacity will not be able to develop, which results in reduced labour-holding capacity, and the standard of living cannot be maintained.
- The H2020 appearance of the scientific and economic actors is not realized at the expected level.
- Due to the lack of proper means to support RDI, Central Hungary is unable to offer further pulling force to the surrounding industrial production and knowledge centres and falls back in the international competition.
- The regions in the "less developed" category which have the R&D potential cannot effectively use the resources to support RDI and, therefore, they cannot join the international trends.

POLAND 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 organised 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”¹. Continuous learning may be realized in the following forms: formal, informal and non-formal (incidental, self-education) . 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 education².

Non-formal education is understood as all organized educational activities that are not school education, i.e. they are not provided by formal educational insti-

¹ Ustawa o systemie oświaty z dnia 7 września 1991 r. art.3 ust.17.

² Urbaniak B., Bariery udziału polskiego społeczeństwa w kształceniu ustawicznym, [in:] Kotlorz D., Rączaszek A. (ed.), *Polityka edukacyjna wobec rynku pracy, Studia Ekonomiczne. Zeszyty Naukowe Wydziałowe, nr 115, Uniwersytet Ekonomiczny w Katowicach, Katowice 2012, p. 181.*

tutions. 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 by³:

- 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.

³ Kształcenie i szkolenie zawodowe w Polsce. Charakterystyka ogólna, CEDEFOP, Luksemburg 2011, p. 37 and following.

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 gen-

eral 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 employers⁴.

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 settings⁵.

⁴ *Kształcenie i szkolenie zawodowe w Polsce. Charakterystyka ogólna*, CEDEFOP, Luksemburg 2011, p. 39 and following.

⁵ *Polska Rama Kwalifikacji*, Instytut Badań Edukacyjnych, Warszawa 2013.

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)⁶. 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

⁶ *Rejestr Instytucji Szkoleniowych (RIS). Raport 2013. Instytucje szkoleniowe i ich oferta*, Ministerstwo Pracy i Polityki Społecznej Departament Rynku Pracy, Warszawa 2014.

in non-school settings⁷. 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.

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 fund⁸.

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)⁹.

The amendment of the act on promotion of employment and institutions of the labor market that came into effect on 27th of May 2014 introduced a new instrument of developing human resources - National Training Fund (NTF) which

⁷ *Regulations of the Minister of National Education and Sport as of 20 December 2003 on accreditation of facilities and centers providing continuous learning in non-school settings* (Dz. U. Nr 227, poz. 2247).

⁸ In compliance with the act as of 14 March 2014 on the amendment of the act on promotion of employment and institutions of the labor market and some other acts, there is no longer a possibility of establishing company's training funds. The interim provisions allowed for spending the gathered funds until the end of 2015.

⁹ *Ibidem*.

finances continuous learning of employees and employers¹⁰.

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 funds¹¹.

Among barriers hindering continuous learning of persons working in Poland,

10 Act as of 20 April 2004 on promotion of employment and institutions of the labor market (Dz. U. z 2013 r. poz. 674, as amended) – art. 69a and 69b, art. 109 section 2d-2n, art. 22 section 1 and 4 point 3 and 4, art. 4 section 1; Regulations of the Minister of Labor and Social Policy as of 14 May 2014 on a specified method and mode of granting funds from the National Training Fund.

11 Topolska K., *Szkolenia dla pracowników 45+ okazały się niewypałem*, „Dziennik Gazeta Prawna” 2014, 23 październik.

there are unfavorable working conditions as regards, e.g.¹²:

- 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%)¹³;
- 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,

12 Urbaniak B., *Barriere udziału polskiego społeczeństwa w kształceniu ustawicznym*, [in:] Kotlorz D., Rączaszek A. (ed.), *Polityka edukacyjna wobec rynku pracy*, *Studia Ekonomiczne. Zeszyty Naukowe Wydziałowe*, nr 115, Uniwersytet Ekonomiczny w Katowicach, Katowice 2012, p. 185.

13 Eurostat data.

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 specializations¹⁴.

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+*.

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 account¹⁵. 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 accord-

ance 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

¹⁴ *Regionalny Program Operacyjny Województwa Podlaskiego 2014-2020*, Urząd Marszałkowski Województwa Podlaskiego, Białystok 2014, p. 5 and following.

¹⁵ The results of detailed research for Poland is presented in *Kształcenie dorosłych 2011*, Główny Urząd Statystyczny, Warszawa 2013.

participation in courses and training, which are shorter and more flexible forms of developing competences¹⁶.

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 women¹⁷.

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 essential¹⁸.

The data included in Figure 2.4 on page 31 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 process¹⁹.

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 smaller²⁰.

¹⁶ Górniak J. (ed.), *Kompetencje Polaków a potrzeby polskiej gospodarki. Raport podsumowujący IV edycję badań BKL z 2013 r.*, PARP, Warszawa 2014, p. 83 and the following.

¹⁷ *Kształcenie dorosłych 2011*, Główny Urząd Statystyczny, Warszawa 2013.

¹⁸ Wilczyńska B., *System kształcenia ustawicznego w województwie podlaskim*, [in:] Tomanek A. (ed.), *Narzędzia polityki flexicurity. Poradnik dobrych praktyk, Izba Rzemieślnicza i Przedsiębiorczości w Białymstoku*, Białystok 2010, p. 94.

¹⁹ Górniak J. (ed.), *Kompetencje Polaków a potrzeby polskiej gospodarki. Raport podsumowujący IV edycję badań BKL z 2013 r.*, PARP, Warszawa 2014, p. 91 and the following.

²⁰ Górniak J. (ed.), *Kompetencje Polaków a potrzeby polskiej gospodarki. Raport podsumowujący IV edycję badań BKL z 2013 r.*, PARP, Warszawa 2014, p. 91 and the following.

Figure 2.4 - 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
Poland	35	22	27	16	55	41	80	75
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 analyses²¹. On the basis of a comparison of work organization, instruments for staff development and innovation index, five segments of European countries have been differentiated (Figure 2.5 on page 32).

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' competences²².

Figure 2.5 - 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, Poland, 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%) (Figure 2.6 on page 33). 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 enter-

prise, 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.

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 qual-

²¹ *Learning and Innovation in Enterprises*, CEDEFOP, Luxembourg 2012, p. 45.

²² Górniak J. (ed.), *Kompetencje Polaków a potrzeby polskiej gospodarki. Raport podsumowujący IV edycję badań BKL z 2013 r.*, PARP, Warszawa 2014, p. 92.

ity 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.

Figure 2.6 - 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								
			<i>the existing skills and competences of the persons employed corresponded to the current needs of the enterprise</i>	<i>the preferred strategy of the enterprise was to recruit individuals with the required skills and competences</i>	<i>difficulties in assessing the enterprise's training needs</i>	<i>lack of suitable training offers on the market</i>	<i>high costs of training</i>	<i>higher focus on IVT than CVT</i>	<i>major training effort realised in previous years</i>	<i>high workload and limited available time of persons employed</i>	<i>other reasons</i>
POLAND	22.5	77.5	81.4	69.0	8.9	10.4	43.5	38.5	15.9	24.4	24.2
Podlaskie	19.8	80.2	67.9	50.0	12.2	12.3	37.3	31.6	15.9	27.9	35.1

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

Figure 2.7 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								
			<i>the existing skills and competences of the persons employed corresponded to the current needs of the enterprise</i>	<i>the preferred strategy of the enterprise was to recruit individuals with the required skills and competences</i>	<i>difficulties in assessing the enterprise's training needs</i>	<i>lack of suitable training offers on the market</i>	<i>high costs of training</i>	<i>higher focus on IVT than CVT</i>	<i>major training effort realised in previous years</i>	<i>high workload and limited available time of persons employed</i>	<i>other reasons</i>
ENTERPRISES EMPLOYING 10 - 49 PERSONS											
POLAND	15.9	84.1	81.9	68.1	8.8	10.6	43.1	38.0	15.2	24.4	23.8
Podlaskie	11.8	88.2	66.6	49.6	12.5	13.0	35.8	30.4	15.4	27.2	34.9
ENTERPRISES EMPLOYING 50-249 PERSONS											
POLAND	41.4	58.6	78.8	74.2	9.4	9.6	46.1	41.4	20.2	24.2	26.6
Podlaskie	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 201. GUS, Gdańsk 2012, p. 155 and the following.

Innovation

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) character²³.

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

²³ Stanisławski R., *Instrumenty polityki innowacyjnej skierowane do MSP*, [in:] Niedzielski P., Stanisławski R., Stawasz E. (ed.), *Polityka innowacyjna państwa wobec sektora małych i średnich przedsiębiorstw w Polsce – analiza uwarunkowań i ocena realizacji*, Zeszyty Naukowe Nr 654, Ekonomiczne Problemy Usług Nr 70, Szczecin 2011, p. 78.

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 programs²⁴.

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:

²⁴ *Program rozwoju przedsiębiorstw do 2020 r. Program wykonawczy do Strategii Innowacyjności i Efektywności Gospodarki*, Załącznik do Uchwały Rady Ministrów z dnia 8 kwietnia 2014, Warszawa 2014.

- 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.

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.

Innovation of Polish enterprises - data

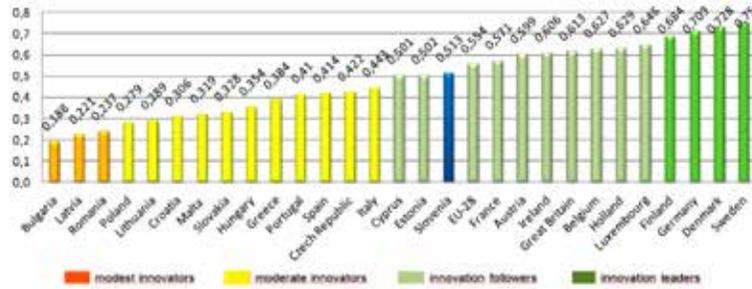
According to the report entitled Innovation Union Scoreboard 2014, in comparison with other EU member states, Poland is characterized by a relatively low rate of Summary Innovation Index – SII – Figure 2.7 on page 36. In the rank IUS 2014, it was placed as last but four with a synthetic rate of innovation 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.

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) - Figure 2.7 on page 36. 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

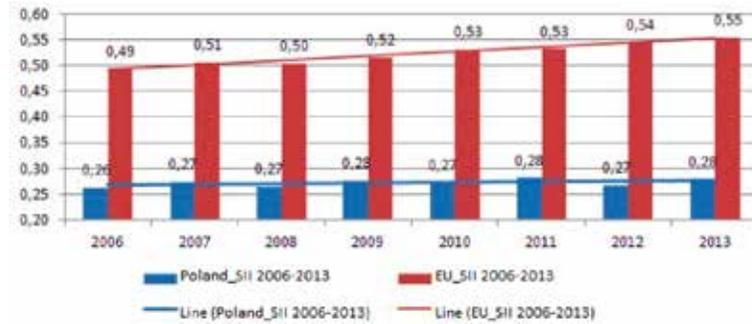
stable with a minimal pro-growth trend in comparison with different countries.

Figure 2.7 - Innovative potential of eu member states in 2013



Source: Innovation Union Scoreboard 2014.

Figure 2.8 - 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%.

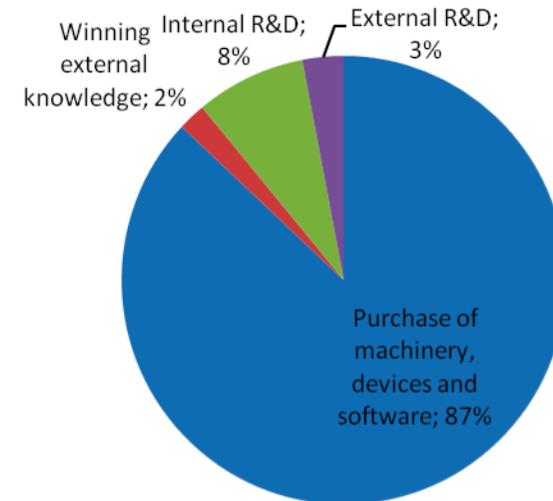
In 2012, Poland was on the twentieth position among EU member states as regards the rate of R&D intensity, which was 2.3 lower than the rate for EU. The preliminary data for 2013 indicates that the rate of R&D intensity in Poland is by 1.15 percentage point lower than for EU-28. In 2012, similarly to 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 24th position with 89€, whereas the average for EU-28 was 532.6€²⁵.

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 (Figure 2.9 on page 36).

Figure 2.9 - 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.

²⁵ Nauka i technika w 2013 r., GUS, Urząd Statystyczny w Szczecinie, Szczecin 2014, p. 56.

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 findings²⁶ 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 (S). 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.

²⁶ *Działalność innowacyjna przedsiębiorstw w latach 2010-2012*, Główny Urząd Statystyczny, Urząd Statystyczny w Szczecinie, Szczecin 2013.

Figure 2.10 - 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 indus-

trial 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 (Figure 2.10 on page 37).

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 (Figure 2.10 on page 37).

SWITZERLAND VET and PET system and policies

Vocational education and training (VET) is provided at upper-secondary level. Professional education and training (PET) is provided at tertiary B level. Both VET and PET use clearly defined curricula and national qualification procedures. They are also characterised by a high degree of permeability: a credit system to keep track of prior education and training makes it much easier for learners to pursue additional education and training opportunities and change the course of their working lives. A wealth of continuing education and training (CET) courses can also be found at all levels. The Swiss VPET system offers a broad selection of available training options. Courses cater to different abilities and are geared to the needs of different age groups.

The Swiss VPET system enables young people to enter the labour market and ensures that there are enough qualified workers and managers in the future. The VET and PET sectors are closely correlated with the labour market and are an integral part of the education system.

Most VET programmes are of the dual-track variety (i.e. part-time classroom instruction at a VET school combined with a part-time apprenticeship at a host company). The less common variety is a school-based VET programme (i.e. full-time classroom instruction, no apprenticeship). School-based VET programmes are generally offered by trade schools or commercial schools. Tertiary-level professional education and training (PET) also combines classroom instruction with work-based training, thereby ensuring a smooth transition from dual-track VET programmes.

VET for adults

Adults may take remedial courses to acquire a VET qualification. The Federal Vocational and Professional Education and Training Act (SR 412.10) leaves several avenues open in this regard: these range from regulated, structured procedures for occupational categories to individual recognition procedures. The provision of VET and PET is a mission shouldered by the Confederation, the cantons and Professional organisations. These three partners are jointly committed to the highest possible standard of VPET. They also strive to ensure the availability of an adequate number of apprenticeships and CET courses. The Federal Vocational Baccalaureate (FVB) was introduced in 1994. It has been successfully established among learners with strong academic skills. Issued as a complement to the Federal VET Diploma, the FVB entitles the holder to enrol in a Swiss university of applied sciences (UAS) without having to take an entrance examination. If an FVB holder also takes the University Aptitude Test (UAT), then enrolment in a cantonal university or one of Switzerland's two federal institutes of technology (FIT) is also possible.

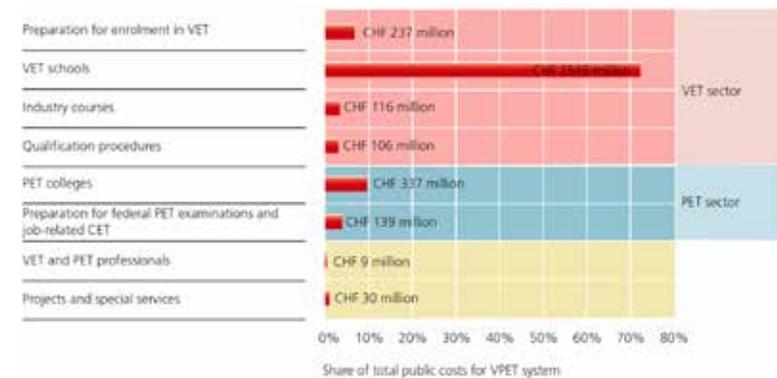
Swiss tertiary-level is comprised of professional education and training (PET), universities of applied sciences (UAS) and cantonal universities/federal institutes of technology (FIT). The PET sector places great emphasis on the actual skills used in a given profession and hence PET is closely correlated with the needs of the labour market. PET imparts the competences required to handle challenging technical or managerial tasks and ensures that employers can find suitably qualified workers.

Some Data – participation companies provided training

According to the Business Census conducted by the Federal Statistical Office (FSO), the participation level of Swiss companies in dual-track VET programmes has gradually increased since 1995. Following an in-depth analysis of available data up to 2008, SFIVET has determined that participation levels have increased mainly in the following branches: education, health and social care as well as hotels, restaurants and catering (HORECA). In contrast, participation levels have decreased in the following branches: banking and insurance as well as corporate services.

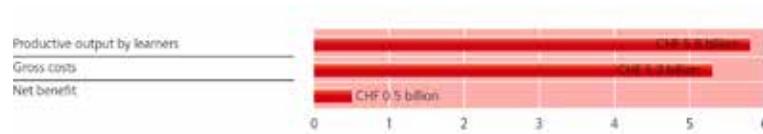
Professional organisations provide both services and funding for the Swiss VPET system: they do the groundwork, run their own training centres and promote specific occupations (VET sector) and professions (PET sector). Generally speaking, host companies stand to benefit from taking part in VET programmes. According to a cost/benefit study conducted in 2009, gross costs of involvement in VET amounted to CHF 5.3 billion. This figure was outweighed by the productive output generated by learners, which amounted to CHF 5.8 billion.

Figure 2.11 - Public expenditure for VPET system in 2012



Source: State Secretariat for Education, Research and Innovation (2013)

Figure 2.12 - Cost/benefit ratio for Swiss companies involved in VET programmes (2009)



Source: Strupler and Wolter (2012)

Innovation

The Swiss Science and Innovation Council SSIC is the advisory body to the Federal Council for issues related to science, higher education, research and innovation policy.

The goal of the SSIC, in conformity with its role as an independent consultative body, is to promote the framework for the successful development of the Swiss higher education, research and innovation system.

As an independent advisory body to the Federal Council, the SSIC pursues the Swiss higher education, research and innovation landscape from a the long perspective. Since 2012 in Switzerland there are a “Federal Act on the Promotion of Research and Innovation (RIPO)”

The SSIC will monitor the phases of implementation of the principles established within the Federal Act on Funding and Coordination of Higher Education, in particular those relating to the composition of committees, quality assurance and funding instruments. Following the consultation of federal offices, the Council has weighed in on the cooperation agreement between the Confederation and the cantons in the Higher Education Sector, proposing some punctual modifications.

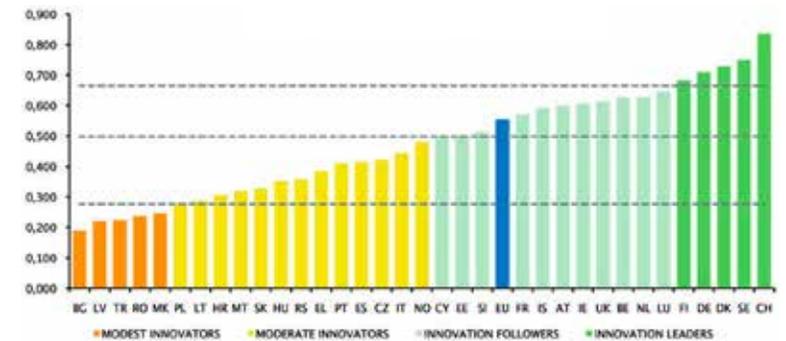
Commission for Technology and Innovation CTI

As the Confederation’s innovation promotion agency, CTI lends support to R&D projects, to entrepreneurship as well as to the development of start-up companies. CTI helps to optimise knowledge and technology transfer through the use of national thematic networks.

Some Data – innovation in companies

When looking at a wider European comparison, Switzerland is the overall innovation leader in Europe, outperforming all EU Member States. Switzerland’s strong performance is linked to being the best performer in 9 indicators, in particular in Open, excellent and attractive research systems where it has the best performance in all three indicators and Economic effects where it has best performance in two indicators (Employment in knowledge-intensive activities and License and patent revenues from abroad). Switzerland’s relative weakness is in having below EU average shares in SMSs collaborating with others (9.4% compared to 11.7% for the EU) and Exports of knowledge-intensive services (25.1% as compared to 45.3% for the EU).

Figure 2.13 - Innovation performance in Europe



Non-EU countries include Switzerland (CH), Iceland (IS), Norway (NO), RS (Serbia), MK (Former Yugoslav Republic of Macedonia) and Turkey (TR)

Source: Innovation Union Scoreboard 2014

Switzerland is an Innovation leader and the most innovative country in Europe. Innovation performance has been increasing until 2012 after which it marginally declined. The performance lead over the EU has been declining.

The Swiss innovation index was 57% higher than that of the EU in 2008, but in 2013 this has reduced to 51%. Switzerland is performing well above the EU average for most indicators, above all for International scientific copublications, Non-R&D innovation expenditures, Community trademarks and New doctorate graduates. Relative weaknesses are in Knowledge-intensive services exports

2.

and Innovative SMEs collaborating with others. Performance in terms of growth has improved particularly for Community trademarks Non-R&D innovation expenditures and Sales share of new innovations. Strong declines in growth are observed in Knowledge-intensive services exports and Innovative SMEs collaborating with others.

3. Continuous vocational training for innovation in SMEs

It must be emphasized that the SME sector plays a key role in EU economy. 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. Continuous training is a crucial element for competitiveness and SMEs face internal and external barriers in current economic and social context.

Lifelong learning and Continuous Vocational Training (CVT) is a key element in a new and global HR approach. High competences in SME's workers staff determinate and support innovation approach. Human capital is related with knowledge and skills, practical experience and motivation of employees. Human capital is one of 3 determinants of innovative ability in companies. Good educational system and training methods are important for well preparation SMEs employees to work.

CVT has increasingly gained attention from both work organisations and governments, as it is one of the means for meeting the strategic goals for the EU to become the most competitive knowledge - based society in the world.

The recent 2012 CEDEFOP research paper "Learning and innovation in enterprises", shows the role that training and learning-conducive work environments can play in making companies more innovative, how workplaces foster skills updating in companies, and how to transform the working culture to stimulate continuous vocational training and develop workplaces open to learning and innovation. Countries where firms invest heavily in CVT also appear to be those which register the most patents. The correlation between the sum variable depicting CVT and innovation is positive, strong, and statistically highly significant. The correlations of individual variables of CVT suggest that every variable tested in this paper has a statistically significant correlation with innovation (i.e. the patent

statistics). (IIT/FiBS 2012, CEDEFOP).

In the Council Resolution as of 27 June 2002, lifelong learning "must cover learning from the pre-school age to that of post-retirement, including the entire spectrum of formal (schools or other facilities of the educational system), non-formal (outside the system of education) and informal (natural) learning. Furthermore, lifelong learning must be understood as all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social and/or employment-related perspective. Finally, the principles in this context should be: the individual as the subject of learning, highlighting the importance of an authentic equality of opportunities, and quality in learning".

CVT may be realized in the following forms: formal, informal and non-formal (incidental, self-education).

The aim of this report is to characterize and assess the system of continuous learning and CVTs SMEs in TRAIN4INNO partners countries: Poland, Germany, Turkey, Hungary, Switzerland.

This report is based on the assumption that the educational policy (also in relation to continuous learning) may play an important role in improving innovativeness of enterprises (including SMEs) in Partners countries.

In this report is presented CVT situation in SMEs in 5 TRAIN4INNO partners countries, especially analyses of every country CVT system and data collected. Partners countries include one of the CVT and innovation leaders, namely Germany and Switzerland, and moderate innovators such as Italy, Hungary and Poland and EU the candidate country Turkey.

3.1 CVT, innovation and SMEs in Turkey

TURKEY The vocational and technical education system in Turkey includes two main dimensions: theoretical (school training) and practical (in-company training). Vocational training policies and activities are mostly carried out by the Ministry of National education (MoNE), which brings about changes to the system, establishing new and strong links of co-operation with industry and commerce.

The vocational education system includes:

- Vocational and technical high schools providing training in more than 130 occupations and giving access or leading to the qualification of specialized worker and technician;
- Apprenticeship training, which is a combination of mainly practical training provided in enterprises and theoretical training provided in vocational education centres;
- Informal education can be provided primarily through vocational education centres.

The responsible body for administering the overall education and training system is MoNE, which has been implementing a comprehensive reform process in all aspects of vocational education and training (VET) since 2004.

The overall objectives of VET in Turkey are:

- Raising the quality of Turkish VET system to the level of EU and other developed countries.
- Improving/updating the provision of VET in line with socio-economic requirements and principles of Lifelong Learning.
- Paving way to 12 year compulsory and uninterrupted basic education.

Key elements being addressed are as follows:

- Linking VET provision with labour market needs
- Developing occupational standards and respective training standards
- Development of competency based and modular VET curricula and learning outcomes
- Strengthening social partner involvement in VET
- Increasing VET teachers' and managers' quality
- Complying with European Qualifications Framework and bringing in lifelong learning concept

- Supporting the establishment of Vocational Qualification Authority
- Raising awareness and ownership on VET and establishing Vocational Information Systems

Labour market analysis, both quantitative and qualitative, is considered to be of utmost importance for the reform of the VET system in Turkey.

Reforming Turkish Vocational Education and Training

The process is based on the priorities of the Copenhagen Process of November 2002 along with national decisions set out in development plans, government programs and declarations of the Education Assembly.

From the above objectives for reforming of VET, The following tasks have been carried out;

Linking VET provision with labour market needs; A Labour Market and Skill Needs Analysis was conducted among employers in 31 pilot provinces, implemented in a joint effort of ISKUR and MoNE. Statistical analysis of developments in the Turkish labour market as well as the educational sector was carried out.

The aim was to provide VET institutions and policy makers with a background document containing well-analysed data on the long term developments in the labour market in relation to developments in educational output.

Development of competency based and modular VET curricula; Ministry of National Education has been developing modular VET curricula, in particular, through EU funded SVET projects, competency based modular VET curricula development studies have been intensified since 2002. From the developments, European Qualification Framework (EQF) which consists of 8 reference levels has been adopted by the Turkish Ministry of National Education and competency based modular VET curricula have been developed in accordance with the 8 reference levels of the EQF.

Strengthening Social Partner Involvement In VET; The Turkish Government attaches great importance to the strengthening of social dialogue. The EU supports these efforts within a number of projects such as 'Strengthening the Vocational Education and Training System in Turkey' which started in September 2002 and completed in September 2007. One of the priorities of this project is

to analyse and specify responsibilities, consultative roles and power of decision making of social partners at different levels of the VET system (national, provincial and local level). The project developed a number of activities and initiatives which led to a new level of involvement of social partners in VET in Turkey.

Increasing VET Teachers' and Managers' Quality; The trainers in VET institutions are a crucial group for the VET reform as they are the interface between the new system, the students and their learning.

Developing occupational standards and training standards; In the sectoral and work analysis conducted and 65 occupational standards have been developed. Deriving from Occupational Standards and Vocational analysis, qualifications for occupations have been identified and training standards for 192 occupations at level 4 have been developed within the curricula. The most important challenge faced by VET systems is to ensure that training standards (curriculum) are in line with occupational standards (competences) required by the labour market. In Turkey, the recent creation of Vocational Qualification Authority (VQA), is a public entity and responsible for establishing a system of vocational qualifications on the basis of occupational standards.

Complying with European Qualifications Framework (EQF) and supporting the establishment of Vocational Qualification Authority (VQA); The law of Vocational Qualifications Agency (VQA / MYK) has been accepted by the Turkish Grand National Assembly. VQA is a system that perform mobility among academic and vocational fields appropriate for assesment at all levels, grading and certification based on the accepted occupational standards. VQA has two major responsibilities that are crucial to the strengthening of the relationships of the VET system to employment. VQA is developing occupational standards (OS) based on actual competencies required by the labour market. So far over 110 OS have been prepared in cooperation with social partners and sector representatives.

European Credit Transfer System in Vocational Education and Training (ECVET); European Credit Transfer System in Vocational Education and Training (ECVET), was designed in order to facilitate transfer, accumulation and recognition of learning outcomes. This system was developed under European Commission in line with Copenhagen Declaration. ECVET is a method enabling qualifications to be defined in terms of learning units that can be transferred and accumu-

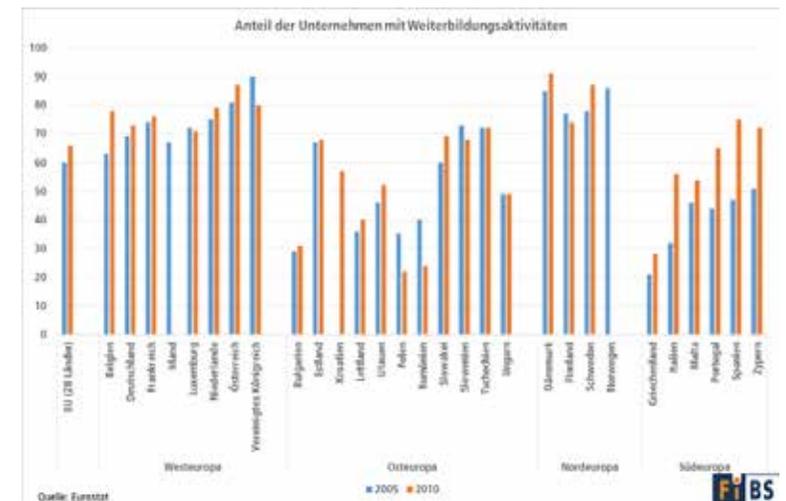
lated (knowledge, skills and competences). It is expected that ECVET facilitates transfer and accumulation of the learning outcomes acquired by persons transferring from one learning environment or qualification system to another.

GERMANY Participation in adult learning in Germany

According to previous results from FIBS studies, several adult learning indicators correlate statistically significant with innovation output indicators (IIT/FIBS 2012, Cedefop 2012, Dohmen 2015). It is therefore of interest to review Germany's participation rates in international comparative studies.

Around 72% of German companies provide training to their employees (see Figure 3.1 on page 44), which is above European average of 66%. The highest rates can be observed in Denmark, Sweden and Austria. Looking at the share of employees, participating in company provided training, Germany's figures are around 10% above the European average (see Figure 3.2 on page 45). In contrast, the Czech figures are 60% above European average, while it is almost 40% in Belgium and Luxembourg.

Figure 3.1 - Share of companies providing training according to CVTS



3.

Concerning the participation of individuals in adult learning according to the adult education survey (AES), Germany's figure is at 50%, which is 10% above the Europe-an average of about 40% (see Figure 3.3 on page 45). As previous research identified that average duration in adult learning changed between 2007 and 2011 substantially, it is also worth looking at such numbers (see Figure 3.4 on page 45). Here again, Germany's figures are at around 120 hours, compared to 110 for the European average.

Figure 3.2 - Participation rates in company-provided training according to CVTS

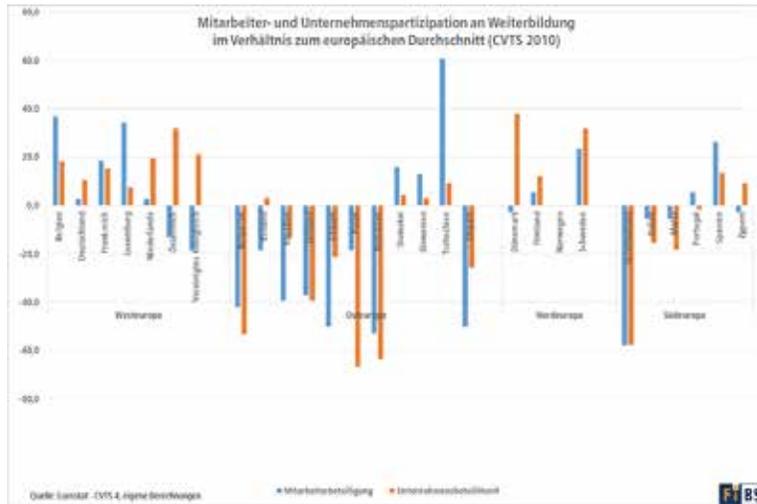


Figure 3.3 - Participation rates in adult learning according to AES 2007 and 2011

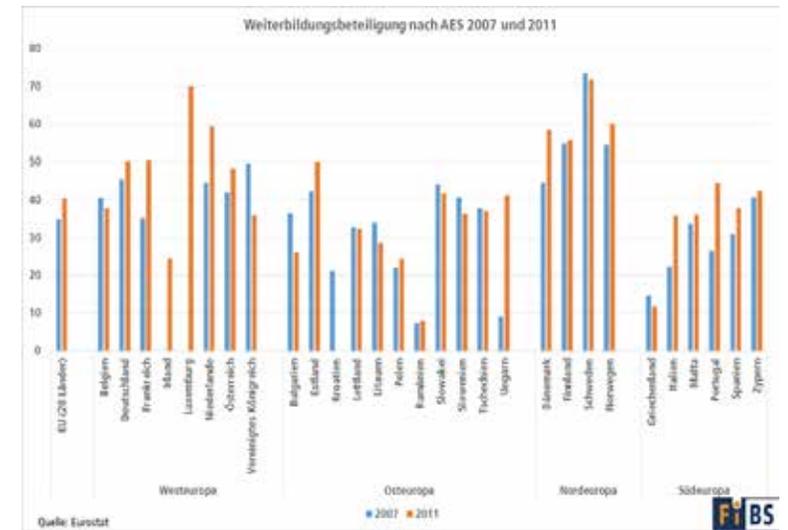
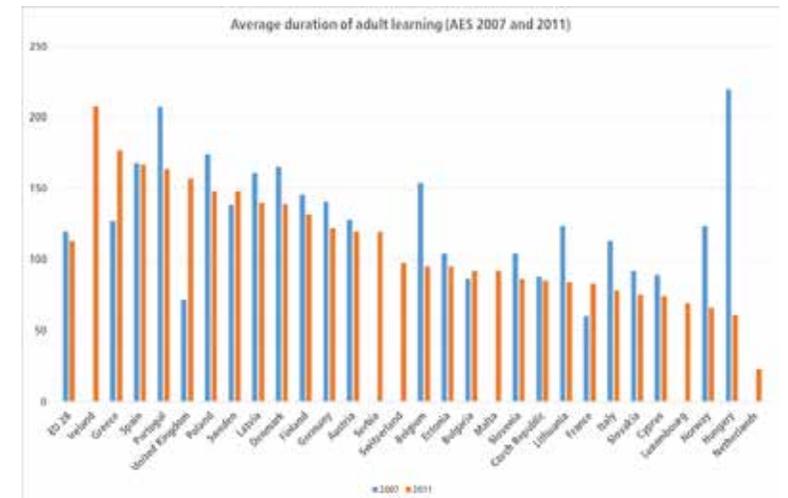
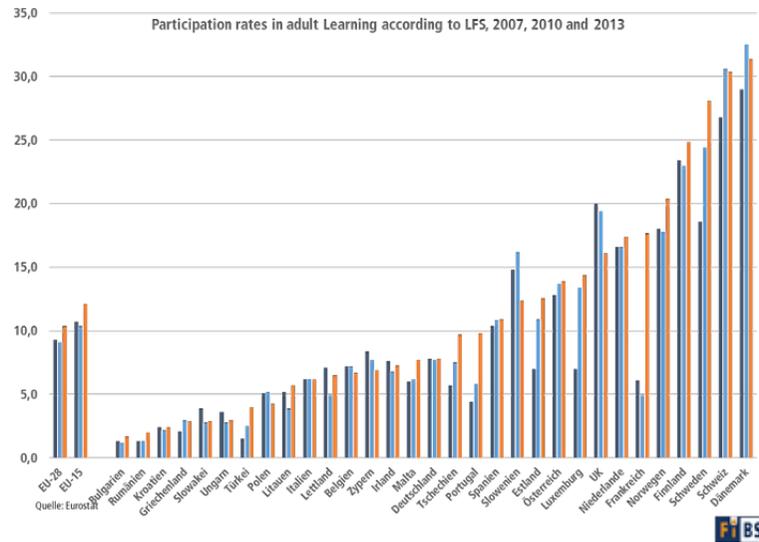


Figure 3.4 - Average duration of adult learning according to AES



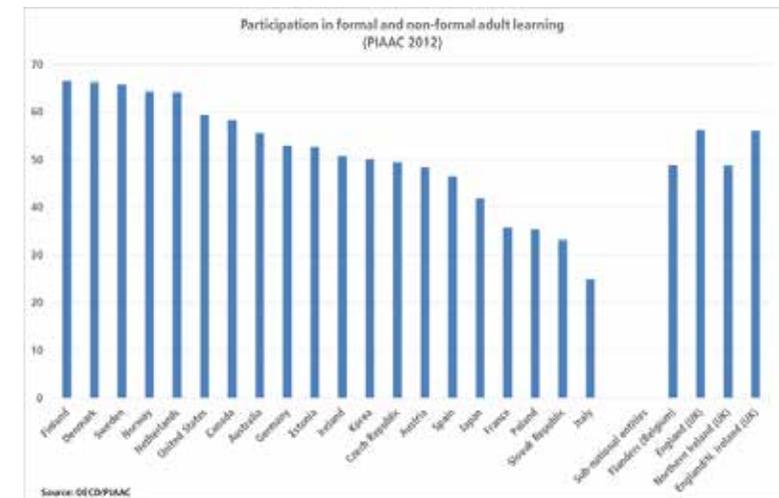
Another survey reviewing the participation rates in adult learning is the Labour Force Survey (LFS, see Figure 3.5 on page 46), which is the basis for measuring the European benchmarks in relation to the Lisbon goals and which is reviewed annually. According to this figures, Germany's rate of 8% is rather stable over the years, while the European average in-cresed from 9 to slightly more than 10%.

Figure 3.5 - Participation rates in adult learning according to LFS (various years)



According to PIAAC 2012, the participation rate in Germany is slightly above 50% (see Figure 3.6 on page 46), and, thus, up to 15 percentage points below the top performers, while almost 30 percentage points above Italy, which has the lowest participation rate.

Figure 3.6 - Participation rates in adult learning according to PIAAC 2012



HUNGARY CVT in the SMEs

Although the right to participate in training is ensured by law for every citizen and employee in Hungary, and quite a wide range of adult training and CVT opportunities are offered by training companies, NGOs and employers, adult training participation rates are considerably lower than the EU average and CVT activities of employers vary greatly according to sector and company size. Social partners are involved in the policy- and decision-making processes of CVT through various tripartite bodies at national as well as regional level. In relation to legislative provisions, the role of social dialogue – advising and reviewing CVT policies - is regulated at national, regional and company level. Although life-long learning as a national level policy objective, as well as various issues concerning vocational training, are widely discussed in the social dialogue forums, CVT as a company policy is practically missing from collective agreements. Employers in SMEs are reluctant to let their employees participate in CVET partly because of the problem of substituting them for the time of the training, given the small number of employees in SMEs. Another problem is, according to

SMEs, is the lack of a wide range of short-term, adequate and efficient training programmes and materials, due to their special training needs which are not adequately met by the traditional training offer of adult training institutions, although this is likely to improve with the introduction of the new OKJ, developed in 2004–2006, awarding partial and ‘built-on’ specialised qualifications and shorter, cost-effective modular training as well. For all these reasons, increasing the flexibility of training, promoting non-formal learning, and the development of training programmes delivered in alternative modes (e.g. e-learning) are of outstanding importance in their case. This is currently supported by various measures of the operational programmes of the National Development Plan as well as through tenders of the National Employment Foundation (Országos Foglalkoztatási közalapítvány, OFA) and the Leonardo National Agency.

Information sources for innovation

The primary resources for competitive companies are human resources and, increasingly, knowledge of individuals and knowledge concerning organizational routines, technology and processes.

It is indispensable for an enterprise to update and maintain its knowledge and integrate new information into company processes efficiently. If a company fails to reform its knowledge base for an extended period, it will sooner or later fall behind its competition. Reform may include the exclusion of outdated technology and knowledge from the company’s operations to make sure the organization only retains knowledge that can be utilized efficiently. From what sources do companies obtain the information and knowledge required for development and how do companies reform or update their knowledge? According to Community Innovation Survey data, elements of information required for technological innovation are primarily created in the typical value chain or industry of the company.

- Approximately 40% of companies obtain the information required for innovation from within the company or the company group, and this figure is only slightly determined by company size (larger enterprises tend to rely slightly more on their existing knowledge during innovation).
- A similar proportion of companies of different sizes (35%) claims that the sec-

ond most important source of information is customers (including customer feedback on products and market research conducted ahead of new development projects).

- Some 15 to 25% of the surveyed enterprises claimed that the roles of suppliers and competitors are also significant.

State and publicly funded R&D institutes play a minor role in the flow of information to enterprises, while the role of higher education institutes is more substantial, and increases strikingly with company size: in the case of large enterprises, the role of colleges and universities is even greater than the role of R&D firms and consultants from the business sector. This is because companies facing stiff competition must rely on external knowledge. As a result, such enterprises depend more on universities, other higher education institutions and various publicly funded R&D institutes to obtain external knowledge and information. Close cooperation with knowledge-intensive organizations is increasingly becoming the key to innovation success in securing and improving competitiveness. The willingness of small and medium-sized enterprises to cooperate in innovation is at a similar level, with around two-thirds of companies running most of their development projects internally.

According to the register of collective agreements maintained by the Ministry of Social Affairs and Labour (Szociális és Munkaügyi Minisztérium, SZMM), 84% of company level agreements deal with continuing training of employees.

POLAND 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 (institu-

tions of self-government administration, companies/private persons), boards of education and regional examination boards¹.

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.

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 Białystok 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.

Best Practices in CVT and innovation in enterprises

Project "PLATFORM B+S – innovative model of cooperation between science and business in Podlaskie voivodeship"²

Project is carried out by Białystok 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 (Białystok University of Technology, University of Białystok) 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

¹ Wilczyńska B., System kształcenia ustawicznego w województwie podlaskim, [in:] Tomanek A. (ed.), Narzędzia polityki flexicurity. Poradnik dobrych praktyk, Izba Rzemieślnicza i Przedsiębiorczości w Białymstoku, Białystok 2010, p. 82 and following.

² "PLATFORM B+S – innovative model of cooperation between science and business in Podlaskie voivodeship", Białystok Foundation of Professional Training [online: 20.02.2015]. Available on World Wide Web: <http://www.bfkk.pl/przedsiębiorczosc/platforma.html>.

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.

Project “We support practitioners – cooperation between science and business”³

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

³ *We support practitioners – cooperation between science and business, Lomza State University of Applied Sciences in Lomza* [online] [online: 18.02.2015]. Available on World Wide Web: <http://www.pwsi.edu.pl/wspieramypraktykow/>.

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.

Project „Knowledge transfer to enterprises”⁴

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.

⁴ *Knowledge transfer to enterprises, Foundation for development of Bialystok University of Technology* [online] [accessed: 24.02.2015]. Available on World Wide Web: <http://www.fundacja.pb.edu.pl/pokl4/>.

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.

SWITZERLAND Institution and services to support CVT development in SMEs

Since the 1998 in Ticino there is a law that promote and support the continuous vocational training and also since 2014 the Switzerland had one. Thanks this regulation almost in every branches in Switzerland you can find some CVT courses.

On the other side, at the national level in the last years politicians are working to create a "National Qualifications Framework" in fact due the particular of the dual school system in Switzerland the qualification are not intelligible for the labour market.

Examples of work-based CVT or learning in the work place

The Swiss vocational training system contains a number of elements of Work Based Learning.

Three-way contract between students, educational institutions and enterprises. This contract is common practice throughout the Swiss vocational training system at the secondary level. The young person undertaking a vocational training programme signs a contract and at the same time benefits from an agreement between his or her employer and the educational institute (in this case a state training institute) which provides formal training. Many other elements of the three-way contract are also incorporated into Swiss vocational training, to varying extents; specifically, the goals and limitations of qualification, the role of the training process in the workplace, the integration of the role of educators in educational institutes and educators in enterprises, the identification of goals, content and timing for study programmes, available educational resources and

students' rights and duties.

At the level of higher education, the same type of contract may be established for instructors in vocational institutes, between the institute coordinating vocational institutions, the instructors who work there and need to specialise as teachers in schools of this kind and the training institution where instruction is provided. Instructors wishing to be authorised as teachers sign an admissibility agreement, which is also signed by their professional supervisor and the person in charge of the training programme required for authorisation, defining the formal features of the educational programme (the amount of time granted for the programme, how it is to be funded), and at the same time sign a training agreement defining the features of the educational programme.

Lastly, on the topic of the conditions for obtaining vocational qualifications, a process of redefinition of all the requirements for various professions is currently underway, aimed at adapting them to the needs of the labour market in terms of skills to be achieved, while at the same time updating the corresponding plans of study. This redefinition process requires specification of methods for gaining access to qualifications through a validation procedure. In this way we are attempting to achieve significant interconnection of the two nationwide projects for "validation of acquired learning" and "new organisation of vocational training".

Best practices in CVT and innovation in enterprises

Inno3

The Inno3 is the Competence Centre for innovation, business and entrepreneurship, University of Applied Sciences and Arts of Southern Switzerland.

The Competence Centre Inno3 Department Business and Social Sciences was founded in 2012 by qualifying in the themes that revolve around the enterprise, innovation and entrepreneurship.

The population explosion and the phenomenon of double aging, climate change and the environment, the energy crisis, the current phase of globalization, the eruption of new technologies and their integration are challenging the social, economic and technological.

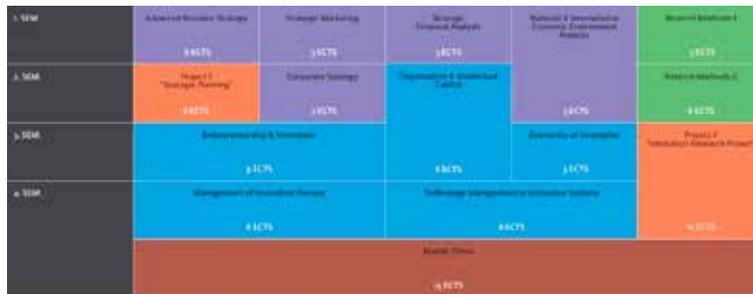
3.

To meet these challenges we need new business models based on innovation processes characterized by multidimensional, interdisciplinary, interdependence, diversity of knowledge and skills, costs and benefits of economic, social, environmental and land.

On these issues, the Center offers Inno3 skills training products, research and services for economic management.

One product of the Inno3 is the Master of Science in Business Administration with a Major in Innovation Management

Figure 3.7 - Structure of the Master of Science in Business Administration



This curriculum is the strategic management of enterprise and places emphasis on the ability of innovation to generate value. The Master ensures the acquisition of integrated skills, theoretical and practical, using diverse and innovative training models.

4. Continuous vocational training methodologies for innovation

Innovation is a key success factor in the face of increasing global competition and fast-changing economic environments. Enterprises that possess innovative capacity can respond quickly to new developments, can drive change themselves and can actively contribute to smart growth. The EU underperforms in this respect compared to other world economies such as Japan and the USA (European Commission, 2013e). Despite growing awareness that innovation and learning benefit each other, the potential of CVET to promote innovation is not being fully exploited in Europe; a stronger focus on CVET as well as better links between innovation and CVET strategies and policies are needed (Cedefop, 2012f; Dehmel, 2014).

What can enterprises and policy-makers do to promote learning – and also innovative capacity – in enterprises? Research shows that two CVET factors have a positive impact on innovation performance, at least at country level:

- (a) learning-conducive work environments (leading to workplace learning);
- (b) more formal and organised modes of CVET (such as CVET courses).

Although research confirms positive relations between learning at the workplace and innovation, analysis of innovation policies and 1030 publicly funded innovation programmes in the EU-27 plus Norway shows few programmes that promote innovative ability by addressing organisational structures and processes at the workplace, aiming at more learning-conducive work environments and thus higher intensities of workplace learning (Cedefop, 2012f).

Effective collaboration, both horizontal and vertical, is crucial for enterprises when it comes to CVET and HRM. Collaboration can range from local partnerships to international networks. Joining forces is important for enterprises of all sizes but particularly for SMEs, which face constraints of size and benefit from economies of scale. The benefits of collaboration can go far beyond simple HR

development issues and can lead to new business contacts and networks, and innovation transfer.

In the past 10 years, there has been an enormous rise in the number of startup incubators, first in the US and then in Europe, with other regions following suit. Today, the per capita number of startup incubators in Europe is the same as in the US, which is partly due to increased European government support. Incubators are perceived to only help companies survive their earliest stages of development, but their role is evolving.

Among the TRAIN4INNO partnership countries of course you can notice the differences, mainly in the level of innovation of the single countries, but we can see that learning in the workplace is more and more important for everybody. During our researches we found that there is always a link between vocational training systems background of an employee and innovation capacity of a company. In Poland, Hungary and Turkey the continuous training for the employees is a big challenge in the SMEs because generally they have less financial possibilities. For this reason in recent years were promoted and implemented innovative forms of education in particular to companies and employees of SMEs and they are also the main beneficiaries of EU funds for training and innovation.

4.1 CVT methodologies for innovation

TURKEY Work Organisation, working environment, learning supporting environment

Vocational training systems build the human capital infrastructure for the SMEs and contributes to the growth of the economy as well as competitiveness of SMEs in global arena. Therefore, there is always a link between vocational training systems background of an employee and knowledge base and innovation capacity of a company. In Turkey, nowadays, SMEs look and search for the most qualified and highly skilled candidates who has capacity to employ. Expectations from the candidates rise as the level of vocational training and innovation capacity gets higher. This is due to the fact that knowledge and experience that a person accumulates increase by the quality of continuous vocational training experience.

One of the case study related with innovation capacity of textile sector have been carried out. The educational infrastructure in textile industry analyzed with regard to both quality and quantity. Currently, there are textile engineering departments in more than 12 universities, departments of textile and clothing teaching in 3 universities, and textile technician departments in more than 100 vocational higher 16 schools.

Vocational Training, Case Study in Textile Industry

This case study was applied the textile industry in Denizli which is the one of the leading cities of textile sector, especially with manufacturing of bathrobes and towels. The reason is Vocational Education Centre is accredited by Ministry of National Education. That is why the data was collected and analyzed and attempt to gather primary data. The other important point is to employment ratio that is very low value compared other cities. The data obtained from the centre aims to analyse the pattern of “apprenticeship training” in the city for the technical textiles. Most of the employees of the textile sector as well as small firms were trained in the apprenticeship training. The obtained data was presented in Table 5.4 on page 63, in which illustrates the number of students in Denizli registered for apprenticeship training in the data of vocational education centre (Denizli Vali Necati Bilican Vocational Education Centre). It is reported by the centre that the demand for “foreman (kalfa) training” is half of “apprentice

training”, due to financial burdens on the firms, and that textile manufacturing industry cannot meet the sufficient number of qualified labour force.

Table 4.1 - Number of students registered for “apprenticeship” certification in textile Technologies

Year	Clothing	Weaving	Industrial Weaving	Cutting	Operator
2008-2009	24	1	-	1	20
2009-2010	13	1	-	-	16
2010-2011	13	-	-	-	23
2011-2012	11	1	1	1	32

It was reported that recruitment strategies of owner managers are concentrated on cost cutting; which is due to increasing production costs in textile manufacturing. Employers preference towards hiring intermediate staff graduated from primary school plays as an indicator of low knowledge base of incoming human resource and this leads to the deficiencies in innovation performance.

Innovation Centers and innovation hubs

Clusters are a geographic concentration of firms, higher education and research institutions, and other public and private entities that facilitates collaboration on complementary economic activities. Clusters are increasingly exposed to global competition and many OECD governments are keen to enhance their competitive advantage and to help firms and entrepreneurs within clusters move up the value chain through innovation and greater specialisation.

In other words, smart specialisation and clustering have recently attracted policy attention. Province-level innovation platforms were set up in 2010 to transform local knowledge into economic and social benefits by stimulating cooperation.

Konya regional Innovation center: in 2011 TUBITAK launched a competitive funding programme to set up regional innovation platforms and co-operation networks at the local level. From these competitive launching programme, Konya Regional Innovation Center were established by coordination of Konya

Chamber of industry together with Mevlana Development Agency by participation of Regional Universities and the regional chambers, i.e., Konya Chamber of Commerce and Konya Commodity Exchange. The main rationale for the Regional Innovation Center is to attempt to enhance the competitiveness of firms in the region and to promote clusters through infrastructure and knowledge-based investments, networking activities and training, an increase in knowledge among regional actors and thus the generation of a collective pool of knowledge that results in higher productivity, more innovation and an increase in the competitiveness of firms.

Knowledge flows and commercialisation: the relative number of patents filed by Turkish universities as well as industry is low. Recently, the government started a programme under TUBITAK that implemented the Technology Transfer Support Programme for SMEs to encourage the commercialisation of public research results in collaboration with SMEs and also in the same time, Technology Transfer Offices belong to Universities to encourage the commercialisation of R&D projects in the academia. The Turkish Patent Institute works to raise awareness of IPRs in the business community and collects data on licensing activities in order to increase revenues from patents. A draft Patent Law is currently under debate to improve the Turkish IP system and better align it with EU and international legislation.

GERMANY Innovation strategy

Germany has announced its so-called high tech strategy in order to strengthen the innovation capacity of the German economy. This strategy covers 17 technical fields, so-called “future areas”:

- Health research and medical technology
- Plants
- Energy technology
- Climate and Environmental technologies
- Information and Communication technologies
- Automotive and transport technologies
- Space technologies

- Maritime technologies
- Services
- Nanotechnology
- Biotechnology
- Micro systems technology
- Optical technologies
- Materials technologies
- Production technologies

A total of € 12 bn were provided by the federal government in order to support technological development in these areas over several years. The high-tech strategy covers areas, which are perceived as so-called very particular national interest areas and having economic and research potential.

The strategy and the decision about the 17 technological fields is based on a sophisticated analysis of Germany's position and its strengths and weaknesses. The major target is to exploit new markets for production and services or to strengthen its position in already existing areas.

In addition to this strategy at federal level the 16 states have their own strategies and policies, in order to respond to the particular needs and strengths of the regional economy.

At federal level innovation is supported by more than 300 universities and universities of applied sciences, of which around 200 are public institutions. In addition, some 510 research centres outside of universities exist, providing high level research in various areas.

HUNGARY Innovation centers and hubs

Hungarian governments have been advocating the primary importance of R&D within the country's economy for several years now. Still, R&D spending, and the pace of developments in the area, undoubtedly has room for further improvement. Most importantly, the government aimed to overtake the EU average in terms of innovation by 2013, but currently ranks 22nd on the latest European Innovation Scoreboard (EIS). There are, however, positive signs, especially when

it comes to newly developed Innovation and R&D centers. “The core function of innovation centers is to create a possibility for SMEs to access innovative technologies, and to increase the added value of their activities,” explains Dr. Sándor Erdei, board member of the Hungarian Innovation Association. In 2011 Hungary spent HUF 336.5 billion (1.2% of GDP) on R&D and innovation, the highest amount in the past two decades. The recently published National R&D and Innovation Strategy, however, aims even higher, and states that this ratio should be increased to 1.8% of GDP by 2020. The strategy notes that while increasing the available resources is crucial, harmonizing government efforts with R&D policies is just as

important. “Hungarian governments deem the area of R&D a long-term investment into the future, and make any specific steps concerning the industry in light of the above,” the analytical section of the strategy reads. While government-level strategy focuses on the future, exactly as it should, there already exist great examples of proinnovation environments within Hungary. Innovation centers, most of all, aim to create small, prosperous islands with an innovation-friendly environment, even if the Hungarian economy as a whole faces major challenges. The National R&D and Innovation Strategy also acknowledges the importance of these innovation centers, and states that a certain critical mass needs to be met in order to use the country’s R&D potential at full efficiency. Thus, the strategy targets a major growth both in the number and the output of these centers. The specific objectives include the opening of 30 more R&D innovation centers by 2020, and ensuring that at least 30 of the existing centers join the world’s innovation elite. Supporting knowledge transfer is another important role of innovation centers, both for SMEs and multinational companies, with a special focus on knowledge transfer between the two. That aside, it is crucial that these hubs cooperate with other knowledge centers and universities in their region, for such cooperation can spawn a real competitive advantage for all parties involved. Another aim of the Hungarian R&D sector is to change the ratio of state subsidized and privately funded projects by increasing the percentage share of the latter. Innovation centers also show a great example in this field: while they are almost always developed using EU funding, currently about 80% of their maintenance costs are covered by multinational companies. Industry experts expect that this ratio will decrease in the coming years as more

SMEs can be channeled into these innovation-friendly environments, providing them with the opportunity to create self-funding cooperation themselves.

Incubator programme

The technology incubators have become an integral part of the economic policy toolkit of the developed countries of the world. Taking into account Hungary’s innovation abilities, opportunities and human potential, supporting the operation of start-up companies built on technological innovation brings along significant socio-economic benefits.

Corporate incubators represent a complex service system or a kind of protected business environment provided to the technology start-ups on a temporary basis. It aims to provide resources, capital, knowledge and relationships to the companies, thereby improving their chances of survival in the initial stage of their careers.

Hungary has started a shared understanding between the government and the business operators on the promotion of the domestic business incubators and the opportunities for the development of the so-called start-up culture. This produced a number of results, including, among other things, an agreement of the government and relevant business stakeholders regarding the scope of the objectives and the agenda.

In the framework of the present pilot, a programme supporting technology incubation will be implemented, which supports the ideas and companies in the initial stage, with the responsible

authorities, key actors and the target audience fully involved in their design. The full operation of the incubator programme is aligned to the business model and operation of start-ups, incubators and accelerators. The aim is that this new support instrument meets the expectations of both the special needs of the specific audiences and the requirements of the state.

The essential points of the construction must be determined as a result of the consultation process already in progress about the topic in Hungary. Based on past experience, the following are the essential points: forms of funding to be provided to the incubators, method of accountability, ensuring the rapid response of the framework to the corporate and market developments, and the

need for a high degree of administrative flexibility.

The incubator programme induces the following positive changes:

- much more ideas and developments reach the end-product stage, Hungary hosts technological innovations, the start-up firms find niche markets and specialize,
- it mobilizes private sector capital for R&D investments,
- a change of approach starts among the young Hungarian people about entrepreneurship,
- opportunities, value is given to creativity, knowledge and risk-taking,
- the domestic business opportunities are given a value, and the country's ability to attract capital increases,
- the migration of skilled workforce decreases,
- the financing problems of the start-ups are solved on a market basis,
- the ratio of business and public R&D spending improves.

POLAND 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 specializations¹. 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;

¹ *Regionalny Program Operacyjny Województwa Podlaskiego 2014-2020*, Urząd Marszałkowski Województwa Podlaskiego, Białystok 2014, p. 5 and following.

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.

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.

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.

Figure 4.2 - Classification of innovation and entrepreneurship centers (mażewska & bąkowski, 2012)

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

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

Bialystok Science & Technology Park

The main Innovation hub in Podlaskie is The Bialystok 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 a wide 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 Technology, established by Bialystok 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.

SWITZERLAND **Work organization, working environment, learning supporting environment**

According to a study (Weil 2007) it's difficult to define only one form of continuous learning in SME's in Switzerland. The first distinction that has to be made is referring on the place of learning: internal or external. The second one regard the kind formal (course, conferences) or in-formal (work based learning). The form of the CVT depends also on the type of SME (mission, vision, dimensions, ...). It's much more easy that a "big" SME has an internal training centre but there are also the "little" one that allow the collaborators to attempts external courses. And there are also the possibilities, due to the Swiss scholar system, to have apprentice that work and goes at school. What seems to be common in every SME is that the collaborators learning by doing on the job. For this reason is also important that the law² and the labour market recognized the competences learning on the job.

Innovation centres and innovation hub

In the Ticino region, and particularly nearby Lugano, there are some interesting innovation centres and some organisations (public and governmental) promoting innovation for the enterprises.

AGIRE Foundation

AGIRE, a public-private partnership established in 2011, fosters the innovation and entrepreneurship in Ticino, leading to the an increase in economic competitiveness and the creation of high-skilled jobs.

It focuses, on one side, on the support of existing companies, by encouraging the transfer of technology and knowledge with academic centers (USI, SUPSI and others) and, on the other side, on the support of new companies (start-ups) that develop innovative products targeting international markets. To achieve these goals, AGIRE manages an investment fund (AGIRE INVEST) that provides risk capital to emerging companies, and operates the Tecnopolo Ticino, a network of technology incubators that host groundbreaking companies and provide the coaching and mentoring necessary for their expansion.

² Ordinance on Vocational and Professional Education and Training (Vocational and Professional Education and Training Ordinance, VPETO) art. 33

To achieve its aims, the Foundation can support the creation or strengthening of Institutions and initiatives in the Cantone Ticino that can be able to:

- Optimise knowledge and technology transfer and the networking of research centers and local industries
- Foster entrepreneurship and innovative projects
- Facilitate the establishment in Cantone Ticino of new innovative businesses and services
- Promote collaborative projects via networking of knowledge and skills that are complementary and synergistic
- Coach start-up companies in the development of their business plan and business strategy
- Finance the innovative companies with the highest potential.

The AGIRE Foundation has a close collaboration with the Swiss Confederation and the Cantone Ticino, and its activities are funded in part by the State and in part, at a Federal level, by the Commission for Technology and Innovation (CTI). The AGIRE Foundation collaborates with Institutes of Research (University of Lugano (USI) and the University of Applied Sciences and Arts of Southern Switzerland (SUPSI) and with other groups already working in the area to promote innovative entrepreneurship, coaching (CTI Start-up), start-up (Promotion Center Start-up) and business accelerator (Tecnopolo Lugano).

AGIRE INVEST SA deals with the financing of innovative deserving projects and it will in future cooperate with financial groups and other external funders to increase the flow of financing to innovative companies located in Ticino.

The purpose of these partnerships is the creation of new companies and the reinforcement of existing companies, helping to develop an industrial network with a high added value in Ticino.

For more information about AGIRE Foundation: www.agire.ch

Tecnopolo

In March 2014, AGIRE Foundation has opened the headquarters (Hub) of Tecnopolo Ticino on the fifth floor of the building Suglio of UBS in Manno. In addition to the new offices of AGIRE, the new space will house innovative companies or companies who work or provide useful services to start-up. The Tecnopolo

Ticino will provide the perfect location to foster dialogue among entrepreneurs, researchers and investors.

The surface of the offices ranges from a minimum of 30 square meters up to a maximum of about 100 square meters. Of the approximately 2,700 square feet available, 150 are occupied by the AGIRE Foundation.

AGIRE offers attractive rental terms (from 200 to 250 CHF/m² + VAT depending on the type of tenant) and include all expenses (except the cleaning of office space). All the common areas have access to the internet via wi-fi; AGIRE suggests to tenants for security reasons to establish its own direct access to the Internet.

The types of companies that can request AGIRE for availability of office space are: Innovative start-ups

- Firms with high innovation
- Consultants that provide technical/scientific high-level know-how to innovative companies
- International companies who intend to settle R&D activities in the canton of Ticino
- Companies, associations or foundations that support entrepreneurship and innovation
- Investors or investment funds specialized in early stage investments in innovation and technology

AGIRE has established a common area (co-working) of about 150 square meters furnished with desks and lockers, available for rent on a monthly basis.

The types of businesses that could be interested in these spaces are:

- Micro-companies in development
- Companies in the process of formation or looking for funding to start their activities
- “Antennas” of innovative companies outside the Ticino, who are considering the establishment in our region
- Highly specialized consultants dedicated to the support of innovative companies, with an occasional presence on the territory

The common area available to the companies includes three conference rooms (two of 30 square meters and one 60 square meters) and two lounges. The con-

4.

ference rooms can be booked online for free for a certain number of hours per week via an online calendar. The lounges are always available for a coffee, a discussion or a game of table soccer.

All requests for space for the Tecnopolo Ticino must be accompanied by a detailed description of the company or project (through business plan or business case) and will be analysed and verified by AGIRE. The companies present at the Tecnopolo Ticino will need to comply to the highest standards of quality both as regards of their projects and products, that with regard to the contractual conditions and wages of employees. If these standards are not met, AGIRE has the option not to renew their rental contract.

5. Stakeholders involvement

Any analysis of stakeholder involvement can be built upon the so-called triple helix model. The triple helix model distinguishes between state/regional organisations, universities and industries. Sometimes this model is augmented to a quadruple helix model, depending on the specific nature of some stakeholders, e.g. chambers of industry or commerce.

Reviewing and summarising the country reports in this regard it turns out that all three groups of stakeholders exist in all countries and regions. Yet, the numbers and roles vary quite substantially, due to the varying regional structures. While Budapest and Berlin are the capital of their respective countries, Konya is a regional hub and larger city, Lugano (Ticino region) and Bialystok (Podlasie region) are regional capitals at the border to other countries (Italy and Belarus, respectively).

Universities are core drivers of innovation development in all places, though number and size vary quite substantially. Berlin, for example, has 4 public universities and 6 public universities of applied sciences as well as another 30 private universities, basically universities of applied sciences. In contrast, the university system in Ticino region is relatively small.

In this regard, the role of university technology-transfer centres is important as their role is to transfer knowledge and innovation from the university to companies, e.g. industry partner which then can build upon and improve or innovate their products and services. However, the role of such university-located transfer centres might be taken over by more independent or regional transfer centres or innovation hubs, as visited during the partnership, in Bialystok and Ticino region.

Another important driver are research centres, which can be either public and/or private. Berlin, for example, counts approx. 70 external (public) research centres, though this is likely not the full picture, as many private research institu-

tions exist also. In Budapest, the situation is similar, though numbers may be smaller. In other, more rural areas, research centres may play a limited role.

Apart from this, basically, public institutions, companies and their representative organisations are key stakeholders. The range of such organisations is very broad, ranging from e.g. the Federal Association of Industries over Chambers of Commerce and/or Industry to sectoral organisations, focussing on micro technologies or machine construction etc. Here again, the profiles of the partner regions vary quite a lot, since such organisations are commonly placed in the capital of the country, state or region, though the size and impact varies accordingly.

5.1 Stakeholders involvement strategies

TURKEY The qualified labor force is one of the critical and indispensable components of the Turkish industrial sector, which has a tendency to expand in recent years with an impetus. In line with the rapid growth of Turkey, human resources are crucially needed for a productive economy. On the other hand, studies indicate the lack of a qualified labor force, which is critically important for the developing economies, in the Turkish private sector. The vocational education and training system in Turkey has to be improved, especially since Turkey is now a candidate to be a full-fledged member of the European Union.

Small and Medium Enterprises (SMEs), contrary to big enterprises, could not solve unqualified labor problems within their organizational system. Therefore, KOSGEB has played a significant role by organizing various training and support programs for SMEs. While delivering training facilities to SMEs, assessing the needs and ensuring the SMEs' participation have been detected as critical issues, both the employer and employees' perceptions on the importance of the

training need to be improved.

Turkey has decided to participate in the Leveraging Training and Skills Development in SMEs Project, which is implemented by the OECD along with another five countries in order to develop new strategies and support mechanisms for public policy makers and to also identify the behaviours of SMEs on vocational and technical training.

Therefore, the project has been implemented by the Local Employment and Economic Development (LEED) Programme at the Organisation for Economic Co-operation and Development (OECD) in collaboration with the Small and Medium Enterprise Development and Support Organisation (KOSGEB) in Turkey. The study in Turkey focused on the OSTIM Organised Industrial Zone in Ankara, which, similar to the other industrial zones, provides necessary infrastructure dedicated to manufacturing companies. The project mainly investigated both the formal/vocational education and training (VET), and informal learning resulting from daily activities of firms related to work that is not organised in terms of objectives, time or learning support (the so-called “Knowledge Intensive Service Activities” or KISA). The survey findings indicated that the majority of SMEs do not attach importance to training and skills development (only 28% of SMEs declared that they received VET and 25% stated that they participated in KISA). The correlation analysis confirmed the benefit of investment in training and skills development on innovation activities of SMEs: the existence of a formal training plan and training budget positively affects the innovation activities of SMEs. Investment in green skills development (particularly through KISA) has a positive impact on green innovations. Furthermore, KISA on entrepreneurship positively affects management innovations and operation innovations (which is not observed in the case of VET).

The project mainly investigated both the formal/vocational education and training, and informal learning resulting from daily activities related to work that are not organised in terms of objectives, time or learning support (Knowledge Intensive Service Activities – KISA).

Vocational education and training (VET) includes education and training programmes designed for, and typically leading to, a particular job or type of job. It normally involves practical training as well as the learning of relevant theory. Initial VET includes programmes mainly designed for and used by young peo-

ple (aged 30 and under) at the beginning of their careers and commonly before entering the labour market. It includes many upper secondary and tertiary programmes. Continuing VET is made up of all the other kinds of VET, including enterprise training of employees and training provided specifically for those who have lost their jobs (OECD 2009).

Similar to other developed and developing economies in the world, SMEs play a predominant role in Turkey. Turkey adopted the EU’s SME definition in 2005. Accordingly, the SME definition in Turkey is as follows.

Figure 5.1 - SME definition in Turkey

Scale	Headcount	Annual Turnover (million TL)	Annual Balance Sheet (million TL)
Micro	1-9	≤ 1 (~ 0.8 USD)	≤ 1
Small	10-49	≤ 5 (~ 4.0 USD)	≤ 5
Medium	50-249	≤ 25 (~ 20 USD)	≤ 25

SMEs form 99.9% of all companies in the country. They account for 81.3% of total employment and but only 57% of value added. The share of micro enterprises in SMEs is remarkably high (98.1%). The share of employment created by SMEs in the industry sector is lower than that of the services sector, and industry sector generate less value added than services (Table 5.2 on page 63).

The first section of this report gives brief information about the region (OSTIM) which is under study. The second section presents an analysis of the findings from the field research; namely, the questionnaire surveys responded to by 108 SMEs in OSTIM, the indepth interviews with five randomly selected firms, and the workshop organised with the stakeholders of training and skills development ecosystem.

Table 5.2 - Turkish firm demographics

	Structural indicators on enterprise population, 2008														
	Number of enterprises					Total employment						Value added (factor costs)			
	Industry		Services			Industry		Services				Industry	Services		Total
	No. firms	%	No. firms	%	%	No. engaged	%	No. engaged	%	%	%	%	%		
Micro	282 577	93.8	1 889 647	99.1	98.1	1 113 081	32.5	3 512 942	75.9	57.4	12.2	44.4	28.2		
Small	18 149	3.9	12 190	0.6	1.2	821 934	15.2	214 797	6.8	10.4	11.1	11.5	11.3		
Medium	7 795	1.9	4 362	0.2	0.5	799 763	23.3	286 269	8.2	13.9	21.7	13.2	17.5		
SMEs	407 521	99.6	1 908 199	100.0	99.9	2 434 778	71.1	4 114 088	88.9	81.3	45.0	69.1	57.0		
Large	1537	0.4	538	0.0	0.1	991 485	28.9	514 680	11.1	18.7	55.0	30.9	43.0		

Source: OECD (2010) SMEs, Entrepreneurship and Innovation (OECD, Structural and Demographic Business Statistics)

Continuous Vocational Training Survey in Turkey and in the UK

It is generally accepted that “Continuous vocational training (CVT) activities” are most appropriate tool for invest in human capital and innovation capacity for SMEs. CVT activities are mainly seen in form of CVT courses such as on-the-job training, self-learning, workshops and attendance to workshops, seminars or conferences. These training activities have been used to realise the lifelong learning of the employees, who are main human resources for SMEs. In Turkey, CVT survey has been applied with EU member states and EUROSTAR for the first time in year 2007. In this survey, the data related with CVT activities were collected from enterprises. The obtained data in this survey were compared with the data of UK. The reason for comparing, the similar survey was also carried out in the enterprises in UK. The key findings from surveys applied in Turkey and the UK are summarized in the Tables. It can be seen that there is an obvious disparity between the participation rates in the two countries, both for internal and external types of CVT activities. Comparing to the UK, rates for manufacturing industry in Turkey are quite low. Moreover, according to the EU Innovation Scoreboard 2011, Turkey’s innovation performance is below the average of European countries, while the UK is among innovation follower. The disparity between the two countries can be attributed to the differences in formal education policies and vocational training patterns. The tables from 5.3 to 5.7 summarize the fact that, the UK has invested in development of human resources more and has been more oriented to lifelong learning, which in turn reflected on the innovation rankings of the country.

Table 5.3 - Participation in Training, overall and by company size (number of employees)

	Turkey			UK		
	10-49	50-249	Total	10-49	50-249	Total
CVT Courses	14,7%	23,7%	17,1%	65%	76%	69%
Other form of CVT	21,7%	30,0%	23,7%	86%	89%	87%
Neither	70,6%	59,7%	68,0%	10%	7%	9%

Source: TUIK, 2009, DIUS, 2008

Table 5.4 - Whether organisations have provided internal or external CVT courses

	Turkey	UK
Internal	7.0%	47%
External	14.1%	56%
Total	17.1%	69%

Source: TUIK, 2009, DIUS, 2008

Table 5.5 - Participation in CVT activities in Turkey: NACE Rev 1.1. classification 17-19 (Manufacture of textiles and clothing)

Types of CVT	% of firms within the same activity class
CVT Courses	7.6
Internal CVT courses	2.8
External CVT courses	6.5
Other forms of CVT	16.1
Neither	80.8

Table 5.6 - Participation in training in Manufacturing Industry in UK

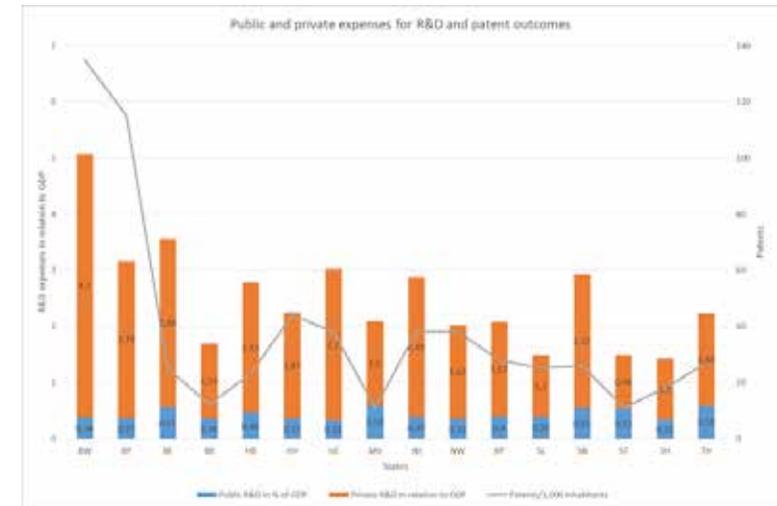
Types of CVT	% of firms in the industry
Any form of CVT	88
CVT courses	59
Other forms of CVT	84
Both	54
Neither	12

GERMANY State level initiatives

As mentioned, the states have their own strategies and policies in order to support their own economy. The following figure (see Figure 5.7 on page 64) provides a brief overview on core indicators of all 16 states, the expenses for R&D in relation to GDP and its patent output. It shows that Baden-Wuerttemberg invests by far the highest amount for R&D as share of GDP (5.1%), of which around 4.7% is coming from the private sector, while the public share is only at 0.4%, around average. This remarkable figure is due to the special and very strong economy, with many well-known companies, investing a lot in R&D. In contrast, some other states, such as, for example, Berlin, show some higher figures with almost 0.6%.

Yet, reviewing the figures on patent output per 1,000 inhabitants, it turns out that again Baden-Wuerttemberg has the highest total number with 135. Bavaria ranks second with 115 patents per 1,000 inhabitants. Comparatively limited is the patent out-put in Berlin, despite a rather large higher education sector, consisting of around 40 universities and universities of applied sciences and 70 non-university research centres, which is the highest number across all 16 states.

Figure 5.7 - Public and private expenses for R&D and patent outcomes



HUNGARY Triple (quadruple) helix model

The full spectrum of interested stakeholders has been involved in the design of the National Smart Specialisation Strategy. During the mapping of possible participant organisations, the designers set out from the so-called classical triple-helix grouping and its improved version, the quadruple-helix grouping. The four types of organizations below have been involved in the national RDI management, and the proposal for the new management system also calculates with the participation of these types of organizations:

Quadruple helix elements	Groups	Organisation
Science	Higher education institutions	Universities Colleges
	Research institutes	Academic and sectoral (public or private) research institutes
	Knowledge centres	
Government	Government and local government organisations	Ministries
		National government offices
		County governments
		County governments offices
		Local governments of cities of county rank
Economy	Innovative enterprises	Large enterprises
		SMEs
		Non-profit
	Technology transfer organizations and accredited clusters	Innovation and technology transfer offices Clusters
Civil organisations		Trade associations
		Interest representation bodies
		Other non.profit organisations

National and regional innovation authorities***The National Research, Development and Innovation Office***

<http://nkfih.gov.hu/>

The National Research, Development and Innovation Office (NRDI Office) founded by the Act “about scientific research, development and innovation” (Act2014/XLLVI) accepted by the Hungarian Parliament (RDI law) with the aim to “create stable institutional framework for the governmental coordination of the national research, development and innovation ecosystem, provide predictable funding and implements an efficient and transparent use of available resources.”

Regional offices

- Regional offices: Pannon Novum West Pannon Regional Development Agency
<http://www.pannonnovum.hu/en>
- DDRIŰ South Transdanubian Regional Innovation Agency
<http://www.ddriu.hu/>
- KDRIŰ Central Transdanubian Regional Innovation Agency
<http://www.kdriu.hu/index.php/en/>
- INNOREG Central Hungary Regional Innovation Agency
<http://innoreg.hu/>
- NORRIA North Hungarian Regional Innovation Agency
<http://www.norria.hu/EN>
- INNOVA North-Great Plain Regional Innovation Agency
<http://innova.eszakalfold.hu/en/about-us.html>
- DARINNO South-Great Plain Regional Innovation Agency
<http://www.darinno.hu/en/>

POLAND 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 inter-

vention in the following spheres¹:

- 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

¹ *Program rozwoju inteligentnych specjalizacji i przedsiębiorczości w województwie podlaskim na lata 2015–2020+*, Geoprofit, Białystok 2015, p. 27-28.

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.

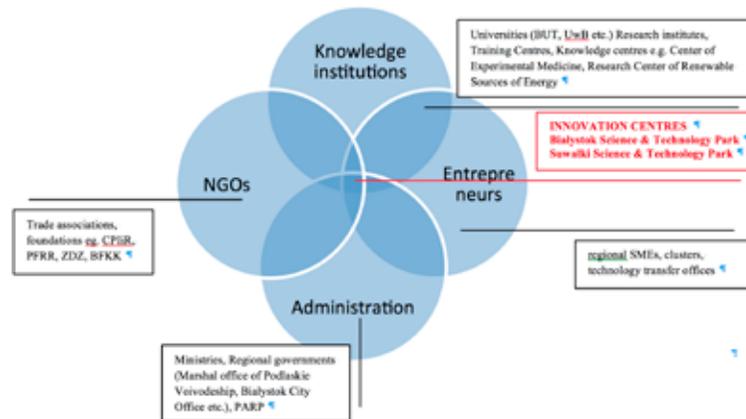
Figure 5.8 - Types of intervention in the context of activities of quadruple helix (policy mix)

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"> • Adaptation of types of educational activity to innovation and entrepreneurship • Cooperation with entrepreneurs and administration in order to activate systems of education in scope of innovative entrepreneurship
	Entrepreneurs	<ul style="list-style-type: none"> • Reporting needs and joint investment in development of an educational offer
	Administration	<ul style="list-style-type: none"> • Financial and information support for the benefit of creating an educational offer in scope of entrepreneurship and innovative entrepreneurship by regional authorities • 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; • Promoting of teaching entrepreneurship
	NGOs	<ul style="list-style-type: none"> • Promoting innovative and adaptive attitudes • Cooperation with entrepreneurs, self-governments and education for the benefit of entrepreneurship and innovation
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"> • Adapting kinds of undertaken educational activities to the needs of smart specializations
	Entrepreneurs	<ul style="list-style-type: none"> • Creating and supporting types of education to the needs of smart specializations with educational units
	Administration	<ul style="list-style-type: none"> • Promotion and financial support of developing types of education adapted to the needs of smart specializations
	NGOs	<ul style="list-style-type: none"> • Supporting the dialogue business-science in scope of types of education; • Creating a supplementary offer

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"> Adjusting the offer of courses, training and practical training to the needs of entrepreneurs
	Entrepreneurs	<ul style="list-style-type: none"> Creating permanent bonds of cooperation with educational units; Overcoming the costs barrier of R&D by joint ordering of courses, training and practical training
	Administration	<ul style="list-style-type: none"> Financial and information support for adjusting the offer of courses, training and practical training to the needs of entrepreneurs Financial and information support for purchase of courses, training and practical training by enterprises
	NGOs	<ul style="list-style-type: none"> Being an intermediary and supporting enterprises in joint orders of courses, training and practical training Creating a supplementary offer

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

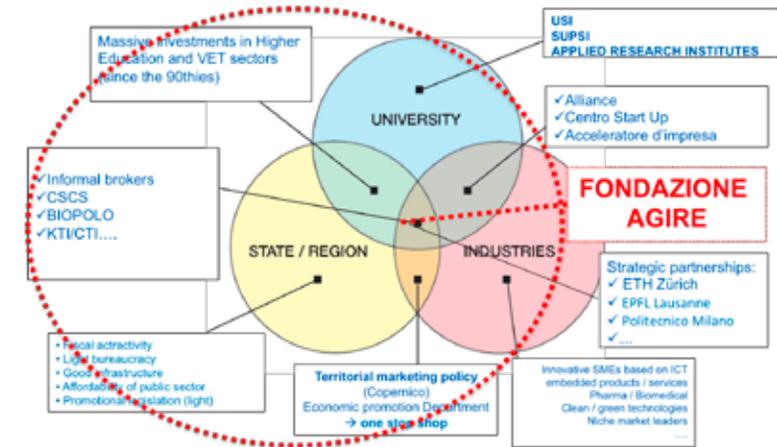
Triple (quadruple) helix model



SWITZERLAND Triple helix model

In the centre of the diagram is the AGIRE Foundation, the cantonal platform for the transfer of knowledge and technologies and for the promotion of entrepreneurship, which supports both cantonal and regional socioeconomic development as well as projects implemented following regional policy. The AGIRE foundation works with companies in order to support the acquisition and the transfer of knowledge and technologies and to assist them during the starting phases of innovation processes. For the consulting services, AGIRE can rely on internal resources and on external business and technology advisors, who aid companies to evaluate projects and guide them to create new collaborations with research and technology partners already present in the territory.

Figure 5.9 - Triple helix model applied to the situation in Ticino region



There are many private and public initiatives promoting entrepreneurship, such as the Start-up Promotion Centre and the venturerep program, this one offers to students and academic researchers various training and coaching possibilities to develop interesting ideas into entrepreneurial projects.

Within the cantonal education and science systems, the University of Lugano (USI) and the University of Applied Sciences and Arts of Southern Switzerland (SUPSI) play a key role, both in research (basic and applied) and in the

educational field. Within the different training opportunities offered, the most significant programs include the Master of Science in Business Administration with a major in Innovation Management (SUPSI), which provides students with in-depth knowledge and expertise in the fields of strategic enterprise management, innovation, and entrepreneurship (also understood in the sense of intrapreneurship).

During the last few years, the cantonal economic system underwent a series of changes. Along the traditional sectors of specialization of the cantonal economy (clothing, metallurgy, trade, construction, financial, and tourism-related business), significant developments have occurred in other sectors, which are more innovative, offer greater added value, and are more export-oriented. Examples include the machinery industry, electronics, ICT, optical and measurement instruments and devices, and the pharmaceutical industry, as well as scientific and technical firms and the healthcare sector. More and more, in Ticino and elsewhere, there are tangible signs of development of meta sectors, where different areas intersect; this is the case for the life sciences, the clean tech sector, computational science, ICT, and audiovisual business, as well as sustainable mobility, an unequivocal indication of a particular entrepreneurial vitality in those businesses and sectors that manage to best meet the challenges posed by the major trends currently recorded at the demographic, technological, social, and environmental levels.

In the development of these meta sectors, professional figures such as the Broker of competences, could play an important role, particularly regarding the involvement of small and medium enterprises, their interconnections inside specific clusters and the relationships between the educational, the political, the territorial and the institutional system.

The political system needs also to update tools and measures to better understand and react to today's changes. An example is the recent assessment of the Cantonal Law on economic innovation, which led to the proposal of a framework law designed to support and promote economic development (Alberton et al., 2011).

In conclusion, it is important to remember the territorial and institutional system itself, which also serves as a physical, organizational, and institutional support for educational, scientific, economic, and political systems.

With the advent of the new generation of regional policy and municipal aggregation policy (within which the transfer of knowledge and technologies is very important), territorial planning is making positive changes to the framework, within which the efforts toward entrepreneurship and innovation are organized and implemented.

In this field as well, the Broker training course could be surely relevant to consistently complete the above mentioned already existing vocational profiles.

6. Conclusion

TURKEY It is suitable to think of government as a fixed variable since the government has always been a conceptual factor for operations of enterprises. Besides internal and external resources of the firm, governments are also responsible for capacity building in SMEs. Bascavusoglu (2011) has studied the impact of SME policy tools in Turkey and found that policies developed in recent years have not yet met the expectations of better innovation capabilities in SMEs; long-term oriented strategies are needed. Within the scope of this research, amendments in the direction of government policies to promote innovation capabilities of SMEs are considered as an indirect effect of EU integration process.

Turkey's relationships with the EU date back to 1960s. The fact that Customs Union agreement came into effect in 1996 and that EU accession negotiations with Turkey have commenced in 2005 proves a pushing effect of the EU on Turkey, which cannot be disregarded. In this vein, it is reasonable to mention the EU factor as an intervening variable into the process of innovation capability development, with a reference to the EU requirements for labour market and innovation policies. Since the start of the accession negotiations with the EU in 2005, European Commission has demanded changes in the regulations of various markets in Turkey. These requirements have been structured under EU Acquis. Therefore, it is possible to mention the implications of prospective EU membership for labour market policies and human resource strategies in Turkey.

European Commission's progress report on Turkey explicitly indicates that lack of a highly skilled labour force in Turkey is the result of permanent problems in educational and vocational training systems (European Commission, 2011: 50). Chapter 26 of the EU acquis is "Education and Culture", which stresses the importance of "cooperation on education and training policies". Statement of the need for promotion of "skilled, trained and adaptable workforce" indicates that

Turkey needs further investment in education and training (La Van and Oppenheimer, 2011: 3). Additionally, Chapter 20 of the acquis, Enterprise and Industrial Policy, requires candidate states to align their industrial and innovation policies with the EU. Turkey has progressed in this area through "wider availability of enterprise and industrial policy instruments" (European Commission, 2011: 82). As previously mentioned, the EU acts as an intervening factor on the development of innovation capabilities in Turkey. Moreover, candidacy provides Turkey opportunities to benefit from funding mechanism of the EU. For instance; an EU funded project, called "Strengthening the Vocational Qualifications Authority and the National Qualifications System in Turkey" has benefited textile industry. The objective of the project is to set occupational standards in the industry within the European Qualifications Framework. By doing this, the project aims to support lifelong learning and strengthen the link between education and employment. With this project, Vocational Knowledge and Skills Testing and Certification Centres (VOC-TEST) have been established. With regard to textile industry, development of standards for qualifications of employees indicates the significant position of human resource for development of the industry. In short, EU integration process has been an important contributor to the development of knowledge-based resources in the industry

HUNGARY Between 2000 and 2010, significant structural changes occurred in the field of enterprise R&D and innovation (RTDI) in Hungary, but the international gap only narrowed to a small extent and in certain sectors the divide in terms of enterprise RTDI performance even increased. A favourable trend in the period between 2001–2010 is that the number of small

and medium-sized enterprises with an R&D profile also increased. The increase in the number of research and development businesses clearly occurred in two waves (from 2005 to 2006 and from 2008 to 2009).

International comparison shows that the innovation performance of Hungarian companies is low, and it is particularly low among medium-sized companies and even lower among small enterprises. Figures in Central Hungary are the highest for both innovation categories and this region has both the highest number and proportion of innovative companies, while even the companies of Central Transdanubia are slightly more innovative than the businesses in the remaining regions. The two regions with the lowest innovation intensity among SMEs are Southern Transdanubia and Northern Hungary (10% each) and although the share of product and/or process innovator companies is the worst in Northern Hungary, the region occupies second place behind Central Hungary in the proportion of companies implementing marketing and/or organizational innovation.

Innovativeness grows exponentially with company size: there are twice as many innovative medium-sized enterprises as innovative small enterprises, and the number of innovative large enterprises is double of the number of innovative medium-sized companies.

In enterprise innovation, knowledge elements required for technological innovation are primarily created in the typical value chain or industry of the company. In general the number of companies deciding to cooperate with other organizations is small, but the willingness to do so increases with company size. The role of publicly funded R&D institutes is minor in the flow of information and new knowledge to enterprises whereas the role of higher education institutes is more substantial, and grows dramatically with the company size: in the case of large enterprises, the role of colleges and universities is even larger than the role of business sector R&D firms and consultants.

According to innovation surveys, innovation is primarily hindered by the lack of funds. However, when adopting innovation policy, it should be taken into account that hindering factors are interrelated and therefore factors other than the lack of resources have an impact, primarily those related to innovation management capacity. Factors hindering innovation are related to the markets and human resources of the companies, which companies typically experience

as financial obstacles. Smaller companies are generally less prepared to take this risk: the ratio of enterprises giving up innovation projects is higher in the case of larger companies. The main reasons for giving up innovation projects are of a financial nature. However, market circumstances (for instance, the extent to which the market structure is well-established), human resources problems and the lack of ability to cooperate all have a significant impact on the level of innovation.

POLAND

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 develop-

ment 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).

equately prepared, lacking competences and internal resources and not able to efficiently interact with the academic and research world.

Concerning continuous training in domain innovation and promoting innovation in Ticino (except the major presented before) there are not specific courses. In the professional vocational training are the teacher that should introduce and foster the innovation thinking in the scholar.

SWITZERLAND Despite the fact that Ticino's Regional System of Innovation still finds itself in a development phase, the first acquired results are positive. At all levels – government authorities, academic world and entrepreneurial contexts – the support and development of entrepreneurial initiatives promoting innovation, competences' transfer and the application of new technologies, have been detected. It becomes then essential to have professional profiles able to make the actors of Ticino's Regional System of Innovation come closer and interact on the basis of the Triple Helix (Etzkowitz & Leydesdorff, 2000). It is generally known that the interaction between companies, especially of small or medium size, and research institutions represents a crucial aspect of the competitiveness and development of a region. A study conducted on the collaborations existing on Canton Ticino's territory (Angotti et al., 2011), shows that local enterprises have a certain amount of difficulty in relation to collaboration dynamics.

This is mainly due to factors such as diffidence, the tendency of overprotecting their own company's culture or the lack of openness. Furthermore, collaborations with the academic and research world are discontinuous and sporadic. In this kind of context, the Broker of competences in this sector can become a significant professional figure, especially for small and medium size companies, which seem to suffer from a sort of inferiority issue in comparison to academic and research institutions. They seem to think themselves not ad-

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