

STI OUTLOOK 2002 – COUNTRY RESPONSE TO POLICY QUESTIONNAIRE**POLAND****1. General framework and trends in science, technology and industry policy****1.1.**

The State Committee for Scientific Research (KBN) establishment act of the 12th of January 1991 made it possible to introduce a modern system for the organisation and financing of research, characterised by the observance of competition principles when applying for public funds, the publicness of criteria, procedures and decisions, as well as basing the decision on the assessment of independent experts coming from the scientific circles ("peer review" system). This resulted in starting competitions for research projects submitted to the Committee, competitions for the executors of ordered research projects and ordered target projects as well as in such allocation of funds intended for statutory activity, in which the categorisation of scientific units is the fundamental factor.

The parametric evaluation and the resulting categorisation of units are performed every four years, in the first full year of the four-year mandate period of the Committee. The evaluation is based on documented results of research and development work obtained in the preceding four full years. The evaluation covers in particular the publications of the staff of the unit, the results of education and development of scientific staff, and the results of innovative activity of the unit. Each Committee group sets its own detailed definitions of the applied concepts, the score given for specific results, and the requirements for the documentation required for the evaluation of units, with the reservation that the "Framework parametric evaluation principles for scientific units" will not be violated.

As a result of a complaint filed by a unit or on its own initiative, a group may perform a renewed evaluation of a unit. An evaluation performed as a result of a complaint filed by a unit covers the same years as the previous evaluation. The group presents its conclusions to the Committee for judgement. The parametric evaluation is expressed as a score given to the unit for the following:

1. Reviewed publications.
2. Scientific monographs and academic handbooks.
3. Scientific degrees and titles.
4. Patented inventions, pattern protection rights and utility models.
5. Practical application of the results of research and development work of the unit outside the unit.

6. Quality systems, accreditation of laboratories, participation in framework programmes of the European Union.
7. General evaluation of the unit by an appropriate group of the KBN (up to 20% of the total score presented in items 1-6 for the following:
 - Great importance of the scientific and technological achievements and wide range of practical application.
 - Very high quotation index.
 - Participation in international research programmes.
 - Execution of tasks within civil service (evaluation by an appropriate supervising body).
 - Co-operation with small and medium enterprises in the creation of new scientific and technological solutions and their practical application.
 - Creating scientific databases with at least national coverage, running museums, collections, etc.
 - Activity in the acquisition of non-public funds for research and development work.
 - Organising international conferences.

1.2.

Even if no breakthrough changes to the better took place in the recent years in the field of R&D activity in Poland, certain positive trends were strengthened, which, if they turn out to be permanent, may result in the future in a noticeable improvement of the situation in this extremely important area, forming on of the pillars of the so called knowledge based economy. According to the data of the Central Statistical Office¹:

1. The number of units which pursued R&D activity in 1999 was 955, which is 50 units more than in 1998. The number of research and development units continues to decrease, while the number of development units, mainly industrial enterprises pursuing R&D activity, increases. The increasing active participation of business in research is a very positive phenomenon and the right direction of change (in the middle of the 90-ties in total in the OECD countries the so called BERD, i.e. Business Expenditure on Research and Development, amounted to nearly 70% of the Gross Expenditure on Research and Development, i.e. GERD). During the 90-ties, both among the scientific units of the Polish Academy of Sciences (PAN), and among the research and development units the number of institutes increased, while the number of other units decreased (for example, the number of research and development centres (OBR) in 1999 was less than in 1990 by 40 units).
2. In 1999 the expenditure on R&D (the index defined in the international literature as GERD) amounted to approx. PLN 4.6 billion (in current prices), including 60% of public funds, 30% of the units' funds and 10% of own and foreign funds, and was by 14.6% higher than in 1998, i.e. above the inflation rate in the same period. For the purpose of comparison it may be added that in 1998 the expenditure on R&D activity (in current

¹ "Science and Technology in 1999", a study by the Central Office of Statistics.

prices) was higher by 19.2% than in the preceding year, and in 1997 the expenditure was higher by 21.7% compared to 1996.

3. After a long period of decrease, the R&D expenditure to gross national product ratio (GERD/GDP) is running in the recent years at approx. 0.7%. In 1999 the ratio ran at 0.75% and was higher than the previous year's GERD/GDP ration by 0.03 percentage points. It is a value substantially lower than in the EU or the OECD, but higher than the GERD/GDP ratio in most of the EU candidate countries, except the Czech Republic, the Slovak Republic and Slovenia
4. The structure of R&D expenditure according to the kind of the executive units, in which the expenditure was born, is the following:
 - Research and development units (so called JBRs) - 39.5% (of which the research and development institutes - 34% of the total GERD, an increase by 0.8 percentage points compared to 1998).
 - Colleges - 27.8%
 - Development units — 21.5%,
 - PAN scientific units — 10.8%,
 - Science service units— 0.4%.

This structure is very similar to that recorded in 1998. The greatest change consists of the above-mentioned increase of the share of the research and development institutes as the executors of R&D work in the total expenditure on R&D activities.

As regards the structure of R&D expenditure according to the financing sources, one should emphasise the continued increase of participation of enterprises in the financing of these activities in Poland. In 1999 this participation amounted to 30.6% and was the highest in the last five-year period. It is a positive trend, which should be supported by the right policy of the state, encouraging the private sector to more and more active participation in the performance and financing of R&D work, which in the current situation is the only feasible way to improve the financial situation of science in Poland.

The total share of non-public funds (apart from the private funds these include also own funds of PAN scientific units, research and development units, and science service units, as well as foreign funds) in the expenditure on R&D amounted to 41.5% in 1999.

The share of foreign funds still runs at a very low level, which does not exceed 2% of the total expenditure (1.7 % in 1999).

Also the participation of foreign entities as the executors of R&D work in Poland is small, however in this case one may observe in the recent period a clear rising trend (in 1997 enterprises with a majority share of foreign capital spent as the executors of R&D work 4.0% of the total R&D expenditure, while in 1998 it was 5.1%, and 8.3% in 1999).

In the structure of R&D expenditure in the 1995-1999 period according to the disciplines of science a decrease of the share of expenditure on natural and agricultural sciences is evident, while the share of expenditure on technical and medical sciences increases.

1.3.

On the 1st of January 2001 an important change of the legal situation took place, when the law changing the State Committee for Scientific Research (KBN) establishment act, adopted by the Polish Parliament on the 15th of September 2000, came into force, and on the 27th of February 2001 the law changing the research and development units act, adopted on the 26th of October 2000, came into force. The purpose of the changes in both acts is to improve the utilisation of the scientific potential for the social and economic development of the country, and to utilise the public funds allocated to research more efficiently.

To this goal the following measures were taken, among other things:

- Changing the assignment of competence between the State Committee for Scientific Research (KBN) and its Chairman, aiming at the strengthening of the decision powers and the responsibility of the Chairman.
- Ensuring equal right of access to funds from the science budget, and in particular to subsidies for statutory activities and investments, for organisational units which perform research and development work, regardless of their ownership status, like for non-public colleges, which will be able to receive funds for own research.
- Creating the possibility to transfer part of the funds — allocated to the financing or co-financing of research projects, target projects and research supporting activities - to the Polish Academy of Sciences, associations, foundations and other units working in aid of science for the competitions organised and financed by them and for the execution of specific tasks.
- Giving the definition of research (basic research and applied research) and development work, which may be subsidised from public funds allocated to science. A definition of innovation activities was also given, which will replace - in accordance with the international standards - the concept of technology progress, and giving the definition of financing of target projects, which cover applied research or development work important for social and economic reasons, as well as practical application of the results of this research and work.

By changing the research and development units act, the following measures were taken, among other things:

- Adapting the regulations of the act to the solutions following from the state enterprise commercialisation and privatisation act so as to make possible both indirect and direct privatisation of research and development units, while maintaining the current status of such units in the transition period.
- Providing for the possibility to give the status of a state research institute to the currently functioning research and development institutes. This will apply only to those institutes which, apart from research, will in a continuous manner execute tasks that are important for the planning and the implementation of the state policy.
- Introducing changes in the functioning of military research and development units, previously supervised by the Minister of National Defence.
- Providing for the possibility of the status of a research and development unit being given to an organisational unit, performing research and development work, created by a physical person or a legal person within the economic activity carried on by this person.

2. Public sector research and public research organisations²

2.1.

Selective promotion of research directions is necessary because of the need for intensive support for those disciplines in the first place, in which Polish science is competitive on the world-wide level and those which have a significant influence on the development of other disciplines, and which contribute to increasing the competitiveness of Polish economy.

In the Polish situation setting the research priorities is necessary also because of the limited funds allocated to science in the public budget. However, this results in certain limitations of the development of science, which requires a relatively balanced development. This regards especially the relation between the basic research on the one hand and the applied and technology research on the other hand.

2.2.

Within the basic research those disciplines of science will be prioritised, in which:

- Research performed in Poland remains on a high level, compared to world-wide science, or research is performed within multi-discipline or trans-discipline programmes, aimed at strategic targets.
- The research results have a significant cognitive value and a great influence on other science areas, or where there is a great chance of obtaining such results which will become a basis for applied research or new technologies, or the results have an indisputable civilisation and culture creating importance for the society and the state.

The priorities in the field of the basic research contain in the first place problems of European, or at least international (regional) dimension, such as, for example:

- Healthcare.
- Environment protection and sustainable development.
- Maintaining peace and solving conflicts.
- Important social, political and economic issues (in the globalisation aspect).
- Raising the level of education in the society.
- Information society and knowledge-based economy issues.
- Scientific education and social understanding of science.

². This section, especially sub-section 2.2 partly overlaps with a separate questionnaire circulated to members of the CSTP Ad hoc Working Group *on Steering and Funding of Research Institutions*. When appropriate, countries could make references to responses given to that questionnaire.

2.3.

Within the applied research those directions and research projects will be prioritised, which are characterised by a high scientific level of the performed work, or result from the needs of economic and social policy, especially innovation policy, including the needs of the "high chance" sectors and the sector connected with national safety and defence, or are co-financed with own funds of entrepreneurs who are interested in the results of the work, or are or will be used by, among others, foreign investors.

2.4.

In the field of the applied research, the State Committee for Scientific Research (KBN) prepared proposals of "Prioritised directions of research and development work in aid of the growth of modernity of the economy and increasing its international competitiveness".

The proposals were established according to the following criteria:

1. Compliance with the sector programmes and priorities of the economic and social policy, and in particular usefulness for:
 - The development of economy, especially for increasing the innovation and competitiveness of products and services and their adaptation to international standards, particularly those in force in the European Union.
 - Improving the health and safety of the citizens, and environment protection.
 - Maintaining and updating data regarding technical safety and protection against natural disasters.
 - Correct functioning of the state (its institutions, authorities, and civil service).
2. Usefulness for the development of new technologies, which contain in particular the following:
 - Unique manufacturing technologies.
 - Technologies reducing the consumption of energy, raw materials and materials.
 - Technologies improving the environmental safety of processes.
 - Specialised microelectronics and measurement methods.
 - Health care and environment protection²
 - Technologies strengthening the export position (regarding production having great share in the incomes from the export of manufactured goods).

When establishing the preferred directions of research and development work, regardless of the above-mentioned criteria, the possibility of solving the research problems - at suitably high level of the contents - by Polish scientific units was taken into account.

The research and development work directions, evaluated in this way, were classed to one of seven research areas:

- I. Information technology.
- II. New material technologies.
- III. New production technologies.
- IV. Biotechnologies.
- V. Health care and environment protection.
- VI. Transport.
- VII. Management and functioning of the state.

The list of preferred research directions — both within the basic research and the applied research - will be modified periodically with the use of the scientific methods defined, among other things, within the scope of foresight.

The preferences in the allocation of funds for the execution of these directions will be taken into account by appropriate bodies of the KBN (groups, the Committee) in accordance with their decision powers.

2.5.

The prioritised tasks in the system sphere will be the following:

- Creating financial and organisational mechanisms providing the economic entities with the conditions for investing in R&D activities. The proposals of such solutions will be presented in subsequent documents regarding the guidelines of the innovation policy of the state.
- Creating and implementing consistent and transparent criteria for the evaluation of the research done by R&D units with regard to ensuring financing priorities to high quality research work.
- Development of research co-financed by the public sector and economic entities interested in utilising the results.
- Ensuring greater influence of research on education at university level and on permanent education.
- Organisational support for international co-operation.
- Supporting the organisation of technology transfer, influencing the improvement of the competitiveness of the industry (technology pools, technology transfer centres, centres of excellence).

3. Government support for private sector R&D and innovation.

Private sector R&D units have not developed in Poland so far. The amendment of the regulations of the State Committee for Scientific Research act and the research and development units act, mentioned in

section 1.3, created the conditions for the functioning of such units. Particularly important for the functioning of private sector R&D is ensuring equal rights of access to funds from the science budget, and in particular to subsidies for statutory activities and investments in science. A definitely greater financial support of R&D for small and medium enterprises from the science budget will take place, and the procedure of filing applications and evaluating the applications filed by these enterprises will be simplified.

One positive development is the systematic growth of the number of development units, in the first place in privatised enterprises carrying on R&D activities. In 1996 there were 296 development units and in 1999 there were already as many as 498 such units.

4. Enhancing collaboration and networking among innovating organisations

The level of innovation in our economy results in the first place from the low capability of Polish enterprises to self-finance development investments, and in particular to invest in new technologies, to modernise means of production and to finance research and development work. This is confirmed by the results of survey on the financial condition of Polish entrepreneurs.

Therefore, the State Committee for Scientific Research initiates the introduction of economic and financial regulations as well as legal and organisational solutions, the purpose of which is to improve the level of innovation in the enterprises, especially small and medium-sized enterprises. The proposals of such solutions were included in two government documents: "Guidelines for the innovation policy in Poland" (adopted by the Council of Ministers on the 24th of November 1994) and "Direction of national innovation policy till 2002" (adopted by the Council of Ministers on the 6th of December 1999).

The following solutions, among other things, were implemented in practice in the sphere of economy.

4.1 Counting the research and development work expenditure as income acquisition costs.

Income acquisition costs include the expenditure spent by the entrepreneurs on the following:

- Research and development work (also when the result of the research is negative).
- Purchase of research results, if there is no acquisition of proprietary rights.
- Non-investment implementation expenditure (construction and technology documentation, prototype, etc.).

4.2. Classification of development work.

In accordance with article 33 section 2 of the accounting law of the 29th of September 1994 (Dz.U. — Polish Law Journal - No. 121, item 591, with subsequent amendments), the costs of development work performed by a unit for its own needs, born before the start of production may (but do not need to) be classified as intangible assets, if:

- The product of the manufacturing technology are strictly defined, and the related costs of development work have been specified in a reliable way,

- The technical value of the product or the technology has been confirmed and properly documented, and on this basis the unit has made the decision to manufacture the products or to use the technology,
- The costs of development work will be covered by the expected income from the sale of the products or the use of the technology.

4.3. Giving bank credit repayment guarantees from the national budget funds.

The law of the 8th of May 1997 regarding guarantees given by the State Treasury and certain legal persons (Dz.U. — Polish Law Journal — No. 79, item 484, with subsequent amendments), provides that guarantees may be given on the condition that the credit covered by the guarantee will be used for financing investment projects, which ensure, among other things, the implementation of new technical or technology solutions, resulting from research or development work. According to the above-mentioned law, guarantees may be given up to 60% of the credit amount being used, covered by the guarantee and up to 60% of interest on this amount. In the case of projects of special importance for the national economy, the Council of Ministers may give a guarantee exceeding 60% of the credit amount being used. According to the law Bank Gospodarstwa Krajowego creates the National Credit Guarantee Fund. In accordance with article 3 section 1 of the above-mentioned law, the Council of Ministers and the Minister of Finance give credit repayment guarantees, if the guaranteed amount exceeds EUR 1.5 million. In accordance with article 37 of the law, credit repayment guarantees for amounts not exceeding the above value are given by Bank Gospodarstwa Krajowego, from the National Credit Guarantee Fund.

4.4. Export contract insurance guaranteed by the State Treasury.

Export sale of the results of research and development work is covered by insurance guaranteed by the State Treasury on the condition that the minimum percentage share of domestic components in the goods and services being the subject of export contracts is 50% of the transaction value of the exported final product.

4.5. Investment reliefs

Those entrepreneurs who invested in the purchase and installation of machines or equipment, classified in group 3-6 and 8 according to the Type classification of fixed assets of the Central Office of Statistics, connected with the implementation of licences, patents and the results of domestic research and development work, until the 31st of December 1996 had the possibility to deduct from the taxable income the entire expenditure or part of it up to 50% of the income, and until the following dates, not more than: the 1st of January till the 31st of December 1997 - 40 % of the tax base, the 1st of January till the 31st of December 1998 - 35 % of the tax base, the 1st of January till the 31st of December - 30 % of the tax base. These deductions, just like before the 1st of January 1997, were subject to no limitations. *The law of the 20th of November 1999 regarding the change of the corporate tax act (Dz.U. - Polish Law Journal - No. 95, item 1101) withdraws investment reliefs for legal persons.* According to the statistics received from the Ministry of Finance, 2440 legal persons took advantage of investment reliefs in 1997 only, and the amount deducted from the income before taxation was PLN 4.9 billion. The amount of investment reliefs in the form of reduced tax was PLN 2.0 billion.

30 thousand entrepreneurs acting as physical persons took advantage of the investment reliefs. In this case the amount deducted from the income before taxation was PLN 678 million, and the amount of investment reliefs in the form of reduced tax was PLN 147 million.

The law of the 20th of November 1999 regarding the change of the corporate tax act introduced:

- Gradual and substantial reduction of the corporate income tax rate (from 32% in 1999 to 22% in 2004). Such a significant reduction of the income tax rate (by 10% in 5 years) should result in an increase of accumulation in companies and create much better opportunities to finance development investments.
- Increase of depreciation rates and including in the corporate income tax act regulations regarding the depreciation of fixed assets and intangible assets, previously regulated by the ordinance of the Minister of Finance of the 17th of January 1997 regarding the depreciation of fixed assets and intangible assets.

4.6. Institutional structures acting in aid of the improvement of innovation in the Polish economy

1) The law of the 12th of April 1996 established the Engineering and Technology Agency. The tasks of the Agency comprise, among other things, the following:

- Promotion and support for the implementation of innovative techniques and technologies and the commercialisation of research results, acting in aid of the implementation of the state policy guidelines and programmes in the area of the application of new techniques and technologies in economy, searching for, evaluation and promotion of new solutions stimulating innovation in activities of enterprises.

2) In order to promote the co-operation of universities, research institutes and PAN entities with entrepreneurs, technology transfer centres, technology pools and business incubators were created, mainly at universities. The work results of these organisations vary. Apart from organisations with very good results, such as the Poznań Technology Pool at the Adam Mickiewicz University in Poznań, the Technology Transfer Centres in Warsaw, Wrocław and Gdańsk, the Incubator Foundation in Łódź and the Science Aid Foundation, the efficiency of these structures is insufficient. The main barrier is the lack of funds for the activities.

3) Particularly important for technology transfer from science to the economy are the centres of excellence developed within the Fifth framework programme of the European Community for research, technological development and demonstration activities. At the moment, there are nine such centres in Poland: the High Pressures Research Centre of the Polish Academy of Sciences (PAN) in Warsaw, the Biochemistry and Biophysics Institute of PAN in Warsaw, the Machine and Automation Technology Institute of the Wrocław Technical University, the Institute of Molecular Biology of the Jagellonian University in Cracow, the Institute of Basic Technology Problems of PAN in Warsaw, the Institute of Animal Reproduction and Food Testing of PAN in Olsztyn, the Institute of Physics of PAN in Warsaw, the Molecular and Macromolecular Research centre in Łódź, the Institute of Mathematics of PAN in Warsaw. In December 1999 – within the PHARE SCI and PHARE II programmes the Minister of Science originated the following five pilot centres of excellence: Krakow Centre for Telemedicine and Preventive Medicine, Centre of Excellence for Laser Technology and Biomaterials in Medicine, Centre for Silicon Chemistry, Centre of Excellence for Research on Mechanisms of Neurodegeneration, Centre for Pressure Systems in Extreme Working Conditions.

4.7. Taking organisational actions in aid of improving the innovation in the Polish economy by individual regions.

The problems regarding the organisational actions, taken by individual regions in order to improve the innovation in economy, as well as creating organisational and financial conditions for the efficient functioning of units dealing with technology transfer are discussed in the "Improving the innovation in the Polish economy until 2006" document prepared by the Ministry of Economy and adopted by the Council of Ministers on the 11th of July 2000.

4.8. Raising the efficiency of creating and functioning of venture capital funds.

On the 21st of March 2001 the law changing the investment funds act came into force. Until that moment there were only two closed investment funds on the investment funds market, which pursued a policy similar to that of venture capital type funds. Because the provisions of the law regarding the functioning of closed investment funds are insufficient for the need of venture capital funds, the amendment of the investment funds act introduced a new type of investment fund - specialised closed investment fund, the concept of which meets the expectations regarding the possibility to create and manage a venture capital fund by investment fund companies. In particular it is provided for that specialised investment funds will be able to issue investment certificates not admitted to public sale. The regulations regarding the principles of making investments by the fund introduce more liberal investment limits than in the case of closed investments funds, and the level of loans and credits that may be taken by the fund was increased. At the same time, the law gives the participants of the specialised investment funds the possibility to influence the investment decisions taken by the fund. An investors' meeting is an organ of the fund, corresponding to the general shareholders' meeting in a joint stock company. The profits of a specialised closed fund may be reinvested. The law also provides for the possibility to pay out the income of the fund without remitting the investments certificates during the existence of the fund. The handling of the gained profit by the fund is in each case defined in the statutes of the fund. Specialised closed investment funds are created and managed by investment fund companies which are joint stock companies registered in the Republic of Poland. Both Polish and foreign subjects may be the shareholders of the companies. Both specialised closed investment funds and investment fund companies managing these funds are subject to supervision by the Bonds and Exchange Commission (KPWIG).

Until now only two applications have been filed at the Commission by investment fund companies for the permission to create a specialised closed investment fund. Therefore, it is now difficult to tell the scope of activity of the funds or to check on what kind of companies the funds concentrate on and what their influence on the extension of management knowledge and experience is.

In the sphere of science.

4.9. Increasing the participation of public funds expenditure on research and development work in relation to the GDP

The proposed public expenditure on science until 2010 will be defined in the following government documents: "Guidelines for the science and technology policy of the state" and "Long-term science development programme 2000-2010".

4.10.

An important role in increasing the innovation in the Polish economy will be played by the amendments of two law, prepared by the State Committee for Scientific Research (KBN) and adopted by the Polish Parliament in 2000:

- The State Committee for Scientific Research establishment act.
- The research and development units act.

From the point of view of improving the innovation in the Polish economy, an important factor is the change - introduced in the amended State Committee for Scientific Research establishment act - regarding the introduction of equal rights in applying for public funds for research for all domestic entities performing such research, regardless of their legal status. This complies with the principles of government, defined in the constitution of the Republic of Poland, and it is advantageous for the initiation of ownership transformations.

The amendment of the research and development units act made it possible, among other things, to commercialise and to privatise the research and development units, which should result in increasing the efficiency of research and development work.

4.11

Improvement and popularisation of crediting by banks of the development work in the area of modern technologies - defined in the government document "Preferred research and development work directions aiming at increasing the innovation in the Polish economy", adopted by the Council of Ministers on the 16th of January 1996 - performed by domestic scientific and R&D entities.

4.12

Increasing the funds for the financing of target projects, covering research and development work as well as implementation and investment activities, and long-term programmes, improving the principles and the procedures for granting the funds with regard to the practical application of the research results.

The procedures for financing target projects for small and medium-sized enterprises will be simplified shortly.

4.13

Improvement and development of the system of promotion and dissemination of scientific and technological achievements having application nature.

4.14

Supporting by the State Committee for Scientific Research of the participation of Polish scientific and R&D entities in the 5th Framework Programme for Research, Technological Development and Presentation of the European Union and wide promotion of the Programme.

The units which carry on projects co-financed from the Framework Programme 5 (FP5) funds may apply for additional financing by the KBN within the frames of the required domestic participation in the projects. Apart from this, in the case of projects not approved for execution within the competition, and evaluated by the Commission as at least good, domestic units may receive a lump sum co-financing to maintain the co-operation with their international partners and to cover the costs of a repeated application. The information about FP5 is published by contact points, co-financed by the KBN. In accordance with the appropriate decisions of the State Committee for Scientific Research, activities connected with Poland's participation in FP5 are co-financed. In the basis of appropriate regulations the State Committee for Scientific Research has granted by the end of the year 2000 a total amount of PLN 11,118,770 for the co-financing of 80 research entities participating in FP5. The purpose of the co-financing is to cover part of own contribution of the Polish entity to the project budget. The KBN budget contains funds allocated to similar support of further projects which will be adopted for execution by the European Commission.

At the same time, Polish teams are co-financed whose projects have not been approved by the European Commission for execution, although the scientific value of these projects has been evaluated positively. By the end of the year 2000 the KBN has granted a total amount of PLN 1,860,000 to 124 entities to cover the costs of continuing the co-operation with their international partners and the costs of preparing repeated applications to FP5.

4.15

The industrial property protection law has been harmonised with the standards of the European Union.

5. S&T human resources

The research and development potential may be characterised by giving synthetical numbers and indexes for 1999, presented in Table 1. Among all persons employed within research and development a little more than 6% (8 thousand) have the scientific title of a professor. This share has been increasing slightly in the recent years, despite the fact that many age groups that started their scientific career after World War II reached the retirement age. There has also been a systematic increase, to over 50% (i.e. nearly 40 thousand persons) all persons employed within research and development, of employees with doctor and assistant professor degree.

The positive trends in the employment sphere include the stabilisation of the employment situation after the "brain drainage" period that was characteristic for the years 1982-1993. The drainage of researchers out of the R&D sector and abroad decreases systematically.

Table 1.

Type of scientific entities	Number of entities	Total employment (in EPC)	Employed researchers (in EPC)	Degree of wear of the research equipment (in %)
Total, of which	955	82368	54433	69.9
PAN Scientific Institutes	58	6727	4338	93.6

Research and development units	240	23918	12376	72.2
Universities (public)	106	42766	35 125	65.7
Development units	598	7878	3910	61.9

The following trends should be regarded as negative:

- Ageing of the scientific staff. The average age of doctors is high and reaches 44 years of age. This average age goes down slowly thanks to the great development of doctor studies (an increase from 1,265 students in 1990 to 21,374 students in 1999). Unfortunately, the increase of the number of students of doctor studies does not yet translate directly to the number of graduates. Approx. 3,500 persons a year get the doctor degree, 750 become assistant professors, and 500 persons become professors.
- Large number of R&D staff having several jobs. Among the persons who perform additional paid work, as many as 88% give financial reasons as the main cause. Performing several jobs, as well as the "grey sphere" in research (doing research on the institute's equipment and often during the working hours for commercial purposes) result to a great extent from the relatively low salaries.

6. International co-operation and globalisation

7. Industry-related policy

The Ministry of Economy is a government administration organ which initiates the industry policy of the state and sets up its implementation, taking into account in the first place its pro-export aspects as well as the aspects promoting the development of small and medium-sized enterprises. The structure of the ministry comprises the Department of Economic Strategy and the Department of Handicraft, Small and Medium-sized enterprises, which are responsible for shaping and co-ordinating a policy which would promote the development of enterprise and international competitiveness of the Polish economy. The policy towards the enterprises has been defined in basic strategic documents, such as:

- "Poland in 2005 - Long-term strategy for sustainable development".
- "National regional development strategy 2001 -2006".
- "Support programme for the years 2001 -2004".
- "National development plan".

The above-mentioned documents assign an important role to the SME sector in the economic development of the country, and in particular in the activation of the local and regional economy, in improving the competitiveness of the regions, and in engaging the local capital and human resources. The purpose of the regional policy is also to make use of the development opportunities which will be created by the participation in the regional policy of the EU and by the access to the structural funds.

In the document "*Poland in 2025— Long-term strategy for regional development and sustainable development*" attention has been paid to the influence of SMEs on the formation of the middle class and the creation of a climate good for enterprise. Promoting entrepreneurial attitudes is important both from the point of view of the economic growth rate, and from the point of view of the society, and its awareness supporting the development of market economy and democracy. Because of the economic and social role to be played by small and medium-sized enterprises, the Government will take measures to support their development and functioning. The tasks of the Government include the following:

- Creating suitable legal and institutional environment supporting the development the development of enterprises.
- Stimulating the innovation in enterprises and facilitating their access to technologies in order to strengthen their competitiveness.
- Developing co-operation links between SMEs and big enterprises as well as other SMEs.
- Increasing the export activity of enterprises.
- Imparting dynamism to the development of small and medium-sized enterprises in the structural policy of the state.
- Promoting ecological management and production methods in the SME sector.

The actions of the Government towards the SME sector, following from the guidelines of the regional policy, have been defined in the "*National regional development strategy 2001-2006*" (NSRR). The actions include both direct financial support instruments for individual entities and supporting the business environment. The support granted within the frames of the regional development policy of the state will be aimed at both creating new SMEs and supporting the existing ones.

The financial support given directly to the enterprises will include:

- Subsidies for establishing new enterprises in the SME sector, increasing the investment level and the modernisation of SMEs, resulting in the creation of new jobs. Priority will be given to investments using innovative solutions, energy-saving technologies and environment friendly technologies. The subsidies will be transferred through local subsidy systems, complementing the activities performed within the frames of the horizontal (trade-related) policy in this area, decapitalisation of regional and local loan funds and credit guarantees for small and medium-sized enterprises. Credits will be granted through regional and local loan funds and the system of credit guarantees.
- Subsidising consulting, information and training services for SMEs. The implementation of this instrument will be done through regional and local business supporting institutions — enterprise support centres, enterprise incubators, regional and local development agencies.

Indirect forms of support for the SME sector include in the first place measures aimed at the development of institutions offering services for this sector, mainly in the area of technology transfer, training and education as well as widely understood consulting.

"*National regional development strategy 2001-2006*", prepared in accordance with the law regarding the regional development support principles (of the 12th of May 2000), attaches special importance to SMEs in the implementation of the main priority, i.e. the restructuring of the economic base of the regions and

creating the possibilities for its diversification. Within the frames of this priority three directions of activity are distinguished, including the stimulation of local investments, technology transfer in enterprises and the development of tourism, recreation and the protection of the cultural heritage. Small and medium-sized enterprises play an important role in other prioritised areas: the development of human resources, support for areas that require activation and that run the risk of losing their importance (by creating non-agricultural jobs in the country) and the development of inter-regional co-operation, including cross-border co-operation.

The purpose of “*Support programme for the years 2001-2002*” is to implement the directions included in “*National regional development strategy 2001-2006*”. The programme contains a detailed list of task types aiming at the implementation of provincial programmes, which may get support within the frames of this programme. The aid for small and medium-sized enterprises and for the handicraft sector will include the following: investments in fixed assets (buildings and equipment), environment friendly, clean and energy-saving technologies, trade consulting services (information, planning, consulting services, marketing, management, design, export, environment, purchase of technologies), services for entrepreneurs (pools, enterprise incubators, stimulating service development, promotion of export, networks, conferences, commercial fairs), vocational training.

These tasks may get support from the Government and may be co-financed within the frames of provincial contracts only if the province administration applies for such aid. The negotiation process of provincial contracts is in progress at the moment, and the final amounts allocated to the individual activities will be known when the provincial contracts have been signed and approved by appropriate authorities, i.e. the Council of Ministers and the Provincial Parliament.

The policy towards the entrepreneurs has a significant influence on the economic development of the country, which is reflected in the “*National development plan*” that is being prepared. One of the five prioritised axes of the plan is “the improvement of the competitiveness of the economy by developing enterprise and improving innovation”. It is worth emphasising that one of the three main principles of the “*National development plan*” is an approach to all activities that promotes innovation and employment. In the future the plan will be the basis for applying for funds from the Structural Funds and the Cohesion Funds of the EU. Taking the above-mentioned priorities into account, the Ministry of Economy plans the preparation of a draft of a sector operational programme, “*Increasing the competitiveness of the economy*”, leading to the improvement of the competitiveness of small and medium-sized enterprises and the industry by innovation and quality improvement and by supporting investments in the economy.

Selected statistical data describing the SME sector in Poland.

The SME sector in Poland, which includes enterprises employing up to 249 persons, has the following characteristics (according to the information available for the entire SME sector for 1999):

- The participation in the gross national product of Poland - small and medium-sized enterprises generated 48% of the GDP. For the purpose of comparison, the participation of big enterprises in the GDP was 22.5%.
- The number of small enterprises (up to 49 employees) registered in the Register of the National Economy Entities (statistical register) at the end of 1999 was 2,978,574 (an increase by 7.9% compared to the end of 1998), and the number of medium-sized enterprises was 28,870 (an increase by 13.4%). The number of active SMEs increased by 2% in 1999. The growth rate of active SMEs in 1999 was lower than in 1998, 1997 and 1996 (18%, 18% and 9% respectively).

- The participation of women in enterprise - in III 2000 women made nearly 37% of all employers and persons working on their own account. This participation has shown a slight falling tendency since 1992 (November 1992 - 39.5%).
- The number of persons employed in SMEs in the end of 1999 was 7,152,000 (64.2% of persons employed in the economy). Some of the entities belong to the so called public budget entities usually grouped in three economy sectors: public administration, education and health care, i.e. with a majority of non-market services. The number of persons employed in small enterprises in the market sector was 4,103,000 (46.5%), and in medium-sized enterprises - 1,689,000 (19.1%). The greatest share of SMEs with regard to the number of employees was recorded in the following areas: trade and repairs - 89.8%, hotels and restaurants - 86% and other service activities - 80.7%.
- In 1999 the participation of the SME sector in the total income of enterprises from the sale of products, goods and materials was 63% and it increased by 3 percentage points compared to 1998. An increase of the share of SMEs in the total income was recorded in 1999 in all economy areas except other service activities.
- The net sales profitability of all enterprises keeping accounting books and employing more than 9 persons fell from 0.6% in 1998 to 0.1% in 1999. This was mainly caused by the falling profitability of small enterprises (a decrease from 2% to 1.1%) and big companies (a decrease from 0.8% to 0.3 %). On the other hand, medium-sized enterprises recorded only a small decrease of net sales profitability from 1.3% to 1.2%.
- In 1999, compared to the preceding year, the export of Polish companies fell by 3% and the import fell by 2.5% (according to prices in USD). In the same period the export of SMEs decreased by 3.8%, and the import increased by 1%. The participation of SMEs in total export fell from 48.1% to 47.6%, and their participation in total import increased from 63.2% to 65.4%.