

Warsaw School of Economics
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Labour market in selected sectors of economy in
Podlaskie voivodship in 2008
and its changes in the years 2005-2007

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Introduction

The aim of the report is to present basic parameters of the labour market in selected sectors of high technology, that is the engineering, electronics, automotive and aviation industries, the medical biotechnology sector and the business services sector as well as its changes in years 2005–2008 in Podlaskie voivodship and the information on the staff access for these sectors.

Podlaskie voivodship disposes at middle work resources potential in comparison to the country average which makes up about 3% of the total employment in Poland. In 2005–2006 the number of employed persons increased by 1.7%. This fact along with the migration outflow influenced the change in basic labour market parameters of Podlaskie voivodship such as the employment rate, the unemployed rate, the intensity of unemployment and the staff related access shortage. In 2005–2007 the employment indicator increased from 56.1% to 54.5% and in the entire period under analysis oscillated at the country average level. Its low level (in comparison to highly socially and economically developed countries) not only resulted from insufficient for the needs creation of jobs, but also from high occupational passiveness of the population of Podlaskie voivodship (about 50% persons over 15 years of age is professionally passive). The main reasons for this situation are pensions, education and raising qualifications ¹.

Table 1. Basic parameters of labour market in Podlaskie voivodship in 2005–2007

No.	Basic parameters of labour market	2005	2006	2007
1.	Employed persons (in thousands)	430	421	454
2.	Employment rate (in %)	56.1	54.0	54.5
3.	Employment rate of persons at working age (in %)	73 193	61 773	48 796
4.	Unemployed persons (in thousands)	14.3	11.4	8.9
5.	Registered unemployment rate (in %)	15.6	13.3	10.7
6.	Unemployment rate according to BAEL *(in %)	193	318	278
7.	Number of unemployed persons per 1 work offer	379	194	176

Source: own work on the basis of the Regional Database of the Central Statistical Office.

In 2005 – 2007 in Podlaskie voivodship the number of unemployed fell by 33% of which about one third due to the absence of confirmation on work readiness. The unemployment rate according to BAEL in the period under analysis fell from 14.3 % to 8.9 % in 2007 and was lower than the

¹ *Labour market in Podlaskie voivodship in the 1st quarter of 2008.* Podlaskie Voivodship Labour Office in 2008.

country average (11.4%). The recorded increase in work offers (1.4 times more work offers in 2007) influenced the unemployment rate in 2005–2006 which contributed to the fall in the number of unemployed persons per one work offer from 379 persons in 2005 to 194 in 2006 (Table 1). In the registers of labour offices of Podlaskie voivodship, the number of the offers unused for over one month increases. In the same time, the average gross monthly remuneration grew, in the analysed period by as much as 26% (Table 4). However, in the entire period under analysis in Podlaskie voivodship, it was by 26% lower than the country average.

1. Employment in selected sectors of economy in 2005-2008.

Positive changes in the labour market are reflected not only in the increase in the employment in the entire region, but also in the sectors of high technology. In 2005–2007 the number of the employed in the selected sectors ² in Podlaskie voivodship grew from 430 thousand 454 thousand persons that is by 5.6% with respect to 13.8% of the number of the employed in the analysed sector in the entire country. In 2005–2007 persons employed in the selected economy sectors in Podlaskie voivodship made up merely 3% of the employed in these sectors in the country.

In the period 2003 - May 2007, the employment in Podlaskie voivodship was increasing dynamically and it exceeded the average employment rate in the sector of enterprises in the country. Employment slow-downs took place each time by the end of the calendar year. The growing importance of the sectors of high technology analysed in terms of the employment dynamics, can also be observed in the internal structure of Podlaskie voivodship. In 2005–2007 the employment in these sectors constituted 5.2% of the total of employed persons which was less than the country average (7,2%). These regularities varied across the sectors.

In 2005–2007 in Podlaskie voivodship the highest average employment in the group of analysed sectors of high technology was the sector of real estate and business services. The average employment in this sector in 2008 reached **7633** persons, but in 2005–2008 the pace of change which equalled 93% was negative and the lowest in the group of sectors under analysis ³. As far as the creation of work places is concerned, the engineering sector and the production of machinery and devices is in the second position, as the average employment in 2008 amounted to 4670 persons. The employment dynamics equalled 121.6 which was higher than the average in the group of the analysed sectors of high technology.

² Data from the Regional Database

³ Database of the Enterprise Institute of the Warsaw School of Economics.

Table 2. Persons employed in the selected economy sectors in Podlaskie voivodship.

	Engineering industry	Electrical sector	Biotechnological sector	Automotive industry	Services for business	TOTAL (All HT sectors including the ones not covered by the analysis)
Average employment in enterprises sector (Jan-Dec 2005)	3856	602	no data	no data	8248	91180
Average employment in enterprises sector (Jan-Dec 2006)	4075	595		no data	8124	93412
Average employment in enterprises sector (Jan-Dec 2007)	4393	631		.no data	7417	94768
Average employment in enterprises sector (Jan-Dec 2008)	4670	864		No data.	7633	101314
Dynamics 2005- 1st Q 2008	121.6	140.3		no data	93	108.9

Source: Statistical bulletins of Podlaskie voivodship: 2005-2008.

In 2005 the average employment was low in the electric sector. However, thanks to a very dynamic growth in the average employment in this sector (40.3%), by the end of the analysed period the average employment in the electric sector was by 262 persons higher than in 2005. The reported changes in the average employment in the sectors of high technology of Podlaskie voivodship took place in the period of the increasing number of enterprises operating in this type of economic activity. The total increase in this type of enterprises reached 8.9%.

2. Students and graduates of post-gymnasium schools: numbers and fields of study*

* Structure of Polish Educational System:

- *Primary*: Primary School (Szkoła Podstawowa)
- *Basic Vocational*: Basic Vocational School (Zasadnicza Szkoła Zawodowa)
- *Lower Secondary*: Gymnasium (Gimnazjum)
- *Technical Secondary*: Technical Secondary School (Technikum)

Sectors of advanced technology have a demand for high quality human resources that is persons with higher as well as secondary technical, often specialised level of education. The system of education created in the region, in particular specialisations at post-gymnasium and higher levels contribute to meeting this demand.

In Podlaskie region the number of graduates of post-gymnasium schools equals 613 thousand which constitutes 3% of the total of graduates in Poland. Similarly to other regions of the country, the learners of general lyceums make up the largest group that is 44% of post-gymnasium graduates. In terms of the number of graduates they are followed by post-secondary schools (17%), secondary technical secondary schools (17%) vocational schools (8%) as well as specialised lyceums (12%). From the point of view of high technology sectors, it is important to mention the number of learners of secondary technical secondary schools increased in the last three years. This fact, along with the growing numbers of work offers for the intermediate technical level should be considered as a positive trend. In the same time, a negative tendency occurs that is the reduction of the number of technicians and secondary technical secondary schools on educational offer targeted at adult persons.

Table 5. The post-gymnasium school graduates structure (except special schools) in Podlaskie voivodship in 2007.

Specification	Number of post-gymnasium school graduates	Graduates structure by school type
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- *Upper Secondary*: General Lyceum (Liceum Ogólnokształcące)
 - *Vocational Secondary*: Vocational Secondary School (Liceum Zawodowe) /Specialized Lyceum (Liceum Profilowane)
 - *Post- secondary*: Post- secondary Vocational School (Szkoła Policealna)
 - *Higher education*:
 - o first level courses (studia pierwszego stopnia); title of Bachelor or Engineer (licencjat/ inżynier);
 - o second level courses (studia drugiego stopnia); title of Master (magister)
 - o uniform 5-year magister level courses (jednolite studia magisterskie)

[translator's annotation on the basis of *The European Education Directory*
<http://www.euroeducation.net/prof/polaco.htm>.(accessed: 15th December 2008).]

	Total	In %	Vocational schools	Post-secondary schools	Specialised lyceums	Post-gymnasium technical secondary school	General lyceums
<i>POLAND</i>	613 270	100	12%	17%	11%	16%	44%
Podlaskie voivodship	20 858	3	8%	17%	12%	17%	44%

Source: the CSO Regional Database.

Specialisations fields of training in occupation-oriented schools (specialised lyceums, technical schools, vocational schools) are in a different degree adjusted to the needs of high technology sectors. In order to assess their usefulness, professions were divided into three groups:

- economic and administrative (this group covers economic and administrative professions gained in specialised lyceums, such as: administrative clerk, technician of occupational hygiene and workplace safety, economic technician, trade technician, office technician, accounting technician),
- general technical (this group covers technical professions, such as: IT technician, mechanic, car mechanic),
- specialist and technical (this group covers specialist and technical professions, such as: car tinsmith, electronics engineer, electrotechnician, electromechanic, electrician, car electromechanic, mechanic production technicians, machine and appliance fitter, mechanic of industrial automatic devices and precision appliances, precision mechanic, mechatronics worker, electronics fitter, mechatronics fitter, CNC operator, operator of chemical industry devices, electronics technician, technician for electrodiology, technician of logistics, mechanic technician for aviation, mechatronics technician, forwarding technician, technician of teleinformation, technician of telecommunication).

In Podlaskie voivodship the total of 16 thousand persons study the above mentioned specialisations which is 3% of the total number of learners in Poland. From the point of view of enterprises operating in high technology sectors, the most desirable persons are those of specialist and technical profession. In Podlaskie voivodship the percentage of persons studying specialist and technical specialisations equals 16.7% of the total number of learners of all the occupational specialisations which is 4.5 percentage points below the country average. Most of the learners in the region that is 28.9 % are trained for economic and administrative occupations which is by 1.1 percentage points below the country average. However, number of persons who study general technical occupations in Podlaskie voivodship is by 6.6 percentage points higher than the country average. As far as teaching of specific professions is concerned, in Podlaskie voivodship a great deal of persons studies the occupations of: economic technician (over 1300 persons),

electromechanic, mechanic/technician, forwarding technician, electroradiologist, mechatronics technician, technician of teleinformation, economic and administrative clerk.

It is important to emphasise a positive fact, that in Podlaskie voivodship 15 schools offer a specialisation of technician of economy and 12 schools teach a specialisation of IT technician. The same number of schools have a specialisation of mechanic/technician on offer. There are also specialised lyceums: 18 offer a specialisation of information management. Graduates of economic and administrative specialisations, offered by 13 vocational schools, can search for employment in the sectors under analysis. From this point of view, the presence of 24 profiled vocational schools offering a specialisation of car mechanic should be considered positive.

As far as teaching of foreign languages in post-secondary schools in Podlaskie voivodship is concerned, the lowest percentage refers to German (3.19 % of the country total), French which is in one of the last positions (1.41 % of the country total) as well as German (3.77%) and English (4.18%). Teaching of other languages was not reported in the present voivodship. Over 47.2 % of persons learning a foreign language at vocational schools of Podlaskie region learn English, German (34.4%), Russian (17.6%) and French. Podlaskie voivodship, according to the voivodships rating on teaching of foreign languages, is in the 3rd worst position.

Table 6. Learners number learning a foreign language at vocational schools in the schoolyear 2006/2007 - by voivodships

Voivodship	English language	French language	German language	Russian language	Other language	Total
Dolnośląskie	45 043	3 197	50 395	3 877	44	102 556
Kujawsko - Pomorskie	39 194	1 539	31 267	14 552	0	86 552
Lubelskie	42 569	1 753	25 626	19 932	217	90 097
Lubuskie	19 310	2 219	22 276	1 659	0	45 464
Łódzkie	38 503	2 213	34 375	9 839	21	84 951
Małopolskie	67 648	7 821	56 742	9 905	264	142 380
Mazowieckie	76 090	2 989	47 116	32 650	532	159 377
Opolskie	20 342	493	21 135	544	0	42 514
Podkarpackie	52 785	2 872	44 738	8 218	0	108 613
Podlaskie	27 091	670	19 578	10 114	0	57 453
Pomorskie	40 722	1 944	38 001	6 117	430	87 214
Śląskie	94 321	12 295	72 503	12 879	270	192 268
Świętokrzyskie	28 453	803	21 514	7 094	179	58 043
Warmińsko - Mazurskie	30 015	598	25 834	8 151	0	64 598
Wielkopolskie	68 092	4 641	72 300	9 834	57	154 924
Zachodniopomorskie	28 417	1 501	31 179	2 747	0	63 844
POLAND	718 595	47 548	614 579	158 112	2 014	1 540 848

Source: Own work based on *Oświata i wychowanie w roku szkolnym 2006/2007 (Education and training in the school*

3. Students and graduates of higher schools: numbers and fields of study

In Poland the number of university students and graduates is gradually increasing. In Podlaskie voivodship, there are 22 universities (including 16 private ones) which teach 52 thousand students. In terms of the number of students, 14 thousand persons attend Uniwersytet Białostocki (University of Białystok) which makes it the largest university in the analysed region. Other large universities of the region are as follows: Politechnika Białostocka (Białystok Technical University) (over 12 thousand students), Uniwersytet Medyczny (Medical University) (about 4 thousand students). The fact that the universities offer technical, medical and mathematical specialisations can be considered an advantage. Graduates of these specialisations are sought after in the analysed economy sectors.

The humanities and economics are those specialisations which prevail at the majority of universities located in Podlaskie. This situation also refers to the largest university in the region. The following specialisations prevail at the University of Białystok: English and German studies, economics, law, administration, management, finance and banking as well as: computer science, biotechnology, electronics and communication, electrical engineering and technical physics. A great deal of persons study at private universities in Podlaskie voivodship. The ones with the highest number of students (located in Białystok) are presented below: Wyższa Szkoła Ekonomiczna (Academy of Economics): 2527 persons, Wyższa Szkoła Finansów i Zarządzania (Academy of Finance and Management): 5467 persons, Wyższa Szkoła Administracji Publicznej (Academy of Public Administration): 4155 persons, Wyższa Szkoła Kosmetologii i Ochrony Zdrowia (Białystok Institute of Cosmetology and Healthcare): 1039 persons.

It can be noticed that, there is an absence of private universities of technical or medical profile. It is also typical for other voivodships where higher technical education, due to a higher capital intensity, does not develop in the private system. On the other hand, the interest of young persons to study technical specialisations at private universities is low.

In most of the cases specialisations suitable for the demands of high technology sectors, due to high capital intensity, are offered by public universities. In 2007 about 32155 thousand persons studied in the public sector of higher education and 20741 at private universities within five study subgroups selected for the analysis that is, economic and administrative, computer science, engineering and technical, production and processing and social services specialisations.

In Podlaskie voivodship the number of university graduates constitute 3% of all the graduates in Poland that year. The number of public and private school graduates of five specialisations listed above equalled 2982 and 2605, respectively. The number of university graduates per 10 thousand

inhabitants at over 25 years of age in Podlaskie voivodship is by 10 persons lower than the country average. **The most popular study specialisations reflect the graduates education structure whose number in Podlaskie voivodship in 2004–2007 increased by 4%,** whereas the country average reached 6%. Taking account of graduates in specialisations adequate for the sector of high technology in the total of universities in Podlaskie voivodship in 2007 (over 20 thousand persons) the following can be observed:

1. the number of graduates in the engineering and technical specialisations in Podlaskie voivodship is relatively low (*compared to the country average*)
2. the number of graduates in the biological specialisations, computer sciences and physical sciences is similar to the country average: **from 1% to 3 %.**

3. Research fellows (in higher schools and research and development centres)

The sectors of high technology industries are strictly linked with area of research and development. On the one hand, enterprises establish their own research and development centres, employ scientific researches and on the other hand, in the conditions of the more and more intense outsourcing, in this respect, the potential external to the enterprises is used (regional, national or foreign). An indirect measure of the development level of high technology sector in the region is the number of persons employed in the area of research and development. In Podlaskie voivodship in 2007, 2417 persons ⁴ were employed in the research and development sector of which 108 worked in industry.

Moreover, as far as the latter group is concerned, it increased by 7% in Podlaskie voivodship in 2005–2007, whereas in the same period the number of the employed in the R&D sector in Poland grew by 4%. Not all the persons are employed on a permanent basis which and thus, the conversion to full-time posts gives a lower number of employees in the research and development activity in the voivodship.

In 2007 in Podlaskie voivodship the number of university research fellows amounted to 3072 persons of which professors constituted 636 senior lecturers and lecturers 6 and 1091, respectively. In 2006 in Podlaskie voivodship the number of persons employed in the area of research and development per 1000 economically active persons constituted 0.5% and in the total of employed persons the percentage was slightly higher and reached 0.56%.

Research and development institutions located in the area of Podlaskie voivodship play a supportive role for the analysed high technology sectors. The institutions referred to are the

⁴ Data from the Regional Database: RESEARCH AND DEVELOPMENT ACTIVITY

Sub-group: Persons employed in the research and development activity by economic sectors CSO, 2008. Retrieved: November 2008.

following:⁵ MKS Biaman Politechnika Białostocka Centrum Komputerowych Sieci Rozległych (MKS Biaman Białystok Technical University Centre of Wide Area Networks) and Centrum Innowacji i Transferu Technologii (Centre for Innovation, Technology Transfer). The latter centre focuses on service, research, consulting, training, promotional and organisational activities in the scope of technology transfer and the promotion of entrepreneurship.

In the conditions of low employment in the R&D enterprises field, the use of scientific and research personnel working for the universities and scientific and research centres depend on smoothly operating interrelations between universities, research and development centres and the area of economic activity, also with enterprises operating in advanced technology sectors. In the voivodship, there are 28 business-related organisations in the public sector (except research and development entities) which have a real influence on the development of a specific sector (i.e.: economic chambers, consulting companies, venture incubators, business centres, HR companies, etc.) and those which can actively operate in this area. The entities operating in this sector are: Podlaska Fundacja Rozwoju Regionalnego (Regional Development Foundation) and Fundacja Rozwoju Przedsiębiorczości w Suwałkach (Entrepreneurship Development Foundation in Suwałki).

4. Unemployment – shortage/surplus professions

The development of high technology sectors also determines the unemployment level present in the region. It can also be a sign of insufficient adoption of specialisations offered by the educational sector in the region to the demands expressed by enterprises. On the other hand, the level of unemployment reflects the unused potential of work resources from which also the enterprises operating in the fields of advanced technology can benefit. In Podlaskie voivodship in the period under analysis changes both in the unemployment structure and in the group of employed persons took place. In the context of high technology sectors two aspects are worth considering: the age factor, as the employers of innovative sectors usually prefer to employ young persons and send them for specific trainings to develop their qualifications, as well as the factor of education level. In 2005–2007 in Podlaskie region the number of unemployed persons fell in all age categories and education levels. This drop is most noticeable in the unemployed over 55 years of age, due to the fact that this group is less susceptible to migration movements as well as less flexible in the labour market. Despite the extent of the change in the unemployment rate, in the entire period under analysis, the persons of 25–34 years of age constituted the most numerous group of the unemployed (12.8 thousand persons in the 1st quarter of 2008), then the group of 45–54 years of age 45–54 (12.2 thousand persons in the 1st half of 2008). In comparison to the previous year, the unemployment in

⁵ Data from a survey questionnaire by Polish Information and Foreign Investment Agency, Regional Cooperation Department, July 2008.

these groups fell by 20 %.

In addition, for the sectors of advanced technology, information of the unemployment structure by profession groups is important as well. In 2005–2007 in Podlaskie region, persons with basic vocational education or at most gymnasium education constituted the most numerous group of the unemployed (10779 persons in the 1st half of the year). These persons could not be employed in the sectors of high technology without adequate trainings. Persons of higher and secondary education can potentially represent the latter group. In 2007–2008 the number of the unemployed within the first group decreased by 11% that is the dynamics of the fall was lower than in the entire group of the unemployed persons in Podlaskie voivodship. Persons of higher education constituted almost 8% of the unemployed in the 1st half of 2008. In the 1st quarter of 2008 the number of the unemployed of general secondary education and vocational secondary education amounted to 14.5 thousand persons. In comparison to the end of the 1st half of 2007 the unemployment decreased in the large profession groups (classification of professions by labour offices). The greatest drop in the employment concerned the most numerous profession groups of the unemployed, that is industry workers and craftsmen (by 2343 persons which is by 1.6%), technicians and other intermediate personnel (by 1617 persons which is by 19.5%) as well as personal service workers and salespersons (by 1094 persons which is by 19.7%).

As in the case of the other profession groups, the number of unemployed specialists decreased. By the end of the 1st half of 2008, 3151 persons with higher education were registered as unemployed. In comparison to the end of the 1st half of 2007 the unemployment in this group decreased by 578 persons, that is, by 15.5%. Nonetheless, this group grows within the total of the unemployed; during the year, it increased by 0.2 percentage point and reached 7.5%.

In terms of specialisations of the unemployed persons with higher education, it is important to stress, that in the recent years, economists and specialists for management not classified in other groups have been the most numerous ones (504 persons: 96 persons less than in the previous year); public administration workers not classified in other groups (442 persons: 39 persons less); economists (374 persons: 158 persons less), gymnasium and post-gymnasium school teachers (363 persons: 9 persons more); archaeologists, sociologists and related specialisations (281 persons: 18 persons more); agriculture engineers, forestry engineers and related specialisations (240 persons: 23 persons more); lawyers not classified in other groups (156 persons: 26 persons less) and elementary school teachers (149 persons: by 55 less).

In the assessment of potential supply of work resources for the sectors of high technology, the knowledge of the unemployment structure by profession groups is useful as well. In 2007 in Podlaskie voivodship the unemployed with technical specialisations constituted the most numerous group amounting to 4752 persons, 1081 persons of which were technicians, then, 683 persons were

mechanics: machine and devices fitters (profession studied: mechanic: machine and devices fitter) and 1157 technicians of agriculture and related specialisations. In other profession groups useful for the sectors of advanced technology, the unemployment rate was very low.

In the market economy information on adopting of the educational system to the needs of enterprises in the scope of adequate personnel is provided by the labour market and is considered from the point of view of the profession surplus/shortage ⁶. If the educational system is not adequately tailored to the needs of the labour market, the demand is significantly lower than the number of qualified persons wishing to exercise a given profession (surplus professions). On the other hand, the employers have difficulties filling vacant positions in certain professions (shortage professions). If the analysis is narrowed down to the professions in the field of high technology sectors, it can be noticed that in Podlaskie region in the period of 2005–2007 a surplus of professions rather than a shortage was observed. In the labour market of Podlaskie voivodship prevail surplus professions. There were 21 surplus professions and 9 shortage professions out of 30 profession groups. Therefore it can be stated, that this market still remains deeply imbalanced in the scope of the supply and demand for work.

Some profession groups, due to their specificity and a very low number of work offers, are not completely subjected to the rules of the supply and demand, such as representatives of public authorities, senior clerks, professional activists. The **highest surplus** profession groups are: farmers, intermediate technical personnel, intermediate personnel in the field of biological specialisations and healthcare, the group of other specialists, specialists of physical, mathematical and technical sciences and the group of other industry workers and craftsmen.

The **shortage** professions, representing large professions groups, demanded by the sectors of high technology are presented below: money flow and customer services clerks, vocational teacher and instructors, managers of middle and large organisations, simple jobs workers in commerce and services, office services workers. The labour offices in Podlaskie voivodship organised trainings aimed at preparing for the profession of welder.

The classification of shortage and surplus professions by 2-digit large groups is too general and does not reflect the actual situation which entails losing several significant items of information.

However, it is necessary to emphasise, that the data at which powiat (district) labour offices dispose, do not completely reflect the analysed problem. Firstly, not all the enterprises report to the labour offices on vacant workplaces and very often refer to the services of specialised companies. Secondly, the registered unemployed are frequently not interested in taking up a job. That is why, the analysis of shortage and surplus professions presents merely some regularities and relationships

⁶ According to the definition by the CSO, the shortage profession is a profession for which the demand in the labour market is higher than the number of persons searching employment in this profession.

and it is not a complete statistical analysis.

According to the poviats (district) labour offices in Podlaskie voivodship, the surplus of work resources supply concerned, in particular specialists, although it decreased in the period under analysis.

In 2005–2007 in Podlaskie voivodship significant surplus of work supply related to technicians, finance and commerce clerks, technician for biological and agricultural sciences. As in the case of the executive staff and specialists, in 2007 the surplus of these professions was much lower than in 2005. The falling trend was also present in the group of office clerks and qualified workers. In 2007 in Podlaskie voivodship, the shortage concerned the professions of: electronics equipment fitters, mechanics/fitters of machines and devices, electrotechnicians, operators of meat and fish processing machines, footwear manufacturers, tailors, hatters and the related professions, whereas in technical professions: technicians, mechanics of construction and environmental protection, technicians of electronics, electricians.

5. Wages vs. expected wages

The supply shortage of work resources in the sectors of high technologies can be related to the fact that remuneration levels do not meet the expectations of employees. In 2005–2008 in all the sectors of high technology (not only the ones covered by the analysis) located in Podlaskie voivodship the increase of the average remuneration reached 26% which was significantly higher than the average monthly remuneration in the region. It has to be emphasised that the average remuneration in the business services sector, electronics and automotive industry was below the average gross remuneration in the voivodship and in the engineering sector, the remuneration only slightly exceeded the average. As a result of the increase of wage levels in the sectors of high technology in 2008, the average monthly remuneration was higher than the average pay in the voivodship.

Table 7. Average gross remuneration and its change in high technology sectors in Podlaskie voivodship in 2005 – 2008

	Engineering industry	Electrical sector	Biotechnological sector	Automotive industry	Services for business	TOTAL (All HT sectors including the ones not covered by the analysis)

Average gross monthly remuneration in enterprises sector (Jan-Dec 2005)	2138.63	1766.61	no data	no data.	1880.93	2091.53
Average gross monthly remuneration in enterprises sector (Jan-Dec 2006)	2316.68	1836.37	no data	.no data	2014.17	2226.8
Average gross monthly remuneration in enterprises sector (Jan-Dec 2007)	2540.41	2063.4	no data	.no data	2223.85	2496.7
Average gross monthly remuneration in enterprises sector (Jan-June 2007)	2669.91	2360.05	no data	.no data	2416.4	2628.29
Dynamics: 2005-2007	125	134	no data		128	126

Source: Statistical bulletins of Podlaskie voivodship: 2005-2008.

Specific sectors of high technology differed in the level of remuneration and their pace of increase. In 2005–2008 in all the sectors under analysis, the increase in the average gross remuneration was lower than in the total of high technology sectors. The highest pay increase concerned the electronics industry (by 34%) that is the sector where in the same time, a significant growth in employment was reported. In 2005–2008 in Podlaskie voivodship, the average gross remuneration increased by 28% in the business services sector. Despite such dynamic increase in remunerations in 2008, the business services sector, similarly to the electric industry offered the lowest average gross remuneration. It is worth mentioning, that in the latter sector the increase of work efficiency was relatively low. In 2005–2008 in the engineering sector along with **a 25% increase of the average gross monthly remuneration, a very high 51% increase in work efficiency** took place. **In the group of sectors under analysis of Podlaskie voivodship the highest increase in work efficiency (92%)** was reported in the business services sector that is the sector which offered the lowest average gross remuneration in 2008, despite its high growth in 2005–2008.

The pay scale differs according to the position and in Podlaskie voivodship it equals from 2

thousand PLN on the posts of physical worker to 6 thousand PLN on the managerial positions⁷. It means that, in 2007 the average gross remuneration in the majority of the positions in the sectors of high technology was lower than the voivodship average.

The results of the analysis conducted by the Enterprise Institute of Warsaw School of Economics indicate, that in most of the cases the salaries offered in the sectors of high technology do not meet the expectations of the employees. The analysis of the offered and expected remunerations show that the average remuneration offered in Podlaskie voivodship is similar to the country average.

Conclusions

The number of persons employed in the sectors of high technology increased by 7.2 percentage points in Podlaskie voivodship in the period of 2005–2007. The number of research and development workers diminished. In 2007 there were 5489 research and development workers.

The unemployment trend still remains falling, however, its pace is much lower than a year before. In the 1st half of 2008 the number of registered unemployed decreased by 6.6 thousand persons which is by almost 14% (in comparison to the 1st half of 2007 the unemployment level diminished by 11 thousand persons which is by almost 18%) and the number of the unemployed in the group of economically active population (the unemployment rate) decreased by 1.5 percentage points in 2007 (a year before by 3.2 percentage points). In the same time, the employers reported on 278 work offers which was by 40 (by 13%) less than in the same period of the previous year. In the 1st half of 2008, 39.8 thousand persons found employment, that is by 4.7 thousand less than a year before. Particularly positive changes concerned the business services sector and the electronics industry. In fact, in 2007 persons working in the sectors of high technology constituted 6% of the total employed of Podlaskie voivodship, and in terms of the number of persons employed in the analysed sector, the business services sector was in the first position. However, the percentage of persons working in the sectors of high technology is lower than the country average. The number of graduates of technical specialisations equals 17% of the total of graduates in Podlaskie voivodship and is by 4 percentage points lower than the country average. The majority of students is trained in technical (44%) and economic and administrative professions (39%). These persons can potentially find employment in the sectors of high technology, in particular in the business services sector. The fact that the education structure is inadequately adopted to the needs of the present economy expresses itself in high unemployment among young persons and 15 thousand unemployed persons of postsecondary and vocational secondary education.

⁷ Database of the Enterprise Institute of the Warsaw School of Economics.

On the other hand, not all the graduates of technical specialisations find employment due to low the workplaces supply. In 2007 in Podlaskie voivodship persons of technical vocational specialisations, such as mechanics, fitters, electromechanics and electrical fitters as well as operators of machines and devices, constituted a numerous group of the unemployed.

In Podlaskie voivodship, economic specialisations and the humanities prevail also at secondary education level. However, in comparison with the rest of the country, a high number of students of engineering and technical specialisations, especially at the Bialystok Technical University, and a relatively high number of students of public services specialisations, should be considered positive. This situation contributes to the employment growth in the business services sector (graduates of economic and public services specialisations) and the already mentioned employment increase in the electric sector (graduates of engineering and technical specialisations). The higher education structure reflects more adequately the demand structure at the post-gymnasium level which is reflected by a low unemployment rate among persons of higher education. According to the poviat (district) labour offices data which are not completely reliable, in Podlaskie voivodship the supply surplus of the executive staff and specialists is relatively low and is gradually decreasing.

The poviat (district) labour offices in Podlaskie voivodship report on the surplus in highly qualified work resources, which is inconsistent with the market situation, and a considerable increase in remuneration levels in the business services sector, such as a growth in the electrical industry and the engineering sector (by over 30% and 25%, respectively). However, they still do not meet the expectations of employees, as they are lower than in other economy sectors. It contributes to the migration outflow of high-class experts and also negatively influences the interest of young persons in technical at the post-gymnasium or higher level.