OECD SCIENCE, TECHNOLOGY AND INDUSTRY OUTLOOK 2004
COUNTRY RESPONSE TO POLICY QUESTIONNAIRE

POLAND

GENERAL OVERVIEW OF SCIENCE, TECHNOLOGY AND INNOVATION POLICIES IMPLEMENTED IN POLAND AND MAJOR CHANGES IN 2002-2003

The following questionnaire is intended to provide a general overview of science, technology, and innovation policies that are being developed or were recently implemented and to outline major changes that took place in 2002-2003 in Poland.

1. General framework and trends in science, technology and innovation policy

In 2002-2003, the science and technology system in Poland was still significantly affected by slowdown in economic activity. Polish economy – generally speaking – did not manage to restore positive trends in R&D and innovation activities observed in the period 1995-1999.

For the past few years underfinancing of research and development in Poland has still been a problem. The present situation is due to the fact, that in the course of the past decade budgetary means assigned for scientific research have been systematically reduced and in effect Poland has recorded for the present year almost 50% decrease as compared to the beginning of 1990's.

In 2002, PLN 4 582.7 million were spent on R&D activity in Poland (in current terms), of which 61.1% came from the state budget and 38,9% from non-budgetary funds. It was by about 5.7% less than in 2001 (PLN 4 858.1 million). As a consequence, the ratio GERD/GDP has also decreased – from 0.65 in 2001 down to 0.59 in 2002. This startling trend can additionally be illustrated by comparing expenditure on R&D financed from the state budget (GERD financed by the government). In 2003, PLN 2 729.1 million were distributed on R&D from the national budget (in 2002 – PLN 2 662.5 million). Despite the fact that expenditure has increased in absolute terms, correcting for inflation, budget expenditure on R&D in 2003 was a little lower than in 2002.

There were also positive trends in Polish science. The level of education of Polish population, despite economic difficulties, is being continued to rise throughout the whole decade of 1990s and the beginning of 2000s. The number of students enrolled in tertiary education has reached a level comparable with that characteristic for most advanced countries. There has also been growth in the number of research scientists and engineers. In 2002 the number of researchers engaged in R&D was by one fourth higher than in 1994.

The number of entities which pursued R&D activity in 2002 was 838, which is by 82 less than in 2001. Institutes of the Polish Academy of Sciences preserved the same level (81 institutes during the past four years), while the number of Research and Development Units decreased from 216 in 2001 to 211 in 2002. Development units including those associated with business enterprises, have grown to

463 in 2001. The number of public higher education institutions, which perform R&D activity, was on about steady level – 119 in 2002.

Expenditure on technical innovation in Polish manufacturing enterprises in 2002 – experiencing a sharp increase in the period 1995-1999 (in 1999 it was four times as large as in 1995) and stagnation in 2000 – 2002 – has again risen. Nevertheless the share of innovative enterprises in total number of enterprises has slightly decreased.

Despite decrease in innovation expenditure recorded at the beginning of 2000s, Polish manufacturing sector still fares reasonably well compared to international standards as far as innovation intensity is concerned (in 2002: Poland – 3.4; EU – 3.7).

In 2002 the number of resident patent applications filed with the Patent Office of Poland was only 2313 (in 2000 and 2001 respectively: 2404 and 2202).

In the recent years, there has been recorded a rapid growth in number of manufacturing enterprises (with at least 50 employees) using the Internet: 17.0% in 1997, 61.6% in 2000, 74.9% in 2001, and 86.4% in 2002). Unfortunately, this trend is not shared by number of households connected to the Internet – only 22.8% in 2002.

The Polish most ambitious expectation for R&D in the coming years is to boost GERD/GDP ratio to 1.5% till 2006 in order to reach 3% in 2010, of which 2/3 should come from private sector, in accordance with the targets set at the summits in Lisbon in 2000 and in Barcelona in 2002.

Nevertheless, it is not likely to significantly increase budgetary expenditure on R&D in a short term. Polish scientists must take into consideration the fact that in view of the country's financial situation they cannot expect, for a few coming years at least – a significant increase of scientific research financing by the state budget. There is an urgent need to obtain means from extra budgetary resources such as private sector, international co-operation or structural funds.

Moreover, in view of permanent tendency to reduce financing of science by budgetary means, it becomes extremely important how the means are utilized. The principle of competition, as far as access to funds is concerned, needs to be maintained. The priority task for the system of science financing is to become much more effective. A coherent system of evaluating and comparing the quality of research is going to be introduced. It should result in a strict selection of research programmes in all areas of research financing. Financing scientific units and teams, which are essentially poor and show little prospect for development, will be suspended. The Ministry of Scientific Research and Information Technology must carefully watch the effectiveness of utilizing funds being at its disposal.

A chance for a fast and significant increase in scientific research financing in Poland depends on:

1. A strict priority of the quality of scientific research.

2. Utilizing the process of European integration as well as utilizing possibilities of obtaining financial means from extra budgetary sources in and outside Poland.

3. Further changes in the structure of many institutions responsible for scientific research (State Committee for Scientific Research, Polish Academy of Sciences, Research and Development Units) to make them more efficient.

4. Vast co-operation of national institutions aimed at organizing large research entrepreneurs.

5. Explicit economic preferences for enterprises investing in scientific research and innovation.

6. Permanent promotion of domestic scientific achievements and of activities aimed at the recognition of scientific research as one of decisive elements of Poland's future position in the world.

Therefore the Ministry of Scientific Research and Information Technology has decided to reform Polish research sector in such a way that it becomes more open, more flexible and more eager to use opportunities created by both the accession and the influx of foreign investments into industrial sector.

There have been prepared and implemented some reforms of science system in the period 2002-2003, such as new regulations and legislative solutions, administrative and institutional changes.

The first step has just been accomplished. In April 2002 the Office of the State Committee for Scientific Research (KBN) was transformed into the Ministry of Scientific Research and Information Technology (MNiI) with a typical ministerial structure. The Ministry's sphere of activities also includes problems of the country's computerization.

The next step is to implement a new regulation amending the Polish system of science financing. The Act on Scientific Research Financing is intended to be implemented in 2004. The regulation provides for the following changes in science and technology financing:

1. The present State Committee for Scientific Research (KBN) will be transformed into the Council of Science, which would function as the Minister's (of Science*)* consultative organ only;

2. Minister's competences will be strengthened and broadened. At present Minister's impact on creating science and technology policy of the state is restricted (KBN is still the supreme authority on state policy in the area of R&D). The new Act will give the Minister of Science more effective power in pursuing policy.

3. The way of science dissemination will be improved to become more effective, efficient and to have stronger influence on involvement of industry in scientific research and technology.

4. There will be introduced a new type of research projects, aiming to achieve results that would be used in production and to support innovations.

5. The Minister will be entitled to:

    a. allocate sums assigned from the state budget on particular streams of financing science and technology,

    b. establish country's framework programmes for ordered research projects financing,

    c. increase share of science networks and consortia in carrying out research projects in order to integrate scientific research and industry sectors,

    d. create specialist and interdisciplinary scientific teams to coordinate strategic tasks of science policy.

In accordance with the above changes the Ministry has been preparing some documents concerning guidelines for science policy. The main regulation is "Knowledge-Computerization-Competitiveness: Poland on the way to knowledge-based economy" (WIK). This programme is based on the governmental document "National Plan of Growth 2004-2006", which provides for launching Sectoral Operational Programmes (*Improvement of the Competitiveness of Enterprises, Development of Human Resources*) and the Integrated Operational Programme of Regional Development in the area of R&D and computerization.

WIK assumes growth of financing of R&D from 0.62% in 2003 to 1.50% of GDP in 2006. This goal should be accomplished by increasing funds from the state budget to 0.6% of GDP in 2006, and increasing non-budgetary funds to 0.9% of GDP in the same year.

There are the following strategic priorities of building knowledge-based economy:

1. development of science and research potential;
2. building the Polish Research Area as a part of European Research Area;
3. preparing and implementation of regional innovation strategies;
4. promotion of information society.

WIK provides for implementation of new instruments of R&D financing to make it more efficient. The following three financial tools are considered:

1. traditional instruments;
2. structural instruments;
3. computerisation instruments.

The traditional instruments would consist of funds from the state budget assigned for core financing and basic research. Funds from structural instruments (funds obtained from the state budget, private sector, international co-operation, EU structural funds and offset contracts) would be distributed for applied research, experimental development, innovations, international co-operation and other goal-oriented projects, which aim to support innovativeness in economic enterprises by co-financing research designed to achieve results that will be used in production. Computerization instruments are intended to co-finance projects aimed at promotion of information society, improving computer infrastructure, WWW content and access to the Internet to achieve a level comparable with that characteristic for most advanced countries.

The Ministry has also been preparing “Action plan for boosting expenditures on R&D in order to achieve aims of Lisbon Strategy”. In accordance with the targets set at the summit in Lisbon in 2000, Poland has to reach GERD/GDP ratio equal to 3% in 2010 (2/3 should come from the private sector). The document defines the following tools to accomplish this aim:

1. Implementation of the “National Plan of Growth 2004-2006” that assumes growth of total expenditure on R&D to 1.5% of GDP in 2006.
2. Acceleration of economy growth that will enable changes in structure of the state budget in order to boost funds for R&D.
3. Economic concessions for selected areas of scientific research and innovation enterprises.
4. Amendment of science financing system, including the new Act on Scientific Research Financing.
5. Modernization of Research and Development Units, creating advanced technology centres and centres of excellence.
6. Supporting Regional Innovation Strategies.

Another important goal of science policy is to implement the National Foresight Programme. This Programme is intended to be completed in 2006. The main goal of the Programme is to define

priority areas of science, which should attract increased attention during the next several years. The results of the Programme will constitute a basis for preparing strategic governmental document “National Plan of Growth 2007-2013”.

So far the government's new economic strategy has defined the following priority fields of scientific research:

- informatics and telecommunication;
- biotechnology including genetic engineering;
- microelectronics and nanotechnologies;
- robotisation and automation;
- new material technologies;
- alternative and renewable sources of energy;
- health and environment protection.

The serious problem is inappropriate perception of the role of science in the country and this concerns as well political elites and the society at large. Polish society is ignorant of importance of science and technology for economic situation and welfare of the country. Science and research are underestimated in Poland. Therefore there have been initiated some actions to change this situation, such as promotion of national scientific achievements, *e.g.* through media (television, radio, press), organization of science festivals and exhibitions in most of Polish big cities, and others.

2. Public sector research and public research organizations

2.1.

The practice of the past ten years in public sector research has revealed, apart of the system's fundamental assets, it’s numerous shortcomings. These are the following:

1. Incompatibility of the system with principles of the democratic state functioning, in accordance with which members of the government undertake decisions concerning the assignment of public means and, as a consequence, are fully responsible for those decisions.

2. The KBN dissimilarity in relation to other ministerial offices.

3. Lack of effective instruments for implementation of the scientific policy at the disposal of the Minister of Science.

4. Fragmentation of scientific research community.

5. Insufficient effectiveness of securing means from extra budgetary sources.

This situation requires further reforms in public sector and changes in the structure of many institutions responsible for scientific research to make them more efficient.

One of the measures to accomplish that goal is to create the Polish Research Area that would be a part of the European Research Area and would enable Polish institutions to be competitive on the European market. It involves broadened participation in and enhanced diversity of research programmes, co-operation of public scientific institutions with government, universities and private sector, integration of research and education. It will enable migration of people, ideas and tools throughout the public and private sector.

The other essential task is to support industrial (applied) research. The Ministry promotes rather industrial research than fundamental research, because results of industrial research can be applied in practice and solve difficult problems and provide new technologies. The industry related R&D, weak anyhow before the political transformation, received additional hit after 1989. It is Poland's natural need and determination to support and expand short and medium-time scale, industrial research. However, Polish scientists are very much in favour of financing the long-term, basic research.

Another most urgent need is to reform Research and Development Units (JBRs). The Act on Research and Development Units of 2001 created the conditions for reforming JBRs and enabled introduction of changes. A plan of reconstruction of JBRs assumes the following actions:

6. Integration of smaller and scattered JBRs with stronger ones which carry out research and development works significant for economic growth and implementation of the state policy.

7. Commercialization and privatization of JBRs.

8. Transformation and inclusion of JBRs into other scientific institutions such as institutes of the Polish Academy of Sciences, higher schools, advanced technology centres, centres of excellence, and others.

9. Maintaining the current status of those JBRs which represent high scientific level and are important for implementing strategic scientific research and to achieve goals listed in the "National Plan of Growth 2004-2006".

10. Suspending of financing of those JBRs, which are essentially poor and show little prospect of development.

2.2

New organizational structures for performing R&D, such as advanced technology centres, centres of excellence, technology parks, research networks and others are to be created. Those institutions will be combined of research entities and industrial enterprises that will implement multi-disciplinary research projects into industry, integrate research and industry and carry out projects and works that are significant for economic growth and state policy.

The parametric evaluation and the resulting categorization of research entities is to be changed. At present the evaluation is based on documented results of research, number and quality of publications and the results of development of scientific staff. The amended evaluation criteria will put stress on efficiency of use of financial means and practical dimension of achievements of research works.

2.3.

As it was mentioned before Polish research teams and institutions have to look for other than budgetary means of research financing. Good alternative is international co-operation with partners abroad. Poland co-operates with around 50 countries in the area of science and technology. Poland is also developing multilateral relations: it participates in such international programmes as Eureka, COST, NATO Science Programme. Poland joined the 5th. and 6th. Framework Programme of the UE. In the 5th. Framework Programme Polish scientists received for execution of research projects more funds from the European Commission than they have contributed to the Programme from the state budget.

After accession to the European Union Poland will receive means from the so called Structural Funds and Cohesion Funds. As these funds are aimed at equalizing standards of living and economic development in the various regions of Europe, all regions of Poland meet the requirements enabling

them to obtain means from the structural funds. Part of these funds will be assigned for the development of industrial scientific research.

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

3.1

As Poland cannot expect a rapid increase of budgetary means assigned for science, the Ministry of Scientific Research and Information Technology has to find, create and use new financial and economic instruments, which may encourage businessmen to invest in scientific research. Moreover, Poland is obliged to meet Lisbon Strategy requirements, which assume that 2/3 of GERD should come from private sector. This challenge is more difficult due to the common belief that investment in science in Poland is not profitable enough. It is a very important question to encourage businessmen and enterprises to invest in scientific research and carry out research and development works by offering them certain economic instruments such as preferential bank credits, investment tax concessions and others. The considered instruments are the following:

1. Explicit economic preferences for selected areas of scientific research and innovation enterprises; in particular the preferences will be offered to those enterprises, which invest in development of own inventions and know-how, as well as those, which introduce to production imported licences and know-how, but not more than 5 years old.

2. Entering the international system of research and scientific institutions evaluation.

3. Using new financial and economic instruments promoting research and development services, encouraging undertaking of innovation activities.

4. Increased participation in international programmes and projects co-financed by foreign funds, particularly within the EU Framework Programmes.

5. Joint financing of bilateral and multilateral research programmes.

6. Using European Union's structural funds for development of scientific and innovation infrastructure.

7. Supporting innovation in small and medium size companies in order to implement new technologies.

8. Utilizing offset funds (direct and indirect offset funds) from government commissions for research and development investments.

9. Improvement of links within the research community and between the research and technology sectors by removing existing barriers that limit effective interactions between private sector and universities and public research institutions.

10. Support for clusters of institutions capable of demonstrating a clear research policy and adequate management, and ready to undertake ambitious, large scale R&D projects.

3.2.

There will be established and new institutions and organizations for encouraging and supporting enterprises investing in research and development works, such as:

1. technology transfer centres,

2. technology incubators,

3. technology parks,

4. research networks,

5. training-advisory centres,

6. centres of innovation.

Minister of Science is authorized to establish advanced technology centres and centres of excellence.

In 2001 the Ministry of Economy, Labour and Social Policy established FIRE Innovation Centre, whose main task is to offer advise and consulting services to those entrepreneurs, who wish to promote and develop own ideas having bright market prospects. Several projects in this area have already been initiated, some other are in a preparatory stage.

Very recently – in January 2004 – parliamentary works on the amendments of "industrial property rights" have been completed, which undoubtedly will facilitate technology transfer and innovations.

The same role, but in more practical dimension, should be played by industrial and technology parks. Necessary documentation (feasibility studies, environmental impact assessments, business plans) has already been prepared for 10 such parks.

4. Enhancing collaboration and networking among innovating organizations

At present there are being prepared projects for implementation of Regional Innovation Strategies (RISs). These strategies are included among priorities described in the governmental document "National Plan of Growth 2004-2006". RISs should be implemented till 2004 and, as a consequence, the National Innovation Strategy will be launched in 2005 to enhance coordination of RISs on the governmental level. Strategies aim to foster co-operation between research and development institutions and the industry and to strengthen innovations in the regions.

After accession to the European Union Polish regions can be reinforced by means from the structural funds. All regions of Poland meet the requirements enabling them to obtain these funds. Part of funds will be assigned for fostering innovation both in public and private enterprises. Funds will be used to enhance all local reforms and actions. Polish scientists consider as absolutely essential that the use of regional development tools is much more streamlined into the development of modern research and higher education infrastructure.

5. Human resources for S&T

The number of students has increased during the past ten years almost fourfold. This increase has been due both to public and private funds. Rapid growth of number of students and creation of quite a number of private higher education institutions is often considered to be the most amazing phenomenon in the period of transition in Poland.

As far as the tertiary education students "intensity" (number of students in tertiary education per 10 000 population) is concerned, Poland is now ahead of many developed countries. The value of this indicator in Poland in 2001 was 443 and even 498 when including those learning in post-secondary non-tertiary education institutions. More than half (57%) of total number of students in tertiary education constituted women.

The number of doctorates conferred in 2001 was 4400. That was the largest ever number of doctorates conferred (about three times as high as in 1991). In the period 1995-2001 the share of

women among recipients of doctor's degree has increased by 11.3% (from 33.2% in 1995 to 44.5% in 2001).

There has also been rise in the number of research scientists and engineers. In 2002 the number of researchers engaged in R&D was by one fourth higher than in 1994 (when the Frascati-type R&D survey was launched by Polish Central Statistical Office).

Employment in research and development activity by occupation and educational level is shown in the attached tables.

5.1 Policies to boost innovation in the service sector.

Unfortunately, not too much is being done in this particular area.

5.2 Policy evaluation.

Ministry of Economy is preparing a study "Fostering governmental policy and institutional coherence to increase innovativeness of economy before accession to the EU". Completion of the study and necessary recommendations are expected in the mid of this year.

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SOURCES:

Science and technology in Poland in 2001, Central Statistical Office, Warsaw 2003.

Science and technology in Poland in 2002, Information note, Central Statistical Office, Warsaw, October 2003.

ANNEX : TABLES AND GRAPHS

Table 1. Units and employment in research and development activity by occupation

Specification	1990	1995	1998	1999	2000	2001	1995	1999	2000	2001			
	units (as of 31 XII)						Personnel[a]						
							total				researchers	technicians and equivalent staff	other supporting staff
Total ……	**949**	**738**	**905**	**955**	**860**	**920**	**83590**	**82368**	**78925**	**78026**	**56918**	**12384**	**8724**
Scientific units of the Polish Academy of Sciences ……...	**79**	**81**	**82**	**81**	**81**	**81**	**8089**[b]	**7486**	**7233**	**6934**	**4646**	**1165**	**1123**
scientific institutes ……	52	54	58	58	58	58	6702	6727	6492	6184	4188	1027	969
independent research departments	27	27	24	23	23	23	1387	759	741	750	458	138	154
Branch research-development units	**260**	**253**	**246**	**240**	**240**	**232**	**30900**	**23918**	**23044**	**21708**	**12211**	**5443**	**4054**
research institutes ……	111	128	137	136	137	136	24244	19745	18930	18208	10367	4520	3321
central laboratories ……	12	10	11	11	11	11	425	381	357	306	185	73	48
research-development centers.	116	80	78	76	74	68	5147	3513	3432	2854	1512	744	598
others ……	21	35	20	17	18	17	1084	279	325	340	147	106	87
Science support units	**51**[c]	**4**	**25**	**21**	**23**	**18**	**72**	**137**	**130**	**184**	**127**	**7**	**50**
Development units (business ente-rprises)	**479**	**296**	**438**	**498**	**402**	**463**	**8908**	**7879**	**6906**	**5923**	**3270**	**1858**	**795**
Higher education institutions	**80**	**104**	**114**	**115**	**114**	**121**	**35621**	**42948**	**41499**	**43180**	**36597**	**3891**	**2692**
Other units	**-**	**-**	**-**	**-**	**5**	**5**	**-**	**-**	**113**	**97**	**67**	**20**	**10**

[a] In full-time equivalents, [b] Excluding the Museum of Earth, [c] Including units which did not perform research and development activity.

Table 2. Employment in research and development activity by educational level. Head count data – as of 31 XII

Specification	Total	Education				
		higher				other
		with title of professor	with scientific degree of		with other university degrees below the PhD level (master, bachelor and equivalent)	
			habilitated doctor [a] (HD)	doctor (PhD)		
Total …… …….. 1999	126000	8096	9353	31277	45904	31370
2000	125614	8362	9778	32798	45461	29215
2001	**123840**	**8618**	**9934**	**34694**	**44683**	**25911**
Scientific and research-development units 1999	37778	1659	1343	5698	13374	15704
2000	36632	1659	1281	5670	13356	14666
2001	**34475**	**1663**	**1330**	**5590**	**12611**	**13281**
Units of the Polish Academy of Sciences	7825	825	683	1834	2338	2145
scientific institutes …….	6944	752	616	1653	2088	1835
independent research departments …….	881	73	67	181	250	310
Branch research-development units …	26446	834	644	3728	10157	11083
research institutes …….	21681	749	595	3357	8184	8796
central laboratories …….	392	9	2	49	183	149
research-development centres …….	3966	69	38	285	1636	1938
others ……..	407	7	9	37	154	200
Science support units ……	204	4	3	28	116	53
Development units (business enterprises) 1999	10846	9	16	157	5322	5342
2000	9443	25	23	193	4948	4254
2001	**8171**	**6**	**9**	**141**	**4667**	**3348**
Higher education institutions …… 1999	77376	6428	7994	25422	27208	10324
2000	79539	6678	8474	26935	27157	10295
2001	**81087**	**6944**	**8586**	**28934**	**27374**	**9249**
Other units ……..	191	5	13	23	107	43

2000						
2001	**107**	**5**	**9**	**29**	**31**	**33**

a The habilitated doctor`s degree (HD) which is higher than doctorate (second doctorate), is peculiar to Poland. The degree is awarded on the basis of an appropriate dissertation and is necessary for obtaining the title of professor and a professorial post in a university.

Table 3. Gross domestic expenditures [a] on research and development activity (GERD) by type of costs in million PLN (current prices)

Specification	1995	1999	2000	2001			
	grand total				expenditures		
					Current[b]		capital
					Total	of which labour costs	total	of in me equ
Total ……..	**2 132.8**	**4 590.5**	**4 796.1**	**4 858.1**	**3 894.5**	**1 902.3**	**963.6**	
Scientific and research-development units	**1 278.9**	**2 328.5**	**2 463.4**	**2 442.2**	**2 095.1**	**1 152.2**	**347.1**	
Scientific units of the Polish Academy of Sciences	265.6	497.0	550.1	623.2	528.2	305.2	95.0	
scientific institutes ……	213.5	448.8	496.2	548.0	467.2	278.7	80.8	
independent research department ……	52.1	48.2	53.9	75.2	61.0	26.5	14.2	
Branch research-development units ……	1 010.5	1 815.3	1 899.5	1 802.6	1 552.5	839.3	250.1	
research institutes ……	785.2	1 558.9	1 617.5	1 565.0	1 333.6	728.6	231.4	
central laboratories ……	9.5	23.8	24.4	15.6	13.8	7.7	1.8	
research-development centers ……	167.5	214.1	227.7	192.9	177.1	89.5	15.8	
others ……	48.3	18.5	29.9	29.1	28.0	13.6	1.1	
Science support units ……..	2.8	16.2	13.8	16.4	14.4	7.7	2.0	
Development units (business enterprises) ……..	**292.9**	**987,7**	**791.6**	**803,9**	**576.0**	**263.2**	**227.9**	
Higher education institutions ……..	**561.0**	**1 274.3**	**1 512.4**	**1 589.9**	**1 208.5**	**478.0**	**381.4**	
Other units ……..	**-**	**-**	**28.7**	**22.1**	**14.9**	**8.9**	**7.2**	

[a] Excluding depreciation of fixed assets [b] Including expenditures on so-called special research equipment (research equipment meeting criteria for inclusion in fixed assets but according to the regulations in force temporarily treated as current assets).

Table 4. Structure of gross domestic expenditures[a] on research and development activity (GERD) by source of funds; % (current prices)

Specification	**1995**	**1998**	**1999**	**2000**	**2001**
Total …….. of which funds from:	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
The state budget [b] ……..	60.2	59.0	58.5	63.4	64.8
Economic entities ……..……	24.1	29.7	30.6	24.5	24.3
Scientific units of the Polish Academy of Sciences and branch research-development units ……..……	11.9	8.3	7.5	8.1	6.5
International organizations and foreign institutions ……..	1.7	1.5	1.7	1.8	2.4

[a] Excluding depreciation of fixed assets. [b] The main disposer of which is the State Committee for Scientific Research (KBN).

Table 5. Current expenditures [a] on research and development activity by type of activity in million PLN (current prices)

Specification	**Total**	**Research**		
		Basic	**Applied**	**Experimental development**
Total …….. 1995	1 834.8	668.0	491.5	675.3
1998	3 219.8	1 111.3	830.5	1 278.0
1999	3 694.9	1 339.2	904.8	1 450.9
2000	3 981.5	1 534.2	991.7	1 455.6
2001	**3 894.5**	**1 474.6**	**1001.9**	**1 418.0**
Scientific and research-development units ……	**2 095.1**	**741.7**	**653.0**	**700.4**
Scientific units of the Polish Academy of Sciences ……..	528.2	475.1	44.8	8.3
Branch research-development units ……...	1 552.5	266.6	596.3	689.6
Science support units ……...	14.4	-	11.9	2.5
Development units (business enterprises) ….	**576.0**	**-**	**34.6**	**541.5**
Higher education institutions ……	**1 208.5**	**732.9**	**314.3**	**161.3**
Other units ……..	**14.9**	**-**	**-**	**14.9**

[a] Excluding depreciation of fixed assets; including so-called special research equipment (see footnote [b] to the table 3).

Table 6. Employment and expenditures in research and development activity by field of science

Specification	1995	1998	1999	2000	2001	1995	1998	1999	2000	2001
	personnel (FTE) [a]					expenditures [b] in mln PLN				
Total …….. in the field of:	**83 590**	**84 510**	**82 368**	**78 925**	**78 027**	**2 132.8**	**4 005.1**	**4 590.5**	**4 796.1**	**4 858.1**
Natural sciences ……	18 201	17 822	18 296	17 885	16 348	537.3	787.4	943.0	1 049.6	1 192.4
Technical sciences ……	37 218	34 066	31 672	29 254	28 370	1 053.5	2 160.5	2 451.0	2 390.4	2 376.3
Medical sciences ……	9 124	10 880	9 515	10 018	11 635	172.3	411.2	493.9	586.7	518.2
Agricultural sciences ……	9 257	7 653	8 851	8 213	8 023	245.7	355.1	399.9	439.4	400.1
Social sciences and humanities ……	9 790	14 089	14 034	13 555	13 651	124.0	290.9	302.7	330.0	371.1

[a] See footnote [a] to the table 1. [b] In current prices; excluding depreciation of fixed assets.

Table 7. Main research and development activity indicators

Specification	1995	1998	1999	2000	2001
Gross domestic expenditures[a] on research and development activity (current prices)					
ratio to gross domestic product [b] (GERD/GDP) in % …	0.69	0.72	0.75	0.67	0.65
per capita in PLN ……..	55	104	119	124	126
Employment in research and development activity per 1000					
economically active persons [c] ……	4.9	4.9	4.8	4.6	4.5
of which researchers ……	2.9	3.3	3.3	3.2	3.3

[a] Excluding depreciation of fixed assets, [b] In 2001, the method of compilation of gross domestic product (GDP) was corrected in a following way: *1)* the changes in the scope of units included in the particular institutional sectors were introduced; *2)* the recording of transactions in the accounts of general government sector was changed from cash basis into an accrual basis; *3)* the new criterion of qualifying households to the individual sub-sectors was used as well as the number of sub-sectors was increased from 4 to 6 sub-sectors; *4)* the valuation of fixed assets according to market prices was done. For 2000 the ratio GERD/GDP was adjusted to conditions comparable with 2001. In conditions comparable with 1999 the value of the above mentioned ratio was 0,70. [c] Employment – in full-time equivalents; economically active persons – on the basis of the Labour Force Survey (LFS): of May in 1995 and 1998, of IV quarter in 1999-2001.