

Warsaw School of Economics  
Enterprise Institute

**Labour market in Polish regions 2008**  
**Basic parameters of the labour market in selected economy**  
**sectors**  
**in 2008, and changes thereof in the years 2005 - 2007.**

Summary report

Prepared by:

**Prof. Ph.D. hab. Irena Lichniak**

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This report prepared at the Enterprise Institute, Warsaw School of Economics, contains information about the labour market in selected economy sectors in individual voivodships. It consists of 16 reports describing labour market in the following sectors: engineering industry, electronics industry, automotive industry, aviation industry, medical biotechnology industry and business services sector (including R+D). Development of these sectors plays a special role in improving competitiveness of the Polish economy. Poland, like many countries and regions of the world, treats acquisition of technologically advanced capital as an important factor contributing to the development of the sectors. One of the key conditions for the acquisition are suitable labour resources. Therefore, it is important to answer the question: which regions, from the point of view of labour resources, are attractive for technologically advanced capital? The aim of this paper was to find answer to this question.

In order to realise this goal, a survey was conducted among enterprises representing selected sectors, post-gymnasium and higher schools, Vocational Training Centres and labour offices. Questionnaires were sent to 9 thousand respondents (questionnaire forms are attached to this document). The survey supplied many valuable data unavailable in the following publications that were also used in preparation of this paper:

- publications of the Central Statistical Office, and voivodship and powiat statistical offices, including CSO's Regional Data Bank;
- databases of the Education Information System owned by the Ministry of Education;
- databases of the Ministry of Labour and Social Policy, Voivodship Labour Offices and documents prepared by state employment services;
- PONT INFO database;
- documents and expert opinions prepared by advisory companies specialising in Polish labour market research;
- other sources.

Analysed sectors were identified as follows:

- engineering industry (sector) comprises enterprises classified in section 29 of the Polish Classification of Economic Activities (Manufacture of machinery);
- electronics industry (sector) comprises enterprises classified in section 30 (Manufacture of office machinery and computers);
- automotive industry (sector) comprises sections 34 (Manufacture of motor vehicles, trailers and semi-trailers), and 35.4 (Manufacture of motorcycles and bicycles);
- aviation industry (sector) comprises enterprises classified in section 35.3 (Manufacture

of aircraft and spacecraft);

- medical biotechnology sector comprises enterprises in section 24.4 (Manufacture of medicinal chemicals and pharmaceuticals), and section 73.10 B, D, E, F, H (Research and experimental development on chemistry, biology, natural environment, forestry, agriculture, veterinary sciences, medical sciences, pharmacy and other natural sciences and engineering);
- business services sector comprises enterprises classified in sections: 64 (Post and telecommunications), 65 (Financial intermediation, except insurance and pension funding), 67 (Activities auxiliary to financial intermediation), 70.3 (Real estate activities on a fee or contract basis), 71 (Renting of machinery and equipment without operator and of personal and household goods, with the exception of 71.40 - Renting of personal and household goods), 72 (Computer and related activities), 73 (Research and development, with the exception of 73.20 - Research and experimental development on social sciences and humanities), 74 (Other business activities, including legal, accounting, book-keeping activities, management activities of holding companies, architectural and engineering activities, technical consultancy, advertising, labour recruitment and provision of personnel, detective and security activities, industrial cleaning).

Reports on labour markets in individual voivodships contain basic labour market parameters, as well as information about availability of personnel for selected sectors, with details on the level and field of education, selected occupational groups, knowledge of languages, and offered and expected wages.

This document takes into the account labour resources in operating enterprises, post-gymnasium and higher schools graduates, as well as unemployed people. It also contains information about the potential of research personnel employed in higher schools and research and development units. The analysis comprises the years 2005 - 2007 and the year 2008.

General conclusions from the analysis of labour markets in individual voivodships, in selected economy sectors are presented below:

In the years 2005 - 2007 the position of the selected economy sectors in Poland was strengthened. The number of enterprises and employees in these sectors went up. In 2007 in the selected sectors in Poland there were 7658 enterprises employing 10 people and more, and submitting F-01 financial reports.

They employed nearly 1.2 million people. The largest group of enterprises represents the business services sector, the following positions are occupied by: engineering, electronics,

automotive, biotechnology and aviation industries. In terms of location, the largest number of enterprises operated in Mazowieckie voivodship, with Śląskie, Dolnośląskie and Małopolskie on further positions. Almost a half of Poland's medium-sized and large companies classified in the selected sectors operate in these voivodships. The smallest number of enterprises operate in the following voivodships: Podlaskie, Opolskie, Świętokrzyskie, Warmińsko-Mazurskie and Lubuskie. The distribution of the sectors' employees corresponds to the distribution of enterprises: the largest number of personnel worked in Mazowieckie, Śląskie and Dolnośląskie, and the smallest - in Podlaskie and Warmińsko-Mazurskie.

The largest occupational groups among the sectors' personnel are: financial and trade personnel, office workers supporting economic activity, trade agents, office personnel, metal processing workers, and machines and devices mechanics. The largest number of jobs was offered to specialists in sales, finance, banking, vindication, and managerial personnel. Such offers occur mainly in regions with the largest number of occupied jobs.

High technology enterprises have difficulties with finding the following personnel:

- in the business services sector: consultants, experts, sales specialists, programmers, IT specialists and translators;
- in the aviation sector: production managers and locksmiths,
- in the automotive sector: electronics specialists, painters, cnc programmers, mechanics and exports specialists;
- in the engineering sector: locksmiths, welders, production engineers, numerically controlled machines operators, salespersons;
- in the biotechnology sector: pharmaceutical representatives and production managers.

High technology enterprises have strict requirements in terms of personnel's educational background and professional qualifications. The following candidate's features are taken into the account while assessing his suitability for work: specialist knowledge, qualifications and skills confirmed by certificates and specialist courses, experience confirmed by professional successes, personality features like communication skills, ability to work in a team, non-confrontational attitude, creativity, ability to solve problems creatively, openness to new experiences, knowledge of foreign languages on a level appropriate for contacts with customers and keeping up to date with specialised literature. Skills important for managerial personnel include, alongside professional experience, experience in human resources management, ability to think strategically, solve problems, foresee and prevent difficult situations.

The situation of labour resources for high technology sectors varies strongly from

region to region in terms of employment activity, research and development potential, number of graduates of different schools, further education system, activity of labour market institutions in the field of training unemployed people to adjust them to needs of employers in the sectors.

Employment activity in Poland is very low, which is proved by the very low employment rate of 48.5%. The employment rate is different in each region: from 51.9% in Mazowieckie voivodship to 44.3% in Zachodniopomorskie voivodship. Higher than average employment rate occurs in the following voivodships: Lubelskie, Wielkopolskie, Łódzkie, Podlaskie, Świętokrzyskie, Podkarpackie and Małopolskie. In recent years the rate increased in Świętokrzyskie, Dolnośląskie and Lubuskie voivodships.

There are very high regional differences in R+D workers. In Poland there are 4.3 R+D workers per 1 thousand employees. This factor is the highest in Mazowieckie voivodship (9.8), and the lowest in Świętokrzyskie (1.2). Higher than average saturation with R+D staff occurs only in Małopolskie and Pomorskie voivodships. The same is true about research fellows in higher schools. Nearly a half of all researchers work in four voivodships: Mazowieckie, Małopolskie, Śląskie and Wielkopolskie. The highest increase of the number of scientists in 2007, in comparison with 2004, occurred in Kujawsko-Pomorskie, Łódzkie and Lubelskie voivodships.

The structure of post-gymnasium schools graduates does not correspond to high technology sector needs. High technology companies need graduates of technical subjects. In Poland, the share of technical schools graduates in the overall number of post-gymnasium schools graduates is equal to 16%, with the highest share in Podkarpackie (22%), the lowest in Dolnośląskie (12%). On average in Poland, 46% of post-gymnasium schools graduates major in economic and administrative subjects, 32% in general technical subjects, and only 22% in specialised technical subjects. Situation of specialised technical education is the worst in Warmińsko-Mazurskie voivodship (13%), and the best in Śląskie voivodship (31%).

In Poland there are 157 higher school graduates per 10 thousand people; the rate varies strongly from region to region, from 102 in Opolskie voivodship to 211 in Mazowieckie voivodship. The rate is higher from the national average also in Małopolskie, Łódzkie and Dolnośląskie voivodships. High technology sector companies are interested the most in graduates from the following faculties: biology, chemistry, medicine, engineering, physics and information technology. In 2007 the share of graduates of some of the abovementioned faculties in the overall number of graduates was as follows: biology 3%, physics 3%, information technology 4%, engineering 9%. Thus, the structure of higher education does not

correspond to the needs of high technology sectors. Analysis of individual voivodships shows that some of them specialise in faculties particularly useful for high technology sectors: in Warmińsko-Mazurskie 10% of higher schools graduates majored in biology, 13% of graduates in Podlaskie, 12% in Zachodniopomorskie, 11% in Malopolskie, and 10% in Dolnośląskie, Mazowieckie and Pomorskie majored in engineering.

Foreign languages teaching, alongside occupational education, is another important field for high technology sector employers. In terms of foreign languages taught at schools, Poland has fewer languages per one student than the EU average; however, we achieve better results in teaching English and German. The best situation of language teaching at school occurred in Śląskie voivodship. Teaching of individual languages differs from voivodship to voivodship; e.g. Mazowieckie is the leader in teaching Russian; groups of students learning French, Russian and German are the smallest in Opolskie.

Cooperation between high technology companies and educational establishments is weak. The strongest relations were established between the companies and basic vocational and technical schools; the cooperation consists of internships, practical training courses and other types of training courses. Only 9% of the surveyed companies cooperate with higher schools in acquiring new staff; the cooperation takes the form of internships, training courses and postgraduate studies. As for postgraduate studies, 38% of doctoral students study at technical, agricultural, economy, medical and higher vocational schools. It seems that these are the types of schools where top-quality specialists for high technology sectors are being educated.

In terms of wages, Warmińsko-Mazurskie offers the best conditions for investors (average gross wage over 16% lower from the national average), however the quality of labour in this voivodship is low. Extremely different conditions may be found in Mazowieckie voivodship where the average monthly gross wage is 28% higher from the national average, but the quality of labour is also high.

A barrier to acquisition of new employees are wages offered by high technology companies; the wages are lower from the expected ones. Discrepancies between offered and expected wages are higher in managerial positions, than in worker positions. In majority of cases the average discrepancy between offered and expected wage was 1 thousand PLN.

Unemployed people are not a good source of labour for high technology companies as such companies need only people with suitable education and occupational training. The share of unemployed higher education diploma holders is low (7% in 2007); unemployed post-secondary vocational school and secondary vocational school diploma holders constitute 22%

of the population, unemployed general lyceum diploma holders - 9%, and the unemployed with vocational training - 30%. The largest group among unemployed people are those without professional experience (23%). The worst situation in terms of education and working experience among the unemployed occurs in Podkarpackie and Łódzkie voivodships. The share of unemployed representatives of occupations needed by high technology companies is low; e.g. unemployed engineers constitute from 0.3% of all unemployed in Kujawsko-Pomorskie, Pomorskie and Warmińsko-Mazurskie, to 0.6% in Dolnośląskie, Malopolskie, Śląskie and Świętokrzyskie. On the other hand, there is a large share of unemployed people without any occupational training: national average - 19%, 24% in Świętokrzyskie and 1.8% in Opolskie. Knowledge of foreign languages among unemployed people is poor.

Ongoing education plays an important role in alleviating high technology companies' recruitment difficulties. Schools and other facilities, under ongoing education programmes, train IT staff, production processes operators, mechanical processing workers, bookkeepers, and office personnel. Managerial personnel receives additional training in author's rights protection, patents and languages.

Labour offices play an important role in organising training for the unemployed. Training courses organised by labour offices are used by high technology companies, because it is for them one of the ways to acquire representatives of shortage occupations such as: numerically controlled machines operators, welders, locksmiths, bookkeepers, computer service personnel. Training institutions offer a variety of courses that could satisfy the majority of high technology companies' needs, however the companies fail to use the opportunity.

One of the important roles of labour offices is to monitor surplus and shortage occupations. Information about such occupations from labour offices do not reflect the actual situation on the local labour market. It is so, because the offices collect information about the number of job offers for a specific occupation notified to the office, and about the number of registered unemployed people; the surplus or shortage is calculated as a difference between the two values. It is obvious, however, that employers do not notify all vacancies to labour offices; in particular, they do not address labour offices when looking for specialists, since they know that this is not the best place to find them. On the other hand, specialists do not register in labour offices and search work without the help of public employment services. This monitoring of surplus and shortage occupations is not fit for the purpose of establishing which occupations are demanded by employers, and which occupations are in surplus. This is the reason why information from labour offices are different from those obtained from

employers looking for employees, and from job seekers.

More extensive use of flexible work organisation in Poland could considerably reduce recruitment difficulties encountered by high technology enterprises. Introduction of various forms of flexible work organisation in enterprises will result in a better use of equipment and labour, an adjustment to demand fluctuations and changing order intensity, a use of opportunities provided by new technologies, including information technology, and consequently in lowering of costs. Flexible working hours are also attractive for employees as the result of changing styles of life, work and leisure, higher value of free time, and increased need for training causing longer absences in the workplace. Thus, flexible work organisation, on the one hand, enables the company to adjust employees' working hours to its needs, on the other, enables workers to choose the length of time devoted to work and distribution of working hours, which is important for combining professional and family responsibilities, for employees in different age groups, disabled and studying. Taking into the account possibilities and preferences of employees that are hard to acquire, usually with high and unique qualifications, will make it easier to recruit them. In particular, one may take into the account employees' time spend on the commute, their involvement with other employers; companies could consider letting their staff execute work outside of the workplace, and allow for e.g. conducting research in a particular time and place. This applies to, *inter alia*, the following occupations: research and development personnel, IT specialists, designers, constructors, architects, bookkeepers and financial advisors, and managers at different levels.

High technology companies may also find it easier to find employees by offering them employment under employment contracts and other forms of employment agreements. This concerns in particular working from home and telework. Propagation of this type of employment is connected with the development of telecommunications and modern information technologies.



## Annexes:

**Table 1. Changes in the number of high technology enterprises and the number of employees in regions of Poland in the years 2005 - 2007 (medium-sized and large enterprises employing more than 9 persons)**

Region	The number of region's high technology employees			The number of high technology enterprises		
	2005	2007	Change (2007/2005)	2005	2007	Change (2007/2005)
Dolnośląskie	108470	125069	16599	698	779	81
Kujawsko-Pomorskie	29418	32687	3269	319	321	2
Lubelskie	16888	18367	1479	231	227	-4
Lubuskie	16587	22054	5467	165	192	27
Łódzkie	48778	57798	9020	435	469	34
Małopolskie	57855	67085	9230	587	618	31
Mazowieckie	342594	379316	36722	1461	1510	49
Opolskie	13574	16525	2951	138	155	17
Podkarpackie	36277	48133	11856	268	293	25
Podlaskie	10910	7278	-3632	138	136	-2
Pomorskie	38513	47455	8942	486	518	32
Śląskie	136354	152951	16597	1212	1204	-8
Świętokrzyskie	12712	15576	2864	156	170	14
Warmińsko-Mazurskie	10619	11566	947	161	176	15
Wielkopolskie	82803	89301	6498	614	608	-6
Zachodniopomorskie	15862	16272	410	263	282	19
Poland	1024773	1165764	140991	7332	7658	326

Source: own document based on data from PONT INFO.

**Table 2. Geographical distribution of the analysed high technology enterprises with numbers of employees in 2007 (medium-sized and large enterprises employing more than 9 persons) [%]**

<b>Region</b>	<b>Geographical distribution of the analysed high technology enterprises in 2007 [%]</b>	<b>Geographical distribution of high technology employees in 2007 [%]</b>
Dolnośląskie	10.2	10.7
Kujawsko-Pomorskie	4.2	2.8
Lubelskie	3.0	1.6
Lubuskie	2.5	1.9
Łódzkie	6.1	2.9
Małopolskie	8.1	5.8
Mazowieckie	19.7	32.5
Opolskie	2.0	1.4
Podkarpackie	3.8	4.1
Podlaskie	1.8	0.6
Pomorskie	6.8	4.1
Śląskie	15.7	13.1
Świętokrzyskie	2.2	1.3
Warmińsko-Mazurskie	2.3	1.0
Wielkopolskie	7.9	7.7
Zachodniopomorskie	3.7	1.4
<b>Poland</b>	<b>100.0</b>	<b>100.0</b>

Source: own document based on data from PONT INFO.

**Table 3. Positions for which, in the respondents' opinion, recruitment was problematic**

Medical biotechnology sector	Engineering sector	Electronics sector	Automotive sector	Aviation sector	Business services sector
Pharmaceutical representative Production manager	Locksmith Welder Production engineer Numerically controlled machine operator Marketing specialist / trader Customer advisor - engineer Laboratory manager Bookkeeper	Programmer Offer specialist Electrical fitter	Electronics specialist Car body painter Cnc programmer CNC operator Mechanic Export division specialist	Locksmith Production manager	Consultant Expert Sales specialist Analyst IT specialist - programmer Computer systems implementation specialist Translator Sales department director

Source: Source: survey conducted by Enterprise Institute "*Labour market in Polish regions 2008*".

**Table 4. The most and least attractive regions in terms of wages in 2007**

Medical biotechnology sector (section 24.4)	Top attractiveness	Łódzkie (8,67%)*
	Lowest attractiveness	Kujawsko-pomorskie (34,59%)
Engineering sector (sections 29 and 31)	Top attractiveness	Wielkopolskie (16,48%; 11,12%)
	Lowest attractiveness	Podkarpackie (22,93%; 25,87%)
Electronics sector (section 33)	Top attractiveness	Mazowieckie (18,44%)
	Lowest attractiveness	Lubelskie (40,63%)
Automotive sector (section 34)	Top attractiveness	Śląskie (4,60%)
	Lowest attractiveness	Zachodniopomorskie (24,88%)
Aviation sector (section 35.3)**	Top attractiveness	Mazowieckie (33,55%)
	Lowest attractiveness	Podkarpackie (35,86%)
Business services (section 74)	Top attractiveness	Świętokrzyskie (14,13%)
	Lowest attractiveness	Dolnośląskie (55,46%)

\* percentage values mean values of the wage indicator calculated as:  
Remuneration + social insurance and other benefits \* 100% / Net sales income;

\*\* only two voivodships were taken into the account.

Source: own document based on PONT INFO database.

**Table 5. Employment rate for economically productive population  
in the years 2004 - 2007 by voivodship.**

Details	2004	2005	2006	2007
<i>Poland</i>	44.3	45.2	46.5	48.5
Dolnośląskie	40.2	42.0	44.9	46.5
Kujawsko-Pomorskie	43.8	44.7	44.3	45.8
Lubelskie	47.7	48.6	48.8	51.1
Lubuskie	42.1	44.6	45.7	48.2
Łódzkie	44.7	45.7	47.1	49.7
Małopolskie	47.1	47.4	48.1	48.9
Mazowieckie	47.7	47.8	49.9	51.9
Opolskie	43.0	44.7	45.8	46.4
Podkarpackie	44.8	45.2	46.7	49.3
Podlaskie	47.1	48.0	47.8	49.6
Pomorskie	42.5	43.5	45.6	48.1
Śląskie	41.3	42.3	43.9	46.1
Świętokrzyskie	41.9	44.0	46.5	49.6
Warmińsko-Mazurskie	41.6	41.6	43.2	46.0
Wielkopolskie	46.8	47.2	48.3	49.9
Zachodniopomorskie	41.4	41.8	42.1	43.7

Source: Own document based on data from BDR of 22 October 2008.

**Table 6. Employment in R+D**

Details	research personnel	technicians and equivalent personnel	Other personnel	per 1000 professionally active people
<b>Poland</b>	81%	12%	7%	4.3
Dolnośląskie	85%	12%	3%	3.8
Kujawsko-Pomorskie	87%	8%	5%	3.4
Lubelskie	84%	11%	4%	3.3
Lubuskie	96%	3%	1%	1.6
Łódzkie	79%	12%	9%	3.4
Małopolskie	88%	8%	4%	5.4
Mazowieckie	76%	13%	11%	9.8
Opolskie	81%	13%	7%	2.4
Podkarpackie	68%	24%	9%	1.7
Podlaskie	87%	8%	4%	2.8
Pomorskie	89%	8%	4%	5.4
Śląskie	82%	12%	5%	3.5
Świętokrzyskie	85%	8%	8%	1.2
Warmińsko-Mazurskie	88%	8%	4%	2
Wielkopolskie	78%	10%	11%	3.5
Zachodniopomorskie	72%	27%	1%	3.4

Source: Own document based on *Nauka i Technika w 2006 r. (Science and Technology in 2006)* Statistical data GUS, Warszawa 2007.

**Table 7. Research fellows at higher schools; independent and employed researchers in 2007, by voivodship**

<b>Details</b>	<b>Total</b>	<b>independent</b>	<b>Employed</b>
<i>Poland</i>	99 221	24%	76%
Dolnośląskie	8 753	22%	56%
Kujawsko-Pomorskie	4 435	25%	55%
Lubelskie	6 476	20%	61%
Lubuskie	1 606	23%	51%
Łódzkie	7 749	25%	55%
Małopolskie	12 220	21%	57%
Mazowieckie	16 464	28%	51%
Opolskie	1 642	26%	54%
Podkarpackie	3 212	23%	47%
Podlaskie	3 072	21%	61%
Pomorskie	5 908	22%	57%
Śląskie	9 781	21%	58%
Świętokrzyskie	1 794	30%	49%
Warmińsko-Mazurskie	2 687	26%	55%
Wielkopolskie	9 290	24%	49%
Zachodniopomorskie	4 132	23%	58%

Source: Own document based on data from BDR of 22 October 2008.

**Table 8. Average knowledge of English in unemployed people, by education background and voivodship.**

Details	primary school (education)	vocational training	secondary education	engineer (BSc degree)	higher education	average
<i>Poland</i>	2.0	2.6	3.1	2.7	2.9	2.9
Dolnośląskie	1.0	-	3.0	2.3	2.5	2.7
Kujawsko-Pomorskie	-	3.0	2.5	-	2.0	2.6
Lubelskie	-	-	3.1	4.0	2.8	3.1
Lubuskie	-	3.0	2.3	-	3.0	2.6
Łódzkie	-	-	3.4	-	-	3.4
Małopolskie	-	2.0	3.0	3.0	3.2	2.9
Mazowieckie	-	-	3.6	3.5	2.5	3.3
Opolskie	-	-	2.7	2.0	-	2.5
Podkarpackie	-	1.0	2.9	3.0	3.1	2.9
Podlaskie	1.0	-	3.0	1.0	3.0	2.4
Pomorskie	3.0	2.0	2.8	3.5	2.5	2.8
Śląskie	-	3.0	3.0	2.0	2.7	2.9
Świętokrzyskie	-	-	3.3	2.0	3.0	3.0
Warmińsko-Mazurskie	-	-	2.8	2.0	4.0	2.9
Wielkopolskie	3.0	3.5	3.2	-	2.7	3.1
Zachodniopomorskie	-	3.0	3.1	-	4.0	3.2

"-" no data

Source: Own document based on a survey of the knowledge of English conducted electronically on 29.08 - 2.09.2008



**Table 9. Survey of knowledge of foreign languages conducted by Poviats Labour Offices, by voivodship.**

Details	English	German	Russian
<i>Poland</i>	2.4	1.9	2.0
Dolnośląskie	2.2	2.2	2.2
Kujawsko-Pomorskie	2.0	1.9	2.0
Lubelskie	2.3	1.0	2.5
Lubuskie	3.0	2.0	2.0
Łódzkie	2.0	1.5	1.0
Małopolskie	2.2	1.7	1.4
Mazowieckie	2.1	1.6	1.7
Opolskie	3.5	4.0	2.0
Podkarpackie	2.0	1.3	3.0
Podlaskie	2.5	2.3	3.3
Pomorskie	2.1	2.0	1.4
Śląskie	2.3	1.4	1.1
Świętokrzyskie	2.3	2.3	1.3
Warmińsko-Mazurskie	2.0	1.8	1.5
Wielkopolskie	2.4	2.1	2.1
Zachodniopomorskie	2.7	2.0	3.0

Source: Own document based on a survey "Labour market in Polish regions 2008. Questionnaire for Poviats Labour Offices"

**Table 10. Post-gymnasium schools graduates (with the exception of special schools) in 2007**

Details	Number of post-gymnasium schools graduates		Structure of graduates by school type				
	Total	Percentage	Vocational schools	Post-secondary vocational schools	Specialised lyceums	Post-gymnasium technical schools	General education lyceums
<i>Poland</i>	613 270	100	12%	17%	11%	16%	44%
Dolnośląskie	45 781	7	11%	20%	15%	12%	43%
Kujawsko-Pomorskie	34 890	6	13%	20%	8%	16%	42%
Lubelskie	38 249	6	9%	18%	12%	14%	47%
Lubuskie	16 580	3	12%	17%	15%	16%	41%
Łódzkie	38 167	6	9%	17%	10%	15%	49%
Małopolskie	54 500	9	13%	16%	9%	19%	43%
Mazowieckie	74 884	12	10%	14%	10%	14%	52%
Opolskie	15 980	3	15%	16%	16%	14%	39%
Podkarpackie	36 736	6	12%	13%	12%	22%	42%
Podlaskie	20 858	3	8%	17%	12%	17%	44%
Pomorskie	35 752	6	14%	18%	12%	14%	43%
Śląskie	74 071	12	10%	21%	11%	18%	40%
Świętokrzyskie	19 681	3	10%	10%	13%	20%	47%
Warmińsko-Mazurskie	24 330	4	12%	17%	13%	15%	42%
Wielkopolskie	57 532	9	15%	18%	11%	17%	39%
Zachodniopomorskie	25 279	4	11%	17%	12%	14%	45%

Source: Own document based on Regional Data Bank of CSO, as of 11.10.2008 r.

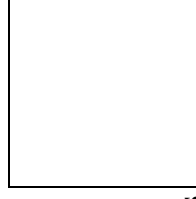
**Table 11. Higher schools graduates by faculty useful to advanced technology companies in 2007**

Details	biology	physics	information technology	engineering
<i>Poland</i>	3%	3%	4%	9%
Dolnośląskie	3%	3%	5%	10%
Kujawsko-Pomorskie	5%	5%	1%	7%
Lubelskie	4%	3%	2%	7%
Lubuskie	2%	0%	4%	4%
Łódzkie	3%	4%	6%	6%
Małopolskie	3%	3%	4%	11%
Mazowieckie	2%	2%	3%	10%
Opolskie	2%	2%	6%	5%
Podkarpackie	2%	2%	5%	7%
Podlaskie	4%	1%	6%	13%
Pomorskie	2%	2%	3%	10%
Śląskie	3%	4%	5%	9%
Świętokrzyskie	3%	5%	2%	8%
Warmińsko-Mazurskie	10%	0%	3%	3%
Wielkopolskie	4%	3%	3%	9%
Zachodniopomorskie	3%	1%	5%	12%

Source: Own document based on data from BDR of 22 October 2008.



Table 12. Number of students in post-gymnasium schools by occupation in individual voivodships  
**SIO database - as of 31.03.08**



**Source: own document based on**

Table 13. Number of students in post-gymnasium schools by occupation in individual voivodships

<b>Voivodship</b>	<b>Economic-administrative</b>	<b>General technical</b>	<b>Specialised technical</b>	<b>Total</b>
Dolnośląskie	16 299	13 045	8 484	37 828
Kujawsko-Pomorskie	14 198	11 342	4 897	30 437
Lubelskie	9 712	12 642	4 676	27 030
Lubuskie	5 420	6 190	3 043	14 653
Łódzkie	13 789	11 341	8 614	33 744
Małopolskie	18 872	18 881	9 017	46 770
Mazowieckie	22 514	21 449	8 814	52 777
Opolskie	6 083	5 158	3 094	14 335
Podkarpackie	12 435	12 936	8 243	33 614
Podlaskie	6 205	7 092	2 665	15 962
Pomorskie	13 817	11 453	6 230	31 500
Śląskie	24 520	22 324	18 632	65 476
Świętokrzyskie	6 194	8 854	3 895	18 943
Warmińsko-Mazurskie	10 466	6 712	3 392	20 570
Wielkopolskie	22 792	18 590	11 881	53 263
Zachodniopomorskie	7 465	6 500	3 673	17 638
<b>Poland</b>	<b>210 781</b>	<b>194 509</b>	<b>109 250</b>	<b>514 540</b>

Source: own document based on SIO database - as of 31.03.08

**Table 14. Vacant positions in the analysed sectors (in 2008)**

Sector	Vacancy problem - due to qualifications	Sector	Vacancy problem - due to qualifications
Medical biotechnology sector	customer acquisition	business services (including R+D)	consultant
	production manager		technical expert
electronics industry	offer specialist		technical inspector
	programmer		constructor
	electrical fitter		control systems specialist
	electro-mechanic		IT specialist in a tribology facility
	production manager		analyst
aviation industry	production manager		IT specialist - programmer
	locksmith		decorator
engineering industry	project account manager		lawyer
	physical worker		foreman
	welder		translator
	bookkeeper		welder
	locksmith		information systems
	diagnostic laboratory manager		implementation specialist
automotive industry including car parts manufacturing	project account manager		trade teaching methodology specialist
	CNC operator		ERP projects implementation specialist
	mechanic		
	lorry driver		
	bookkeeper		
	mechanic		

Source: own document based on a questionnaire survey.

**Table 15. Employment in R+D activities by voivodship**

Details	Total	research personnel	technicians and equivalent personnel	other personnel	research personnel	technicians and equivalent personnel	other personnel
<i>Poland</i>	73 554.30	59 572.70	8 661.60	5 320.00	81%	12%	7%
Dolnośląskie	5 126.10	4 367.40	594.20	164.50	85%	12%	3%
Kujawsko-Pomorskie	2 950.60	2 578.40	227.30	144.90	87%	8%	5%
Lubelskie	3 318.80	2 800.20	369.90	148.70	84%	11%	4%
Lubuskie	791.70	757.70	26.60	7.40	96%	3%	1%
Łódzkie	4 341.60	3 411.80	522.80	407.00	79%	12%	9%
Małopolskie	8 010.60	7 038.70	622.90	349.00	88%	8%	4%
Mazowieckie	24 336.60	18 553.70	3 214.90	2 568.00	76%	13%	11%
Opolskie	948.70	767.10	119.20	62.40	81%	13%	7%
Podkarpackie	1 525.60	1 030.90	360.50	134.20	68%	24%	9%
Podlaskie	1 310.10	1 144.90	106.90	58.30	87%	8%	4%
Pomorskie	4 425.20	3 916.80	341.90	166.50	89%	8%	4%
Śląskie	6 867.60	5 658.30	845.00	364.30	82%	12%	5%
Świętokrzyskie	770.70	653.90	58.80	58.00	85%	8%	8%
Warmińsko-Mazurskie	1 182.70	1 045.70	89.60	47.40	88%	8%	4%
Wielkopolskie	5 398.50	4 223.20	558.00	617.30	78%	10%	11%
Zachodniopomorskie	2 249.20	1 624.00	603.10	22.10	72%	27%	1%

Source: Own document based on *Nauka i Technika w 2006 r. (Science and Technology in 2006)* Statistical data GUS, Warszawa 2007.



**Table 16. Research fellows at higher schools; independent and employed 2004 - 2007 by voivodship**

Details	2 004				2 005				2 006				2 007			
	Total	independ ent	employe d		Total	independ ent	employe d		Total	independ ent	employe d		Total	independ ent	employe d	
<i>Poland</i>	91 558	23%	77%		97 702	23%	77%		98 262	23%	77%		99 221	24%	76%	
Dolnośląskie	8 161	21%	79%		8 814	22%	78%		8 781	22%	78%		8 753	22%	78%	
Kujawsko-Pomorskie	3 448	26%	74%		4 208	26%	74%		4 380	25%	75%		4 435	25%	75%	
Lubelskie	5 911	19%	81%		6 266	20%	80%		6 417	19%	81%		6 476	20%	80%	
Lubuskie	1 546	21%	79%		1 681	22%	78%		1 654	21%	79%		1 606	23%	77%	
Łódzkie	6 659	24%	76%		7 180	24%	76%		7 224	25%	75%		7 749	25%	75%	
Małopolskie	11 447	20%	80%		11 874	21%	79%		12 096	21%	79%		12 220	21%	79%	
Mazowieckie	15 624	28%	72%		16 385	28%	72%		16 325	27%	73%		16 464	28%	72%	
Opolskie	1 550	25%	75%		1 631	26%	74%		1 622	25%	75%		1 642	26%	74%	
Podkarpackie	3 106	21%	79%		3 379	22%	78%		3 239	22%	78%		3 212	23%	77%	
Podlaskie	2 880	20%	80%		3 012	20%	80%		3 039	20%	80%		3 072	21%	79%	
Pomorskie	5 728	21%	79%		5 830	21%	79%		5 850	21%	79%		5 908	22%	78%	
Śląskie	9 207	20%	80%		9 921	21%	79%		9 943	21%	79%		9 781	21%	79%	
Świętokrzyskie	1 841	30%	70%		1 822	28%	72%		1 825	29%	71%		1 794	30%	70%	
Warmińsko-Mazurskie	2 357	26%	74%		2 647	28%	72%		2 650	26%	74%		2 687	26%	74%	
Wielkopolskie	8 088	25%	75%		8 823	25%	75%		9 042	24%	76%		9 290	24%	76%	
Zachodniopomorskie	4 005	21%	79%		4 229	22%	78%		4 175	22%	78%		4 132	23%	77%	

Source: Own document based on data from BDR of 22 October 2008.

**Table 17. Unemployment by occupational group, as of the end of 2007**

Details	Poland	Dolnośląskie	Kujawsko-Pomorskie	Lubelskie	Lubuskie	Łódzkie	Małopolskie	Mazowieckie	Opolskie	Podkarpackie	Podlaskie	Pomorskie	Śląskie	Świętokrzyskie	Warmińsko-Mazurskie	Wielkopolskie	Zachodniopomorskie
technical occupations	116 191	8 185	7 073	10 170	3 136	8 799	6 983	13 089	2 439	10 586	4 073	4 752	8 958	7 913	6 387	7 649	5 999
engineering professions	8 434	708	373	496	216	629	695	1 037	196	535	290	293	1 063	506	296	540	561
machines and devices operators	26 790	2 060	1 684	1 496	921	1 999	1 729	3 915	539	2 978	922	1 174	2 557	1 097	1 090	1 418	1 211
electro-mechanics and electrical fitters	19 466	1 510	1 317	1 219	516	1 696	1 175	2 339	510	1 389	495	834	2 265	1 211	815	1 099	1 076
biology- and chemistry-related occupations	2 120	175	157	125	33	254	176	268	59	123	32	80	243	88	58	153	96
laboratory staff	2 449	216	237	146	84	125	210	319	119	194	36	109	285	46	106	109	108
mechanics	43 497	2 928	2 614	2 818	1 756	3 767	2 216	5 616	1 210	3 413	1 568	1 739	3 225	2 612	2 555	2 391	3 069
fitters	28 654	2 321	1 916	1 786	977	2 014	1 488	4 739	796	1 887	746	1 571	2 436	1 164	1 238	1 756	1 819
no occupation	331 008	22 556	22 974	24 630	9 794	23 601	17 924	40 706	5 994	21 918	10 700	16 603	30 667	20 171	22 252	21 174	19 344
other occupations	1 167 964	86 798	84 898	75 260	34 860	80 264	80 006	147 896	31 476	83 337	29 934	59 749	114 261	48 531	64 198	76 538	69 958

Source: Own document based on data from VLO.

**Table 18. Average monthly gross wages in relation to the national average (Poland = 100)**

Details	2004	2005	2006	2007	Change 2004 to 2007 in %
<i>Poland</i>	100.0	100.0	100.0	100.0	-1%
Dolnośląskie	97.8	98.8	99.3	99.8	0%
Kujawsko-Pomorskie	86.6	85.9	86.0	85.2	-2%
Lubelskie	87.0	87.0	86.9	86.7	-2%
Lubuskie	85.8	85.5	84.8	84.8	-1%
Łódzkie	88.1	87.3	86.8	86.2	2%
Małopolskie	92.0	91.9	92.7	93.0	1%
Mazowieckie	128.5	128.7	128.2	128.1	-1%
Opolskie	90.6	89.7	89.8	91.0	0%
Podkarpackie	83.8	83.0	82.7	82.8	0%
Podlaskie	87.5	87.5	87.5	88.1	1%
Pomorskie	98.5	100.2	100.5	100.6	-2%
Śląskie	103.3	103.2	103.5	102.3	-1%
Świętokrzyskie	87.9	86.7	85.8	86.1	0%
Warmińsko-Mazurskie	85.1	83.9	84.1	83.7	-2%
Wielkopolskie	91.5	90.3	90.6	91.1	2%
Zachodniopomorskie	92.2	92.1	91.3	91.3	-1%

Source: Own document based on data from BDR of 22 October 2008.

