

## **COUNTRY REPORT: POLAND**

### **INNOVATION AND NEW TECHNOLOGIES IN SMES / HHRR**

#### **INTRODUCTION**

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This report on Innovation and New Technologies in SMES/HHRR has been prepared under the EU funded project Innovation and Knowledge Management's Agent using official, national facts and statistics.

WPBS is one of the five partners of the consortium: CEEI (France), Revalento (Netherlands), Dimitra (Greece) and Documenta (Spain) as the coordinating Institution.

The main objective of this research is to illustrate the current state of the innovation aspect in the Country's SME and HR sector.

#### **GENERAL CONTEXT:**

The area of Poland, officially the Republic of Poland is 312, 679 km<sup>2</sup> making it the 69th largest country in the World and 9th in Europe. It's population is over 38 milion inhabitants, which makes it 34th most populous country in the World and the 6th most populous member of the European Union.

In the respect of GPD Poland is the sixth economy in EU and 21st in the World (2009)

GPD per capita is 61% of the Eu avarage.

The pace of economic growth places Poland among the fastest growing countries in Europe. In 2009 GPD grew by 1.7% which was the only positive result in the EU.

The service sector generates 67,3% of total GPD, industry 28,1% and agriculture 4,6%.

The structure of unemployment in the Polish economy differs from European standards. Nearly 14,8% of the population works in agriculture (EU average 4,5%). In the service sector works 57% of the population (EU average is 68%), and in the industry 30% (EU average 26%), 59% of the population of working age is employed, while EU average is 64%. The unemployment fluctuates, and is presently around 10% (Eurostat, end of 2010)

In Poland, below the poverty line lives 17% of the population and 22% of children. These ratios are close to EU level, which is respectively 17% for the population in general, and 20% for children.

In recent research UN have considered Poland as a very highly developed country. It has been expressed in Human Developed Index (HDI, 2010). This aforementioned research, takes into account such factor as: life expectancy, the average length of education held by th 25- year- olds and the expected time for education of children of school age, as well as GDP, when measured per capita in PPP (Purchasing Power Parities).

The HDI value in 2010 was 0.795, giving Poland the 41st place in the World, among 169 countries included. Polish dept is 50% of GDP. It is a lower level than EU average, which is about 73%.

Please see the HDI chart below for more detailed information.

<b>Health</b>	<i>Life expectancy At birth (years )</i>	<b>76.0</b>
<b>Education</b>	<i>Mean years of schooling (of adults) (years)</i>	<b>10.0</b>
<b>Income</b>	<i>GNI per capita (2008 PPP US \$)</i>	<b>LN 9.8</b>
<b>Inequality</b>	<i>Inequality- adjusted HD value</i>	<b>0.709</b>
<b>Powerty</b>	<i>Multidimensional poverty index (k great than Or equal to 3)</i>	<b>n.a.</b>
<b>Gender</b>	<i>Gender Inequality Index, value</i>	<b>0.325</b>
<b>Sustainability</b>	<i>Adjusted net savings (% of GNI)</i>	<b>9.2</b>
<b>Human Security</b>	<i>Refugees by country of origin (thousands)</i>	<b>2.4</b>
<b>Composite indices</b>	<i>HDI value</i>	<b>0.795</b>
<b>Human Development Index</b>	<i>Rank</i>	<b>41</b>

Source: HDI, 2010

The West Pomeranian Region is situated in North- West of Poland and occupies 7,3 % of the national territory. The population is 1693 thus. (06.2009), whereas 25% of the Region's population lives in Szczecin.

The current unemployment has risen in the recent years and is now around 17- 18%.

In 2007 the Gross Domestic Product comprised 4 % of Polish GPD. GPD per capita amounted to 89,8% national average, what placed the Region at 6<sup>th</sup> place in comparison to other Regions, voivodeships in Poland.

**Brief description of main characteristics of SMEs and their investment in innovation and new technologies in the country and region (number of SMEs, number of micro enterprises, evolution of those numbers in the last years –creation or not of enterprises-, investment on innovation by sector, new technologies more commonly used in SMEs and rate of use if possible, etc...)**

Many of the policy issues and challenges faced by entrepreneurship policy makers in Poland reflect the Country's recent history in emerging in central planning. It affects the strengths as part of the reform process.

In comparison with more established EU members states, private enterprises in Poland are significantly smaller in size, with a vast majority of microenterprises and very few firms that are technology- based and/or engaged in high value added activity.

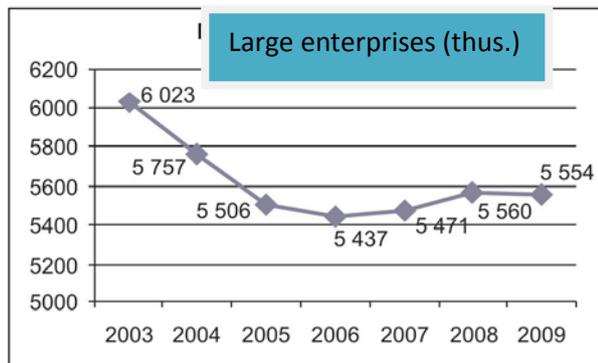
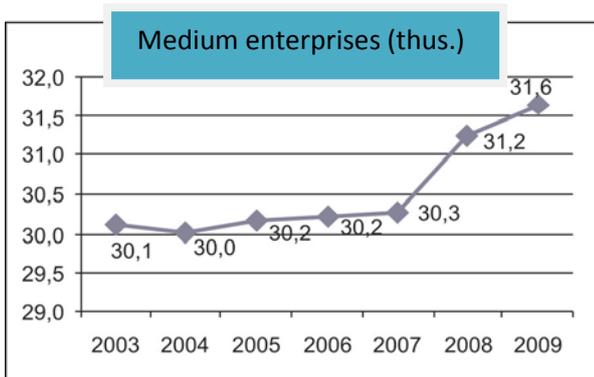
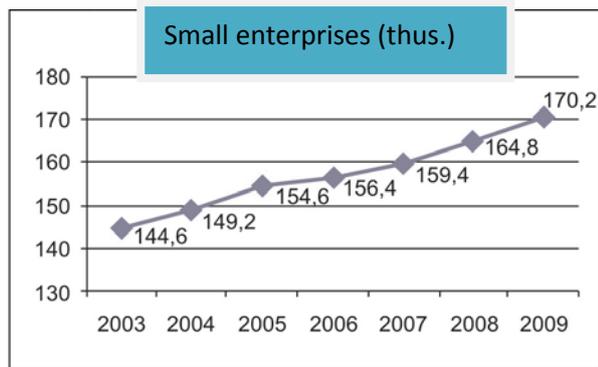
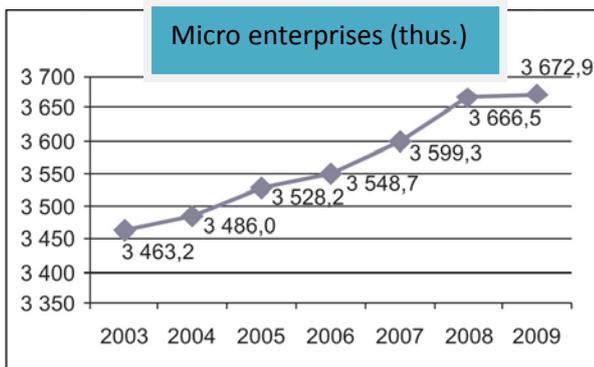
The small share of technology oriented and high value added SME is in the economic structure, combined with the low level of expenditure on R&D and other innovation- related activities emphasizes the importance of prioritizing the development and implementation of effective innovation policies. Polish SME's perform poorly on most innovation indicators, due to still underdeveloped market- oriented innovation systems, lack of recognition of the importance of innovation as well as little awareness of innovation importance to competitiveness of the enterprises.

As various studies also confirm, polish companies are filling strong existing barriers to economic activities. In particular, the poor quality of institutional, legal environment, generating excessive cost and risk of business activity. Among the specific weaknesses indicated by the entrepreneur we can include:

- Low quality of legislation and frequent changes in regulations
- The complexity of tax laws, particularly in terms of VAT
- Excessive amount of taxes
- Relatively frequent and burdensome controls
- Excessive length of proceedings in the field of commercial jurisdiction

Despite the above difficulties, we can observe graduate increase in the level of investments in SME in all regions.

### Dynamics of enterprises development in Poland 2003-2009



Source:

GUS (2010), Warszawa

The other equally important aspect of SME development is the concept of innovation.

Innovation through higher productivity of production factors and knowledge diffusion affects the competitiveness of enterprises, ipso facto determining the position of the region, within the area it operates.

Innovation activities of enterprises depend on the level of knowledge held by resources of the companies, used technology, management style, human and financial resources.

Entrepreneurs deciding to undertake innovative activities aim at achieving purposes, which, may involve different areas of the company such as: products, processes, markets, quality.

Successful introduction of innovation depends on quality of the innovation, state of the sector, situation of the region as well as the system of knowledge and innovation management in the enterprise.

The research shows, that the public sector entities are far more innovative than the private sector.

In recent years Poland has improved its position according to European Innovation Scoreboard (EIS) classification, and is now located among "moderate innovator" group.

According to the above report, strengths of Poland are associated with HR, business investment and economic performance. However, the following areas require special attention: cooperation between public and private sectors, intellectual property protection and the need to increase the number of innovative enterprises. The innovation level in Poland is lower than average level of EU countries. Rather low level of innovation derives from relatively small expenditure on R+D activity (in relation to GDP, over three times less than the EU level. Nevertheless, as the below table shows, the improvement, year by year is becoming more prominent.

Polish innovation and position of Polish enterprises in the light of statistical data.

Specification	Selected years					
	2000	2002	2004	2006	2007	2008
Country expenditures on R+D	4796,1	4582,7	5155,4	5892,8	6673,0	7706,2
-financed from the State budget	63,4%	61,1%	61,7%	57,5%	58,5%	56,1%
- financed by the enterprise	24,5%	22,7%	22,6%	25,1%	24,5%	26,6%
Country expenditures on R+D as GDP % (R+D intensity)	0,64%	0,57%	0,56%	0,56%	0,57%	0,61%

Source: Own study based on GUS statistical yearbooks

## PART 1: INNOVATION AND HUMAN RESOURCES (MAX. 15 PAGES)

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### INTRODUCTION: THE CONCEPT OF INNOVATION AND ITS FUNCTION IN BUSINESS DEVELOPMENT.

#### 1. National reports related to innovation in SME's in a broad sense

- European Union background

- General background for innovative thinking and acting at the national and regional level in Poland became an EU “Strategy for smart, sustainable and inclusive growth” strategic document with acronym “EUROPE 2020”

**Accepted strategy presents three mutually reinforcing priorities:**

- Smart growth: developing an economy based on knowledge and innovation;
- Sustainable growth: promoting more affluent, efficient, greener and more competitive economy;
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

From our “Country Reports” point of view, the most important priority is a smart growth based on knowledge and innovation.

The second issue presented by the Commission the seven flagship initiatives to catalyse progress under each priority theme and among them:

- “Innovation Union” to improve framework conditions and access to finances for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and job.
- “An industrial policy for the globalisation era” to improve the business environment, notably for SME’s, and to support the development of a strong and sustainable industrial base that would be able to compete globally.

Above mentioned two flagship initiatives are directly related to the problem of SME sector development with an innovative approach.

The EU and Member States are obliged to implement into life these initiatives by using different instruments, policy tools, reforms and methods which are submitted in Agenda 2020. Each member State tailors the Europe 2020 Strategy to its particular situation, the Commission proposes that these EU targets are translated into national targets and trajectories to reflect the current situation of each Member State and the level of ambition it is able to reach as a part of a wider EU effort to meet these targets.

In addition to the efforts of Member States the Commission will propose an ambitious range of actions at EU level designated to lift the EU onto a new, more sustainable growth path. This mix of EU and national effort should be mutually reinforcing

- National background

Poland is the largest country in the Central Europe with area of 312, 680 km<sup>2</sup> and 38,7 million inhabitants. Forests cover 28,1% of the whole territory, from 11% to 48% depending on regions

(voivodship). Rural areas are a vital element in the Polish economy. Agricultural lands occupy around 60% of the Polish territory. About 38% of the population live in the rural areas. Agriculture and forestry sectors give only 4,8% of GDP, but around 15% of the employed people in Poland work in agriculture sector (0,4% in forestry sector).

Rural areas have a very high unemployment rate reaching even 50% in some regions. Industrial and service sectors are main domains in Polish economy and give around 95% of GDP. Among them the service sector has a slightly higher advantage than the industrial one.

In the period 2007-2013 Polish government and other actors were obliged to prepare several documents as a background for EU funds absorption within financial perspective 2007-2013. Acceleration of Polish society and economy transformation from central economy to market economy without EU policy support would not be possible.

The fundamental documents for this period are:

#### 1. National Development Strategy 2007 – 2015

It is a principal strategic document which provides guidelines for other government and local government (i.e. voivodship) strategies and programmes.

The NDS determines the goals and identifies major areas that will be the focus of the state activities. It also sets out priorities of Polish social and economic development and the condition that should sustain this development.

The main goal of NDS is to improve standards and quality of Polish residents, individual and their families lives.

Its main goal should be implemented by the following priorities:

1. Improvement of competitiveness and innovativeness of the economy;
2. Improvement of the condition of technical and social infrastructure;
3. Increase of employment and improvement of its quality;
4. Building an integrated social community and its security;
5. Development of rural areas;
6. Regional development and the improvement of territorial cohesion.

The NDS is kind of a vision of Poland in perspective 2015 as well.

On the basis of this strategic document, its priorities and actions were constructed and will construct other detailed strategies and programmes that will lead to realisation of the final results and outcomes of NCS.

#### 2. National Cohesion Strategy

This strategic document defines priorities and fields of utilisation as well as implementation systems of EU funds (ERDF, ESF and CF) under EU budget framework in 2007-2013. The main strategic aim of NSS in creating Polish competitive economy growth based on knowledge and entrepreneurship which secures (assures) employment growth, level of social and economic cohesion.

Strategic aim will be enriched through specific, horizontal aims implementation.

The horizontal objectives of NCS are the following:

1. Improving the functioning standard of public institutions and development of partnership mechanisms;
2. Improving the human capital quality and enhancing social cohesion;
3. Establishment and modernisation of technical and social infrastructure that is crucial for better competitiveness of Poland;
4. Improving of competitiveness and innovativeness of enterprises, in particular including the manufacturing sector with high added value and development of the services sector;
5. Increase of the competitiveness of Polish regions and preventing their social, economic and territorial marginalisation;
6. Balancing growing opportunities and supporting structural changes in rural areas.

Apart from actions of legal, fiscal and institutional nature the objectives of NCS are implemented via programmes (so called operational programmes) managed by the Ministry of Regional Development, regional programmes (so-called regional operational programmes) managed by the Managing Board of individual voivodeships and projects co-financed from structural instruments, i.e. :

- Infrastructure and Environment Programme – ERDF and CF;
- Innovative Economy Programme – ERDF;
- Human Capital Programme – ESF;
- 16 regional programmes – ERDF;
- Development of Eastern Poland Programme – ERDF;
- Technical Assistance Programme – ERDF;
- European Territorial Cooperation Programmes – ERDF.

NCS is a document which framework on the European Union level was determined by the Lisbon Strategy and the Community Strategic Guidelines (CSG). Every member state of the European Union prepares its NCS on the basis of the NDS.

Sectoral strategies based on NDS and NCS (or NSRF)

On the basis of NDS and NCS are developed different sectoral or national strategies related to economy, special and public sectors' aspects.

At the moment we have not prepared a transparent development management system in Poland with clear relation between different sectoral or national strategies and objectives. Nevertheless we have constructed several different strategies in differ branches of economy or public sector with a very thin and imperfect connections. This system should be much more coordinated, managed, holistic and homogenous as in fact it is.

We have noticed too strong sectoral approach and unclear relation between development policy and regional policy and practically not enough transparent financial system for this policy.

A lot of weaknesses between programming and operational levels provoke to unclear actions and sometimes low level of undertaken effectiveness.

Actually in Poland we develop a long-term national strategy for Regional Development in eight areas:

- Transport Development Strategy;
- National Security Strategy of the Republic of Poland;
- Energy Safety and Environment;
- Social Capital Development Strategy;
- Strategy of Innovation and Economic Efficiency;
- Strategy for Sustainable Development of Rural Areas and Agriculture;
- Human Resources Development Strategy;
- Efficient State.

Above mentioned strategies comprise several specified strategies and programme on national, regional and horizontal level for example:

- National Strategy for the Development of Culture;
- Regional Development Strategies in Poland;
- Polish National Strategy for the Development of Renewable Energy Sector;
- Long-term Strategy for Sustainable Development "Poland 2025";
- Strategy for socio-economic development of Eastern Poland until 2020;
- National Strategy for Employment Growth and Human Resources;
- Strategy for Balanced use of Biomass in Poland.

Each voivodship (region) develops its own Regional Development Strategy as well.

There are 16 documents describing each strategy represented by one region.

On the basis of RDS (Regional Development Strategy) are developed regional, sectoral and horizontal strategies for each region supported by documents carried out by national or sectoral level (on the state level).

In our subject it should be taken under consideration long term national strategy called Strategy of Innovation and Economic Efficiency.

The thinking process about innovation strategy in Poland and its regional context has been practically started since 2003 by the action of Polish Government which provided a grant to regions in order to undertake these kind of studies. Each region has undertaken effort towards preparing own strategy of economic and innovation development. Within 16 regions could be differences and similarities of the approach to the strategy, its results, activities, aims and predicted perspective. Another words each region as its own strategy of innovation and economic efficiency. However we do not have a common document of Innovation Strategy on the national level yet.

Regional Innovation Strategy for the West Pomeranian Province

2011-2020

In a ranking of the level of innovativeness The West Pomeranian Province occupies one of the last position. Innovation capacity is not so negative but utilisation is very low. Innovative thinking and acting process was started in a period 2005-2010 on the basis of a document called Regional Innovation Strategy of The West Pomeranian Voivodeship was an inspiration to many activities

around sketched priorities in different areas (scientific, social, public, political, etc.). Up-to-date version of the “Regional Innovation Strategy” in 2010 for the perspective of 2011-2020 did not realise the global and European changes in economy, policy and environment.

This document comprises inward assumptions as following:

- world, European, national and regional analysis of trends and challenges;
- operational targets and activities;
- ideas of new innovation strategies based on previous experience and many analytical and synthetic document

The main objectives of “RJS” (Regional Innovation Strategy) are concentrated on three pillars:

- innovative consciousness and competence;
- endogenic potential for regional specialisation;
- regional system for creating, diffusing and absorption of innovation.

These pillars are included in new paradigms of regional (on the country level) and European policy (Europe 2020), which presents the way for the future regional innovative development.

Construction of RJS was based on a new development strategy of the West Pomeranian Voivodeship as well.

The Strategy comprises 5 strategic objectives and 20 tendency aims.

One of the most important from the RJS point of view is strategic objective named “Economic innovativeness and effectiveness growth” concentrated around three areas of regional economy for the period 2010-2020:

- tourism;
- maritime policy;
- agriculture and fishery policy.

RJS is concentrated on these three pillars.

The role of SME sector within RJS and above mentioned pillars is very appreciated. Many activities are planned to be delivered: promotion, education, training, financial support (different forms),

new institutions (agents, agencies, incubators, etc.), workshops, conferences, entrepreneurs clubs, consultations, stimulation and in a broad sense activation of SME sector.

## **INNOVATION IN THE ENTERPRISE**

### **1. System of innovation. Actors and relationship among them**

System of innovation is ordered by many legal regulations and acts edited last time by EU, Poland and local authorities. Problem was described in a previous part. From this point of view each region has its own innovation strategy and by different ways and tools, and tries to implement it to regional environment (institutions, enterprises, higher education system, agencies, scientific parts, etc.).

- **SMEs**

Innovation by higher productivity of production assets and knowledge diffusion, has an important input for companies competitiveness and consequently determining the region position in which they operate.

Companies innovative activity depends on the level of knowledge in companies, applied technology, management style, financial and human capacities and a scale of a company.

For instance, large and medium size companies invest in innovation more often than small ones. There are usually much higher financial resources in large firms as well. Thus, these firms have much better opportunities to finance their innovative development.

Some of the economy sectors are characterized by much higher innovativeness than the others, for example: tobacco industry, petrochemical sector, chemical, ICT sector and some other services as telecommunication, financial services, insurance companies.

Industrial companies are much more innovative than companies from the other services sector in Poland.

On the basis of research there are conclusions coming, that a public sector is much more innovative than the private sector. Corporate innovativeness is shaped as well by consciousness of people employed in a company, from the point of the meaning and the role of innovativeness in business.

In recent years, businesses increasingly showing an interest in the benefits of innovation, as evidenced by increasing spending on the activities of industrial enterprises.

In 2003, expenditures on innovation activities amounted to 15.5 billion PLN, while in 2008 24.3 billion PLN (In the group of entities employing more than 49 people) . Particularly high growth was observed in 2007-2008, when outlays rose by 21.7% and 20%.

Expenditures service companies grow less quickly. In 2008, amounted to 12.6 billion PLN, while in 2003, 9.3 billion PLN (In the group of entities employing more than 9 people).

Increasing investment in innovation activities of companies do not translate into an increased participation of entities engaged in these activities. Starting in 2002 a decreasing trend remains in the share of enterprises making expenditures on innovation activities. In 2008 this ratio was 31.9%, while in 2003 was much higher - 39.3%. Among service companies in 2008, 12.8% reported carrying out innovative activities. In considering the differences in terms of size of the entities, it appears that the share of funds of the larger enterprises increases at the expense of expenditures on innovation activities of small and medium-sized enterprises. Dependence that occurs both in the industrial sector and in the services sector.

At the same time we could observe an increase of funds per one entrepreneurship engaged in innovative activity in the industry in 2003, in units with more than 49 persons.

They reached a level of 4932.2 thousand PLN, while in 2008 - 8,172 thousand PLN. It is worth mentioning, that in 2004-2006 there were no significant changes in this regard.

Growth in sectors is not uniform, higher in the public sector. Foreign ownership also noted a decline in unit expenditure. For companies in the services sector, the number of working above 9 persons, also observed an increase in unit effort. In 2003,

expenditures on innovation activity per 1 enterprise amounted to 2,308 thousand PLN, and in 2008 doubled (4,642 thousand PLN). A slight increase of unit expenditures in the public sector was also observed as well as significant decrease in the private sector.

Although spending on innovation activities in industry grew, it was not reflected on the greater willingness of companies to engage capital in innovation activities. Still a significant proportion of enterprises in Poland does not see the source of future innovation

as competitive advantage. Innovative activity is therefore a "luxury good" available at a high price to a limited number of companies. The public sector leading the way in large, most innovative projects, leaving far behind private companies.

Often the problem is not lack of ideas on innovation, but rather a lack of means by which it was impossible. In Poland, the companies are based primarily on own capital. Here the situation, despite some fluctuations has not changed radically. Still the usage of external sources, such as lending, venture capital funds and EU funds is very low.

Companies being afraid of high risk associated with taking new business, act conservatively and finance it with the financial surplus. Lack of sufficient awareness of the value added generated in the innovation process is not conducive to external investment.

In the case of industrial enterprises, the fastest grow is in the value of means procured from abroad and from loans. Regarding entities working in services, the fastest-growing category is primary the bank loan.

Around 31,5% of local (regional) companies actively operate in innovative activities (on the basis of statistical data from Statistical Yearbook 2010). Mostly there is innovation and production sector with the products or a production process. Usually, companies do not have their own special innovation departments, what results in serious problems for majority of companies. Very often, as long as the product is sold, they have no idea to make changes. New technologies are not accepted as long as a cost of a purchase and installation are higher than the old technology, because of the lack of sufficient level of financial resources.

This is the biggest weakness of Polish SME sector and regional, local companies as well. Thus, the biggest investment in innovativeness takes place in big, international companies which possess their business in our region.

- **Public Administration**

Regional public administration offers to the business environment (SME sector) very limited variety of innovations, improving or supporting regional or local economy.

Their activities mainly concentrate on different trainings, consultancy and information system. Offered service is not fitted in SME real demand.

A very small input of knowledge transfer, technologies to SME sector and implementation of innovative solutions is offered.

Lack of professional specialized institutions, concentrated on innovative entrepreneurship.

Location of the most existing institutions in a big few centers, makes that, access to offered services is very limited, first of all, due to location of most SME's in rather peripheral places. Hence, competitiveness and innovativeness is very low.

- **Universities**

In the West Pomeranian Region there are 22 higher education schools, with the biggest being the University of Szczecin with around 32000 students.

Their education and research staff is represented by 4200 teachers, among of them 2004 doctors and 1450 professors.

This sector should be a most significant producer and propagator of innovation in the region.

In fact it is very serious problem. The most of regional universities, concentrate their activities on education process. Only some of them have developed a research activities.

At the national level situation is slightly better, nevertheless Poland as a country, take a very low position in this area, in the most prestigious rankings of universities and

research centers (ex. In 2007 Poland reported 5 patents per million inhabitants, in comparison to Switzerland 400 patents per million inhabitants).

Cooperation between public administration and universities is very rare and insufficient. A new innovation strategy for the region presents some new initiatives and proposals which could be a symptom for changes in the perspective of 2020.

## **2. Diagnosis of innovation in SMEs (in general and by department)**

The situation is not yet optimistic. Normally, there is a tendency that, any new innovations and inventions in large numbers, are being developed during the crisis or war.

In Poland current crisis is used as a fundamental argument against innovation process.

Each innovation company tries to implement innovation on a scale, that can protect them against the bankruptcy or fear of collapsing. In the new Regional Innovation Strategy 2011 – 2020 a certain instruments and tools are proposed, which should play a role of stimulators of the future innovations, innovativeness awareness and competence. A new area of support and invention as elements of regional innovation policy. The important role in the future should also have a new institution existing for two years called Regional Center for Transfer Technology and Innovation. They offer many innovative proposals for companies, universities and individuals.

## **3. Innovation & Human Resources**

In the era of transition from industrial civilisation to the information one, the basic factors of economic competitiveness is becoming the human capital, "i.e. knowledge, skills, energy and health embodied in the nation and in general in every citizen in particular.

The human capital increases the human resources productivity, improves the competitiveness of economies.

In the information economy, based on knowledge, the main carriers of the competitiveness are new technologies, mainly IT and Telecommunication, intense R&D activities, as well as pro-innovation behaviours of the transactors.

The primary condition for their existence in the economy is to have well developed infrastructure and access to high quality of human capital.

The human factor (especially knowledge: technological, linked to the organisation, management and human capital) is required at each stage (life) of technology: in the design phase (human capital- the primary source of ideas and innovation), in the stages of production, distribution and service.

Possession of highly skilled staff allows on the one hand, effectively implementing new technologies invented elsewhere, and on the other hand allows the creation of development directions in the modern economy.

If the economy does not have good human resources, then it is forced to specialize in those branches of industry, which lose their importance in today's technology, and are not able to build a long-term competitiveness of the economy or are even doomed to a progressive marginalisation.

It should be noted, that among the new technologies, economic and growth, competitiveness and human capital are mutually interlinked.

On one hand it is the human capital, that is one of the main factors determining development of new technologies, but on the other hand, new technologies introduce new ways of work, increase added value, contributing to economic growth, increase competitiveness, creating conditions for continuous quality improvement of the human capital.

According to the Lisbon Strategy (2000), one of the main objectives, that all the EU countries are obliged to increase, is the investment in human capital. It can be achieved in the following ways: funding increase for this purpose, strengthening education systems and training closely matched to the needs of various social and professional groups, the development of lifelong learning, overcoming the shortage among workers of science and technology, promoting actions for boost economic activity of the population, strengthening linkages between schools and enterprises, adjustment of the labour market to the new economic trends.

Poland as a new member of the EU, is also required to implement the above priorities, however in rather different ways.

It is not a surprise, that the current level of utility and quality of human resources in Poland is not satisfactory. This situation is subject to particularly long (basically since the 60's of the twentieth century) neglect of the education sector and the R&D sphere.

The result of this underinvestment in education and research is inter alia, today's low intensity utility of human resources documented by:

- Employment rate of 59,3, which is lower than the EU average – 64,6
- High and increasing rate of unemployment, among young people, graduates (19,3 in 2008-2009)
- Relatively low productivity of around 49,6% (2005) of the average productivity in EU.

The above indicators show, that the situation on the Polish labour market is not a simple and feasible case to implement in the short term.

One of the main factors limiting the possibility of increasing the utility of human resources in Poland are: outdated employment structure, in which still too high percentage of workers is employed in agriculture (in 2009 – 14,8%, EU – 4,5%), too low in the service sector (in 2009 – 57%, EU – 68%). In Poland it is disappointing, not only a low level of human resources utilisation, but also the level of education.

The average percentage of population with tertiary education is 12%, much less than the average in EU – 21%, USA – 37%, Japan – 30%.

Nevertheless, in recent years, the school rating has been improving and reached the level of 14,6 % in 2006, and still rapidly increasing.

It has to be also noted, that parallel to the increase in percentage of graduated students, a lifelong learning is becoming popular. It is due to dynamic changes in the economy and its standards, which require continuous learning.

Despite some improvements in recent years, there is still a lot, that needs to be done in the matter of human resources.

Low utilisation of human resources, poor quality of human capital cause, that Poland still has limited access to the benefits of information revolution and new technology. It is a lack of sufficiently qualified staff, deficiencies in infrastructure (also the quality of human resources) that prevent from attracting investment in strategic, economic development of industries.

Polish economy is hence, required to implement major changes: changes of increasing human investment.

For this purpose, the Sectoral Operational Programme – Human Resources Development was set up.

<i>Main objective</i>	<i>Priority</i>	<i>Activities</i>
<i>Building an open, knowledge-based society, by ensuring the conditions through education, training and work</i>	<i>1. Active policy of the labour market, and professional and social integration</i>	<ul style="list-style-type: none"> <li><i>1. Development and modernisation of the instruments and the labour market institutions</i></li> <li><i>2. Prospects for young people</i></li> <li><i>3. Counteracting and reducing long – term unemployment</i></li> <li><i>4. Professional and social integration of disabled people</i></li> <li><i>5. Promotion of active social policy, through support of the high- risk groups</i></li> <li><i>6. Integration and reintegration of women</i></li> </ul>
	<i>2. Development of knowledge-based society</i>	<ul style="list-style-type: none"> <li><i>1. Increasing access to education- promoting lifelong learning</i></li> <li><i>2. Improving education quality in relation to labour market needs</i></li> <li><i>3. Development of human resources for modern economy</i></li> <li><i>4. Strengthening the administrative capacity</i></li> </ul>
	<i>3. Technical assistance</i>	<ul style="list-style-type: none"> <li><i>1. Sector management support</i></li> <li><i>2. Information and activity promotion</i></li> <li><i>3. Purchase of computer equipment</i></li> </ul>

Source: Ministry of Economy, Labour, and Social Policy, Sectoral Operational Programme – Human Resources Development 2004- 2006, Brussels – Warsaw, 2004

Presented priorities, clearly reflect the social and educational policies, both the Polish government and the EU. Implementing actions specifically include the need to invest in human, the necessity to better education and training tailor, to the requiremnet of the knowledge-

based society and improving employment. Through these actions it is planned to achieve (at least decrease), one of the main barriers to economic growth, which is the insufficient public education.

If we could achieve at least some of the objectives set in the programme, it would significantly contribute to the modernisation of the Polish labour market, organisational and technological progress, as well as to raise competitiveness of Polish economy, and increase the attractiveness of the Country for investment.

It is obvious, and needs to be taken into consideration, that for the above- mentioned structural changes, a sufficient amount of time and effort must be devoted.

## **NEW ORIENTATIONS IN HUMAN RESOURCES IN THE LAST YEARS AND FOR THE FUTURE (TENDENCIES)**

Example of some we already took in account:

### **1. Knowledge Management**

- a. Generation and enhancement of knowledge
- b. Competence-based management
- c. Lifelong Learning
- d. Mentoring, counseling and formal and non-formal training
- e. Exchange of experience between companies, skills development
- f. New forms of traineeships and internships for young people
- g. Vocational education support

### **2. Management by value**

- a. Corporate Social Responsibility
- b. Work quality improvement
- c. Place- based approach

Please add those others you consider as relevant:

### **3. Other (please specify and describe)**

- a. Consistency of personnel policy
- b. Cooperation with universities
- c. Emphasis on high technology

Please value from 1 (low) to 5 (high) how you consider those new orientations previously identified and analyzed are actually being used / implemented in SMEs and their importance for improving SMEs competitiveness:

<b>NEW ORIENTATION</b>	<b>USE IN SMEs</b>	<b>IMPORTANCE FOR SMEs</b>
<b>Knowledge Management</b>		
Generation and enhancement of knowledge	3	5
Competence-based management	4	5
Lifelong learning	3	5
Mentoring, counseling and formal and non-formal training	3	5
Exchange of experience between companies, skills development	2	5
New forms of traineeships and internships for young people	1	4
Vocational education support	1	4
<b>Management by Value</b>		
Work quality improvement	2	4
Place- based approach	2	4
Corporate Social Responsibility	3	5
<b>Other</b>		
Consistency of personnel policy	2	5
Cooperation with universities	2	5
Emphasis on high technology	2	5
Creating conditions for continuous quality	2	5

improvement of the human capital.		

**PART 2: NEW TECHNOLOGIES USED IN GENERAL IN SMES RELATED TO THE PROFILE**

NAME OF NEW TECHN.	DESCRIPTION	DEPARTMENT USING IT	RATE OF IMPORTANCE
<b>Robots and industrial manipulators</b>	Automatically controlled, reprogrammable, multipurpose manipulator, programmable in three or more axes. The field of robotics may be more practically defined as the study, design and use of robot systems for manufacturing . Typical applications of robots include welding, painting, assembly, pick and place, packaging and palletizing, product inspection, and testing, all accomplished with high endurance, speed, and precision.	Production	5
<b>Machining Centers</b>	A further development in the automation of machine tools is the “machining centre,” usually a vertical milling machine fitted with automatic tool-changing facilities and capable of several axes of control. The tools, of which there can be more than 100, are generally housed in a rotary magazine and may be changed by commands from the machine tool program.	Production	5
<b>Computer- controlled production</b>	Approach of using computer to control the entire production process. This integration allows individual processes to exchange information with each other and initiate actions.	Production	5
<b>Automated production lines</b>	Automated production lines are typically used for high production of parts that require multiple processing operations. The production line itself consists of geographically dispersed workstations within the plant, which are connected by a mechanized work transport system that ferries parts from one workstation to another in a pre-defined production sequence. Automated production lines consist of distributed workstations connected by a mechanized work transport system that moves the parts from one workstation to another as they enter the system	Production	5
<b>E-mail account</b>	System for sending and receiving messages electronically over an internet computer network.	Information and Communication, Global environment of the enterprise	4

<b>Internal computer network</b>	Private computer network that uses Internet Protocol technology to securely share any part of an organization's information or <b>network operating system</b> within that organization. The term is used in contrast to internet, a network between organizations, and instead refers to a network within an organization.	Information and Communication	4
<b>LAN</b>	A computer network that connects computers and devices in a limited geographical area such as home, school, computer laboratory or office building.	Information and Communication	4
<b>Server</b>	A computer, or series of computers, that link other computers or electronic devices together. They often provide essential services across a network, either to private users inside a large organization or to public users via the internet.	Information and Communication	5
<b>Internal network</b>	Internal wireless network remote access ERP (Enterprise Resource Planning) integrates internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service, etc. ERP systems automate this activity with an integrated software application. Its purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders.	Information and Communication	4
<b>E- commerce</b>	Consist of the buying and selling of products or services, over electronic systems such as the Internet and other computeer networks	Clients' Management	4
<b>CRM systems (Customer Relationship Management)</b>	Widely- implemented strategy for managing a company's intereraction with customers, clents and sales prospects. It involves using technology to organise, automate and synchronize business processes.	Clients' Management Management Strategy	4
<b>Enterprise Resource Planning (ERP systems)</b>	Integration of business management practises and modern technology. Helps companies to manage the important parts of its business. This software can be used to manage product planning, parts purchasing, inventories, interacting with suppliers, providing customer services and tracking order	Clients' Management Management Strategy	4
<b>HR, financial accounting systems</b>	Improving management of human resources and finance in the company	Human Resources, Economic and Financial	5

		Management	
<b>Software as a Service (SaaS)</b>	Delivering software over the Internet. Highly popular for its ability to simplify deployment and reduce customer acquisition cost	Clients' Management	4
<b>Advanced Video Monitoring System (AVMS)</b>	Intelligent, enterprise- quality video surveillance software for small businesses. Solution for improving company's operation, safety and security	All departments	4
<b>New organisation management systems i. e. OD, TQM, BPR</b>	(OD) Organisation Development, (TQM) Total Quality Management, (BPR) Business Process Re- engineering All aim to increase organisational efficiency, and improving the customer satisfaction <b>TQM</b> - attempt to retain or regain competitiveness in order to achieve customer satisfaction in the face of increasing competition <b>OD</b> – is a concept, organisation- wide effort to increase an organisation's effectiveness and viability <b>BPR</b> – analysis and design of workflows and processes with an organisation. Set of logically related tasks performed to achieve a defined business outcomes.	Clients' Management, Economic and Financial Management, Management Strategy	4
<b>Office manager</b>	Administrative tool provided for small businesses. With its use, the office or IT administrator can handle routine operational tasks related to communication	Suppliers' Management, Clients' Management	4
<b>Licence</b>	Obtaining permission to use foreign solutions. Purchase of copyrights, in the form of rights to the invention, know-how.	New Technologies	5
<b>Research and development activities</b>	The main sources of new knowledge are the internal resources of companies, the information collected from customers and counterparties	New Technologies	5
<b>Utility model</b>	Statutory monopoly granted for a limited time in exchange for an inventor, providing sufficient teaching of his/her invention to permit a person of ordinary skill in the relevant art to perform the invention	New Technologies	5
<b>Education technologies: E-learning</b>	Comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked or not, serve as specific media to implement the learning process.	Global environment of the enterprise	4

Example of departments:

- Global environment of the enterprise
- Management Strategy
- Information and Communication
- Human Resources
- Suppliers' Management
- Clients' Management
- Production
- Economic and Financial Management
- New Technologies

## PART 3: CONCLUSIONS

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### RESUME OF SITUATION OF SMES WITH RESPECT TO PREVIOUS POINTS ANALYZED UNDER INNOVATION AND NEW TECHNOLOGIES

As results from the data mentioned in this report, Poland has a long distance to overtake. It is not only in relation to the objectives of the Lisbon Strategy, but to the current innovation capacity of the EU countries.

To meet the objectives of the Lisbon Strategy for R&D expenditure, Polish private spending, should be increased sevenfold, while the public twice. Is this goal realistic?

The key in this case will be to increase public funding.

In order to improve the innovative capacity of the Polish economy is also necessary to maximize the use of structural funds for pro-innovation.

The opportunity to improve the innovativeness of Polish enterprises, especially SME's are regional innovation strategies. Since the mid-90s. The EU supports the creation of regional strategies aimed at strengthening the innovative capacity of the economies of individual regions based on their specific circumstances and supremacy.

Within the framework of regional innovation strategies, and the use of previous experiences some methodological assumptions have been developed, which well- prepared strategies should be characterized by.

- Partnership and consensus of public-private sector (private sector and key stakeholders in the sector R & D should be involved in developing the strategy and its implementation). Public-private partnership should cover all stages of the project i.e. design, implementation, monitoring and viewing the action .
- Regional Innovation Strategies should be integrated, and multidisciplinary. Emphasis should be placed on the connection and interdependence between the public sector (at all levels - European, national, regional and local) and private sector in order to determine a common goal. Moreover, for innovation is important not only technology itself, but also human capital, research and education, vocational training, management, finance, marketing, as well as policies - regional, educational, technological, industrial and competition.
- RIS should place emphasis on the demand side (focus on the needs of innovative companies, SMEs in particular) and bottom-up approach to its development.

- RIS should be action-oriented, should include an action plan and clearly defined projects (as a result thereof shall be new, innovative projects in companies, new innovative programs, policies and networks between companies).
- Regions participating in the RIS should use the European dimension through cooperation between regions and benchmarking policies.
- RIS should be cyclic, completed projects must be evaluated, so that there will be an opportunity to learn from the past.

The main effect of these projects was to raise awareness (among the regional actors involved in economic development and innovation processes), the importance of innovation for economic development, the need to build consensus. An additional result was gaining experience in matters relating to encourage innovation, as a result of enhanced cooperation in networks. In addition, these projects helped to increase the involvement of SMEs in the process of developing appropriate mechanisms to support entrepreneurship and innovation.

In 2002 the first regional innovation strategy projects - funded by the EU - were launched in five voivodeships. Currently, there are also efforts to develop regional innovation strategies in other regions. If the opportunity given by the Regional Innovation Strategy will be used in an effective way, depends on the one hand, on the selection of appropriate priorities, and on the other hand, on the effective implementation of the developed strategies. Institute for Market Economics in the Polish Lisbon Strategy Forum has initiated a debate on the Polish priorities regarding the construction of the knowledge economy and the creation of regional innovation strategies. As a result of this a series of recommendation have been developed for the implementation of regional innovation strategies in Polish regions:

**Raising innovation culture.** Actions in this area should focus on raising awareness of the importance of innovation for the economic development of both society and the individual groups of actors in the innovation process (companies, research units and public administration).

**The focus on soft factors of development.** In developed countries we are beginning to notice a tendency of moving away from hard infrastructure funding in the favour of soft development factors - human capital development, improvement of access to innovation, streamlining the channels of information flow between key players in the economy. Such an approach should also characterize the Polish regional innovation strategies.

**Strengthen the capacity and competence of SMEs.** Initiatives in this area should focus on the one hand, the actions of a horizontal nature - strengthening the economic and innovative potential of all businesses (improving access to various sources of information, raising the level of human capital, improving access to finance) and, secondly, to stimulate the formation of development of high technology enterprises of the branches belonging to (increasing the birth rate of companies founded by graduates of technical universities, strengthening of infrastructure conducive to the birth of such an establishment).

**Strengthening the partnership business and science.** These activities should be based, first, to stimulate dialogue / meetings and discussions between science and business. Secondly, the identification of barriers - the bottlenecks that occur on the side of scientific institutions that limit the involvement of the scientific community in cooperation with industry. Thirdly, it seems necessary to encourage multinational companies to engage in broader cooperation with local / regional economic environment and science.

**Construction of the innovation system based on existing components.** As crucial in building an efficient RSI, the following directions can be indicated:

- ensure the smooth flow of information between all the parties, etc, and system operators and users for maximum utilization of these resources that already exist,

- complement the system offer with a supply of more advanced services (which does not mean that these services must produce by the government sector, it can be done by the commercial sector, but with the support of public funds. Is not needed to build new institutions but rather new programmes ,

- access increase of RSI offer (both for “simple” and advanced services) in remote areas (this may be also associated with the need to build certain institutions, such as financial

**Stimulating the development of clusters and networks.**

**The need to exchange experiences and coordinate activities at interregional and national levels.** Regional innovation systems must be an open system. Therefore, it seems necessary to

enhance coordination between regional innovation strategies. These actions should include, first, the exchange of experiences between the regions and in this respect the most appropriate appears to be the existing network of INTEGRIS. It is also important to identify those policy areas

**Regional innovation strategies must be a continuous process.** Implementing the innovation strategy must be a continuous process. Cannot end with the adoption of the document by the Parliament of the Voivodeship. The main value-added work on the strategy should be not the document itself (although it is important as a plan of action to strengthen the innovation), but the process of cooperation between all stakeholders.

## **MAIN CONCLUSIONS AND RECOMMENDATIONS**

a. For the definition of the profile (profile areas and content by area)

At the present stage of the project and its profile, it is difficult give a good recommendation. The recommendation and conclusions will undoubtedly arise at its early stage, once the profile is being put into practice.

b. For the work to be done in the SMEs by the person trained with this profile

As many studies indicate, there is still a vast amount of work to do within SME's sector, in terms of its competitiveness and innovativeness.

The basis for innovation in the company as we know, is its quality of human resources. Even though it has changed and considerably improved in the recent years, it is still underdeveloped.

One of the main reasons is the level of education which has an obsolete system, not adapted to changing realities and requirements of modern enterprises.

Therefore is important to put emphasis on creation of practical training and courses tailored to the needs of today's marketplace.

In order to that, extremely crucial for the person trained in this profile, will be dissemination and implementation of this innovative knowledge and skills in the form of promoting various trainings, innovative initiative based on the present profile.

A major role in this process must play HEI's, which must work more closely with entrepreneurs as well as local officials, in order to develop an innovative education programme. Only in this way, it will be possible to create a more valuable human resources, which in a long run will be able to increase the overall rating in the whole country.

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