

STI OULOOK 2002 – COUNTRY RESPONSE TO POLICYQUESTIONNAIRE**SLOVAK REPUBLIC****1. General framework and trends in science, technology, and industry policy****1.1. Overview and assessment of policies for science, technology, and industry**

Slovak science and technology system is represented by Slovak Academy of Sciences (SAS) with its institutes, by universities, by governmental/state research institutions (created and primarily financed from the state budget by different ministries) and by organisations of private sector. Transformation and restructuring of the whole society and economy brought about a strong reduction of research potential. An average size (as to the number of researchers and employees) of research organisations downsized approximately by 50%. As to the type of sector, research entities of the private sector represent ca 50 % of the total number of research organisations, public sector (SAS and governmental/state research institutions) is represented by approx. one third of the total research organisations, and about one seventh are university (higher education) institutions. Only a negligible number of research organisations belong to private non-profit sector and/or to international organisations. As to the date, transformation of science and technology sector brought about reduction of total R&D personnel and an increase of an average age of researchers. The total share of research expenses from GDP (ca 1 %), research expenses per capita (ca 80 USD) and total number of research personnel are quite low.

General research information

The Statistical Office of the Slovak Republic follows up all general financial, personnel and economic information on R&D organisations. In accordance with the situation in the OECD member countries, important changes were introduced in the methods of gathering R&D statistical data since 1994. The main changes are as follows:

- An organisation is not evaluated as a single entity, but only its real activities in R&D are evaluated;
- Besides registering R&D personnel in numbers of employees, emphasis is put to FTE (full-time equivalent: so-called “man-years”; FTE = 2000 hours/year).
- University professors were not considered (for statistical purposes) among scientists/researchers properly until 1993. Beginning from 1994, the OECD methodology/standards are used in Slovakia to express in statistic terms their research involvement and capacities. Therefore the statistical number of “R&D personnel” increased in sector of education as of that time.

- R&D expenditure consists of capital/investment expenses (*e.g.* equipment, buildings, etc.) and current (*e.g.* salaries, maintenance, etc.) expenses. Table 1 indicates a brief overview of the most important R&D indicators and research personnel in a period of 1993-2000. It is to be noted that due to the change in statistical methodology, data from 1993 are not directly comparable with those of the next years.

Table 1: R&D expenditure in 2000

<i>Index</i>	<i>Unit</i>	<i>Amount</i>	Trends 2000/1999 in %
Total R&D expenditure	SK (mil)	6 085,5	109,6
R&D expenditure from the State budget	SK (mil)	2 592,1	97,5
Total R&D expenditure from GDP	%	0,686	100,9
Budgetary R&D expenditure from GDP	%	0,292	88,5
Budgetary R&D expenditure from total budgetary expenditure	%	1,075	93,4 x)
Budgetary R&D expenditure share from total R&D expenditure	%	42,6	89,1

Note: x-total budgetary expenditure = State budget plus R&D expenditures of non-budget resources in accordance with par.20 Act No.303/1995 Coll. on Budgetary Rules

There was ca a 10 % increase (in current prices) of total R&D expenditure in 2000 compared to 1999 (not considering the inflation rate), reaching approx. level of 1998. It was caused by R&D expenses increase in private sector by ca 27 %, while R&D expenses from the State budget were reduced by ca 2,5 %.

The share of R&D expenditure from GDP in 2000 remained the same as in 1999. However, reduction of R&D expenses from the state budget as a percentage from GDP continued (decrease by ca 11,5 %), as well as reduction of R&D budgetary expenses from total budgetary expenses (decrease by 6,6 %) was registered.

Table 2: Structure of R&D expenditure – 2000

<i>Index</i>	<i>Unit</i>	<i>Amount</i>	Trends 2000/1999 in %
Current expenses for R&D activities	SK (mil)	5571,6	113,0
Capital expenses for R&D activities	SK (mil)	513,9	82,9
Current R&D expenses share from total R&D expenses	%	91,6	103,2

Capital R&D expenses share from total R&D expenses	%	8,4	75,0
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R&D capital and current expenditure share within total R&D expenditure changed substantially in 2000 compared to 1999 for the following reasons: absolute and relative increase of current expenses and absolute and relative decrease of capital expenses. It is necessary to stress continual decrease of capital expenses in contradiction with needs for modernisation of R&D equipment and infrastructure of R&D organisations.

Table 3: Structure of current R&D expenditure according to basic indicators — 2000

Index	Unit	Amount	Trends 2000/1999 in %
Current expenditure for basic research	SK (mil)	1 385,5	97,4
Basic research expenses share from the current R&D expenditure	%	24,9	86,5
Current expenditure for applied research	SK (mil)	2 913,2	123,3
Applied research expenses share from the current R&D expenditure	%	52,3	109,2
Current expenditure for development	SK (mil)	1 272,9	110,9
Development expenses share from the current R&D expenditure	%	22,8	97,9

There was a 2,6 % absolute and relative decrease of expenses for basic (fundamental) science and quite substantial increase by ca 23,3 % of expenses for applied research as well as remarkable in the structure of current R&D expenditure by elementary R&D types in 2000 in compare with 1999. Total development expenses increased by 10,9 %. The indicators were caused by absolute and relative increase of research expenses from private sector.

Table 4: Structure of total R&D expenditure by scientific disciplines – 2000

Index	Unit	Amount	Trends 2000/1999 in %
R&D expenditure in natural sciences	SK (mil)	1600,0	178,7
R&D expenses share in natural sciences	%	26,29	163,1
R&D expenditure in engineering and technologies	SK (mil)	2 864,3	96,4
R&D expenses share in engineering and technologies	%	47,07	88,0
R&D expenditure in medical sciences	SK (mil)	491,8	81,1
R&D expenses share in medical sciences	%	8,08	74,0
R&D expenditure in agricultural sciences	SK (mil)	718,4	116,5

R&D expenses share in agricultural sciences	%	11,81	106,3
R&D expenditure in social sciences	SK (mil)	354,1	87,2
Index	Unit	Amount	Trends 2000/1999 in %
R&D expenses share in social sciences	%	5,82	79,6
R&D expenditure in human sciences	SK (mil)	56,9	99,8
R&D expenses share in human sciences	%	0,93	90,3

There was a 78,7 % both absolute and relative increase of natural sciences expenses and a 16,5 % increase of agricultural sciences expenses, along with total decrease of other sciences expenses in the structure of total R&D expenditure to other scientific disciplines in 2000 compared to 1999.

These data confirm importance of private-sector resources within total research resources and their relevance to orientation of expenses to particular research areas.

Table 5: Structure of R&D expenditure by financial resources

Index	Unit	Amount	Trends 2000/1999 in %
R&D expenditure from state and public resources	SK (mil)	2 592,1	97,5
R&D expenses share from state and public resources	%	42,6	89,1
R&D expenditure from private resources	SK (mil)	3 312,1	126,9
R&D expenses share from private resources	%	54,4	115,7
R&D expenditure from credit/loan resources	SK (mil)	24,0	15,2
R&D expenses share from credit/loan resources	%	0,4	14,4
R&D expenditure from non-profit private organisations	SK (mil)	2,77	219,8
R&D expenses share from non-profit private organisations	%	0,05	250,0
R&D expenditure from foreign resources	SK (mil)	139,3	111,1
R&D expenses share from foreign resources	%	2,3	100,0

There was a 54,4 % increase of private-resources R&D expenses (from total R&D expenditure). Private resources expenses increased by 26,9 % in 2000 compared to 1999 and by 5 % compared to 1998. It means that the private resources invested to R&D in 2000, as a share of total R&D expenditures, reached 54,4%. Expenses from state and public resources were 42,6 % from total R&D expenditure, while there is only a negligible share (ca 3%) of other resources within total R&D expenses.

Table 6: R&D personnel in numbers of employees – 2000

Index	Unit	Amount	Trends 2000/1999 in %
Total score to 31.12.	person	22 256	99,1
thence: R&D university staff	person	11 114 (49,9%)	101,1
R&D staff from SAS*	person	3 209 (14,4%)	104,9
FTE in „man-years“	FTE	15 221	102,5
Thence: R&D staff from Universities	FTE	5 860,5 (38,5%)	114,3
R&D staff from SAS	FTE	2 858 (18,8%)	104,2
Structure of R&D staff in „man-years“ according to scientific disciplines:			
- Natural sciences	%	24,5	128,9
- Engineering and technologies	%	38,5	92,3
- Medical sciences	%	10,5	81,4
- Agricultural sciences	%	7,9	60,8
- Social sciences	%	15,5	139,6
- Humanities	%	3,1	134,8

*SAS = Slovak Academy of Sciences

Table 7: Number of R&D organisations, which submitted their statistical information — 2000

Index	Amount	Trends 2000/1999 in %
Number of R&D organisations	303	94,4
thence: R&D organisations in private sector	151	89,9
R&D organisations in public sector	84	98,8
thence: SAS	63	98,4
Universities	68	109,7

Table 8: Total expenditure for R&D projects – 2000

Index	Unit	Amount	Trends 2000/1999 in %
Total expenditure for R&D projects	SK (mil)	3 645,5	108,0
thence: State financed	SK (mil)	2 592,1	145,7
thence: Expenditure for state orders	SK (mil)	396,5	80,9
Expenditure share for state orders	%	10,9	75,2
Expenditure for scientific projects	SK (mil)	774,3	107,0
Expenditure share for scientific projects	%	21,2	99,3
Expenditure for R&T projects	SK (mil)	529,6	93,7
Expenditure share for R&T projects	%	14,5	87,0
Expenditure for R&D state financed projects as a share from total expenditure for R&D projects	%	71,1	134,9
thence: structure of expenditure for R&D projects according to the sectors	-	-	-
Private sector	%	67,0	103,2
Public sector	%	20,7	98,1
Sector of Universities	%	12,3	87,9
R&D projects expenditure share from total R&D expenditure	%	59,9	98,5

There was an 8 % increase of total R&D project expenses in 2000 in compare with 1999 and at the same time state financed project expenses increased by 45,7 % to 71,1 % of the total expenditure – they prevailed in absolute figures. Total research projects expenses decreased by 6,3 % in spite of increase of private sector financial research resources.

**Table 9: Total R&D projects expenses by socio-economic priorities — 2000
(only those for which total expenses exceeded 100 mil. SK)**

	<i>Socio-economic priorities</i>	Total expenses (mil SK)	+ increase(according to 1999) - decrease(according to 1999) (mil SK)
1	Industrial development support	1942,2	+64
2	Research progress	1204,9	-31,2
3	Agricultural development	863,4	-4,9
4	Transport and Telecommunications	763,1	+432,7
5	Health	462,6	+8,7
6	General university funds	427,6	+152,2
7	Research and exploitation of the Earth	146,9	+14,2
8	Environmental control	103,1	+37,7

Support for other socio-economic priorities did not exceed the sum of 100 mil. SK.

Transport, telecommunication and general university funds expenses showed the most significant increase.

Table 10: Total R&D expenses split by the classification of economic activities was followed-up mostly within general “research and development activity”, without specification of particular R&D activity. Total R&D expenses = 3 767,0 mil. SK

	Classification of economic activities by sectors of economy	Total expenses (mil. SK)	+increase(according to 1999) -decrease(according to 1999) (mil SK)
1	Education	578,9	+28,0
2	Telecommunication equipment production	513,0	+442,6
3	Chemistry production	402,3	+11,0
4	Rubber and plastic products	174,9	-12,5
5	Machinery production	164,5	+40,2
6	Electrical machines production	56,3	+3,3

Other activities within R&D projects did not exceed the sum 50 mil. SK.

There was an important 442,6 mil. SK increase in telecommunication equipment production expenses and 54,3 mil. SK increase of total research expenditure.

It is to be noted, that due to the general specification of research activities, introduced informations are not unambiguous.

Conclusions based upon analysis of the data and indicators:

- Due to the statistical results global R&D data shown increase in 2000 compared to year 1999 (ca a 10% increase) on the basis of private sector resources increase and negligible decrease of state/public resources (ca 2,5 % decrease)
- Total R&D expenses share from GDP in 2000 remained the same as in 1999 along with an 8,66 % annual GDP increase. R&D budgetary expenses share from total budgetary expenses reduced by 6,6% in 2000 compared to 1999. The indicators showed stagnation of research financing in the Slovak Republic.
- Permanent reduction of capital R&D expenditure prevents modernising of R&D equipment and infrastructure, which is considered very negative.
- Significant increase of current expenses for applied research and development in 2000 compared to 1999 was caused by both absolute and relative increase of R&D private resources expenses.
- Absolute and relative increase of natural and agricultural sciences expenses in 2000 compared to 1999 in the structure of total R&D expenditure by basic indicators
- R&D expenses share from private resources overran 50 % of total R&D expenditure. R&D expenses from the state budget and private resources combined were 97% of total R&D expenditure. There is a 3 % negligible share of other research resources.
- Total R&D personnel number decreased slightly in 2000 compared to 1999 and at the same time light increase of R&D capacity (in “man-years”) in SAS and University sector was registered.
- The number of organisations, which submitted their data for statistical processing, decreased by 12 to 303 entities in 2000 compared to year 1999. This decrease was caused by non-governmental organisations.
- There was an 8 % increase of total research projects expenses in 2000 in compare with 1999, while state financed expenses increased by 45,7% (to 71,1% of total R&D projects expenses) – they prevailed in absolute figures.
- One can state that while there were positive partial R&D expenditure indicators (due to increase of private resources expenses), macro economical indicators as R&D expenses share from GDP and from the State budget did not fulfil expected goals.

1.2. Different types of R&D instruments

Current supporting instruments for research and development activities:

1. Standard instruments

- State administration's execution of the R&D activities is covered by the Government of the Slovak Republic, by its advisory bodies, by the central governmental R&D institution (respective ministry) and by the other central state bodies and their advisory bodies.
- Direct administration of the state R&D organisations through central state administrative bodies.
- Legislative measures for research and technology (financing, institutional arrangement, competencies, etc).
- Direct and indirect R&D support instruments.
- Co-ordination of support and implementation of R&D activities (technical normalisation, metrology, intellectual property rights, etc.).
- Co-ordination of international science and technology co-operation.

2. Non-standard instruments:

- Stimulation of private sector participation in development of science and technology and in use (utilisation, implementation) of R&D results in its activities — for this purpose using indirect economic instruments and specific targeted funds.
- Privatisation as an instrument of restructuring science, technology, research and development.
- Foreign assistance.

R&D legislation:

- - Act on Organisation of Ministries and Other Central State Bodies of the Slovak Republic (Act No. 347/1990 Coll., according to the Act No. 2/1993, No.88/1994, 74/1995 Coll.);
- Act on Higher Education (Act No.172/1990 Coll. - its latest amended wording);
- Act on Slovak Academy of Sciences (Act No.74/1963 - its latest amended wording);
- Trade Act (Act No.455/1991 – its latest amended wording);
- Commercial Code (Act No.513/1991–the latest amended wording);
- Civil Code (Act No.40/1964 – the latest amended wording);
- Labour Code (Act No. 311/2001 – new wording – effective from 1.4.2002)

2. Public sector research and public research organisations¹

2.1. Policy changes and background/rationale related to public sector R&D

R&D activities in public research sector are supported by direct and indirect economic instruments:

- Direct instruments:
 - Financing of budgetary organisations, which are established by central state bodies, and budgetary organisations created by specific legislation (SAS, Universities) is linked mostly to their activities carried out during the respective fiscal year.
 - Financial contribution to the state contributory R&D organisations (“state contributory organisation” means such an organisation, which receives part of its financial resources from the state budget and at the same time it must earn part of its financial resources by its own contracted activities).
 - Contracted R&D by request of central state bodies, financed by these central bodies (from the state budget) and carried out by other than budgetary organisations.
 - Financial contribution to civil associations and non-profit organisations activities.
 - Financial support for innovation activities in specific selected areas, which are of high importance and high progress possibilities but rather risky for private investments.
- Indirect economical support instruments are asserted through the tax and custom policies and they are part of the following legislation:
 - Act No.286/1992 Coll. on Income tax – the latest version – in accordance with the legislation, under some conditions R&D expenses in private entities are tax deductible.
 - Act No.222/1992 Coll. on VAT in the Act No.289/1995 Coll. – in accordance with the legislation, donations for R&D purposes from abroad are free of VAT.
 - Act No.317/1992 Coll. on fixed assets tax - in accordance with the legislation, R&D taxpayers are free of payment land and building tax (par. 4 and 9).
 - Ordinance of the Ministry of Finance of the Slovak Republic No.17/1994 on liberation of goods from import custom duty.

Equipment, tools and goods for R&D and education, which are imported for non-profit purposes, are free of import custom duty. The same arrangement is in force for goods imported for experiments, testing and analysis.

- Indirect R&D instruments are also part of following legislation:

¹. 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.

- Act No.303/1995 Coll. on Budgetary rules, as well as ordinances of the Ministry of Finance of the Slovak Republic No.638/1992 concerning exploitation of R&D means and results.
- Act No.145/1995 Coll. on administrative fees (protection of research results on the territory of the Slovak Republic).

2.2. *Initiatives to reform the organisation and governance of universities and public research organisations*

Existing R&D institutional arrangement is comparable with the organisation in industrially developed countries.

Basic organisational structure is as follows:

(a) Supreme executive and advisory bodies:

- Central governmental body responsible for science and technology in Slovakia: Ministry of Education of the Slovak Republic (Division of Science and Technology), having overall general responsibilities for R&D in Slovakia.
- Other central state bodies at the ministerial level and their advisory bodies for research and technology.

(b) Supporting organisations and bodies:

- Agency for Support of Science and Technology of the Slovak Republic (approved by decision of National Council of the Slovak Republic No. 1398/200).
- Various agencies for science and technology at the sector level (*e.g.* agency created at the Ministry of Agriculture of the Slovak Republic, Scientific grant Agency operates within the Ministry of Education of the Slovak Republic and SAS, other similar agencies are proposed to be established also by other ministries).
- Non-state Fund for Innovation.
- Other foundations and funds for R&D support.
- Agencies for international science and technology co-operation.

(c) R&D entities:

- In the state and public sector.
- In the private sector.
- In the higher education sector.
- In the sector of private non-profit organisations (Act on Non-profit Organisations).

- Organisations with foreign capital participation.

Transformation expects reduction of state administrative interferences into R&D activities and strengthening its activity into systematic measures.

R&D support instruments should be aimed towards development of our human potential, taking into consideration freedom of science and responsibility for conducting R&D, as well as preferential support to the tasks solving problems within the priorities of national R&D policy and world trends.

Research in SAS and at institutions and institutes of higher education establishments have currently specific position in the current framework of Slovak R&D structure.

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

Competitive environment is provided by the legislation in the Slovak Republic. Private sector entities participate effectively on actual R&D tasks.

Actual proposal of the Act on Science and Technology (expected effectiveness as of April 1, 2002) contents direct R&D budgetary support to both legal and physical entities through:

- Grants and subsidies.
- state research and development programmes:
 - Interdisciplinary state programmes, which consist of sets of interlinked tasks from selected research and development areas. These programmes are targeted to strengthen and increase economic and social level in different sectors/branches of the country.
 - Thematic state programmes focused on strengthening R&D effectiveness, particularly in human resources and mobility, R&D technical and institutional building and international R&D co-operation.

Six interdisciplinary state programmes and four thematic programmes will be elaborated for the period 2002-2005.

Selection of appropriate R&D tasks of the state programme is realised by public tenders. Any legal or physical R&D entity – private sector including – can apply for the funds from this public competition.

- R&D state orders – state orders approved by the Government can be realised by legal or physical R&D entities in public tenders.
- State R&D assistance according to the Act 231/1999 C.c. on the state assistance.

The private sector entities can apply for the financial resources from the state budget also in following ways:

- Resources from the Agency for Support of Science and Technology (established by the Act 203/2001 Coll.) providing financial for:

- R&D projects within research programmes promulgated publicly by the Agency (top – down approach).
- Other individual R&D projects of legal or physical R&D entities with the domicile in the Slovak Republic (bottom – up approach).
- Research and development tasks providing by the legal R&D entities within international R&D co-operation agreements.
- The non-investment fund for support of research and development – Innovative Fund (established according to the Act 147/1997 C.c. on non-investment funds) secures the return financing, supporting the application of research and development results in the economical practice.

4. Enhancing collaboration and networking among innovating organisations

4.1 Initiatives to promote collaboration among private and public sector organisations

This issue is linked up with reassessment of aims and goals of R&D applications and of evaluation of systematic research improvement within transformation program. Introduced analysis is focused on so-called “scientific laboratories” only, in relation to industrial development (*i.e.* not considering social sciences and/or humanities).

The above-mentioned scientific entities operate within Slovak Academy of Sciences (institutes of natural sciences, technical and agricultural research institutes) and at technical universities and other higher technical schools.

As found out in our investigation, there is following percentage share of respective scientific areas within total R&D budgetary expenses: natural sciences (30,4%), agricultural sciences (23,9%) and technical sciences (22,2%) – it means these three areas combined are spending 76,5% of the total R&D expenditures from the state budget. Since these scientific areas can substantially contribute to economic development, we consider it is adequate share within total R&D expenses. However, the crucial point is to strengthen links: basic scientific research – applied research – experimental development – implementation – production.

Due to the supposed intentions, following measures are introduced:

- Increasing share of oriented basic scientific research, preparation and calls for new integrated R&D projects.
- Increasing purposefulness in R&D financing of research entities and their participation in complex research projects ordered at the state level.
- Continual transformation of R&D laboratories of natural, technical and agricultural sciences from budgetary type (*i.e.* financed by the state budget) into non-budget type organisations (*i.e.* financed mostly from their own contracts and not from the state budget).
- Establishing the Agency for R&D support of the Slovak Republic with cross-sectional competences (in June 2001), establishing technological research centres, science and

technology parks, and their efficient involvement into co-ordination of programmes and projects according to the needs of industrial and economy development.

4.2 Initiatives to promote stronger industry/science relations

Technological innovations are supported by the Innovation Fund. Strategy of development is an integral part of the “Concept of State Scientific and Technology Policy”, which contains also proposed R&D orientation including proposed state programmes.

Technical policy in economy (industrial) sectors (branches) in Slovakia is focused on renewal of dynamics and effectiveness of economic (industrial) growth in progressive, but as yet underestimated areas. Technological strategy for following years is based on:

- Support of progressive technology transfer via proper actual up-dated information and strengthening of support for research, technological, developmental, constructive and organisational solutions for implementations in specific regions and sectors.
- Revitalising of innovative activities within existing economical entities and establishing of small technological enterprises focused on transfer of progressive technological knowledge to commercial use.
- Intensifying the process of national legislation approximation with EU R&D legislation;
- Preferring “high quality” policy to ensure complex consumers protection — based upon existing consumers protection systems of developed countries.
- Support to further development of international science and technology co-operation and active participation in the R&D programmes of EU and of EU member states.

There is a category of integrated research projects covered by the universities, other institutions of higher education, SAS and industrial sector. Public research bodies and universities (institutions of higher education) are entitled to invest into industrial sphere without any limits. There is no financial limit set for research co-operation within public and private activities. The only limit is availability of resources of respective partners.

Innovative activity of manufacturing industry enterprises

In the period of 1997-1999 there was on average 17% of innovative enterprises in manufacturing industry (i.e. companies which introduced technology innovation of either products and/or technology within this period of time). High innovative capability was characteristic for big enterprises (with 250 and more employees). Innovations were introduced in 43% of these companies, while from medium-size enterprises (50-249 employees) only ca 17% introduced innovation, and in small enterprises (20-49 employees) it was only 7,3%.

Out of the total number of innovative companies, 31% enterprises innovated their products and 18 % companies innovated processes and/or technologies. More than 50 % of innovative companies implemented both product and processes innovations. Industrial sectors/branches with the highest degree of innovation activities are: refineries (50 %), production of medical, fine and optical equipment (37,5 %), production of non-metal mineral products (29,9 %) and production of food and beverages (29,5 %).

Approximately one third of innovative companies had established co-operation with other partners in development of innovative products and/or processes (technologies). Most of them co-operated with private research entities (74,5%), with universities and institutions of higher education (56,3%) and with state/public research institutions (40,2%).

The main obstacles in implementation of innovations in 1993-1997 were shortage of financial resources - 52 % of enterprises found this factor as substantial or the most important. As an internal factor, lack of research capacities was declared.

During 1997-1999 innovations were introduced mostly in enterprises possessing average level of technology (23,5 %) – production of equipment for use in medicine, optical equipment, car production, production of machinery and devices, chemical production and transport equipment.

Statistical data show, that innovative enterprises are more oriented towards export (76,6 %) in compare with non-innovative ones (65,6 %).

Intellectual property rights arising from publicly financed research

The Constitution of the Slovak Republic ensures freedom in scientific research. Issues related to intellectual property rights are spelled out in the following legislation:

- Act no.527/1990 Coll. on patents and industrial designs – the latest version.
- Act no. 35/1965 Coll. on literary, scientific and artistic works (author Act) – the latest version.
- Act no.529/1991 Coll. on provision of topography of quasi conductors – the latest version, referring to Act No. 90/1993 Coll.
- Act No.145/1995 Coll. on administrative fees.

Intellectual property rights are administered by the Office of Patents and IPR of the Slovak Republic, the Office of Standards, Metrology and Testing of the Slovak Republic, etc.

5. S&T human resources

For to keep stable research potential, it is necessary to keep and support human resources in adequate quality, numbers, and structures relevant to specific topics mirroring the needs and requirements of Slovak Republic, with respect to our position within world-wide research community and economy. Schooling and education of creative R&D personnel is a long-term process, which consists of 5-years university study and minimal 3-5 years practise. To achieve higher qualification means further long-term process.

In accordance with this purpose, it is necessary:

- To educate competent R&D personnel at higher education institutions and universities, which are capable prepare qualified experts practically in all fields and professions.
- To retain and increase the number of R&D employees in existing research entities. In accordance with this purpose it is necessary to provide suitable financial and moral

motivation, individual treatment — which is most important in case of the best and the most excellent experts.

6. International co-operation and globalisation

Slovak Republic – its scientists, researchers, universities, higher education institutions, SAS and its institutes, public and/or private R&D entities, entrepreneurial companies of various kinds, as well as the Government and its central state administrative bodies – is aware of high importance of international R&D co-operation. There are no restrictions whatsoever put to this relations (except to our obligation related to internationally accepted ones). Any and all legal and/or physical entities are free to carry out international co-operation in R&D. As comes out from the current system of organisation and financing R&D in Slovakia, the Ministry of Education (Section for Science and Technology) is responsible only for international agreements in which the Slovak Government is one of the parties. Other divisions of the Ministry are responsible for so-called “ministerial agreements” which cover mostly co-operation between higher education sectors or the parties, other ministries are responsible for carrying out their own agreements. Naturally, any institution (or person), having its own international agreement, is fully in charge for its implementation. That means, that Ministry of Education (Section of Science and Technology) takes care of implementing and executing the inter-governmental agreements, without any real influence and possibility to intervene into other agreements on level of respective participants. This is fully in consent with independent status of these institutions. The role of the Ministry of Education is to support and promote international science and technology co-operation (ISTC) in close relation to global interests of Slovakia as a whole and in mutual benefit of the signatory countries (set up of the agreements, selection of priorities, financial means devoted to particular ISTC agreement, selection of projects to be supported, etc.). Inevitable parts of such agreements are clauses related to intellectual property rights and patents arising from joint projects. Most of these agreements contain an explicit clause supporting involvement of private entities in ISTC.

Our legislation is moving fast towards international standards (see above), and in R&D the Slovak Republic already in May 2000 reached conformity with internationally accepted laws set by the European Union and its member states, as was confirmed by closing this particular chapter of *Acquis Communautaire*. The legislation in process is aimed to strengthen and reconfirm the progress in building up a modern competitive and transparent framework for organisation and financing the R&D in Slovakia.

Importance of the international R&D co-operation is stressed, among other means, also in “Concept of State Science and Technology Policy”, in which along with six thematic priorities there are four so-called “horizontal” priorities defined, one of them being precisely “international science and technology co-operation”. Thus, ISTC becomes an integral part of each state programme, and has an eminent importance in evaluation of any project proposal requesting financial resources from the state budget.

Support of ISTC in Slovakia is based upon standard approach used in developed countries. That means, high quality of project is required as well as its financial coverage for “domestic” part of the conducted research (incl. capital investments for equipment, financial resources for utilities, salaries, etc.) adequate to the project. International part of the project is aimed to improve its quality, its effectiveness. Financing of this part covers only required mobility expenses. Selection of projects is arranged via peer review process – which is, in fact, a two step procedure: the first step is to succeed in internal competition to obtain positive evaluation for to be financed as a “domestic” project, and in case the project competes to receive grant for ISTC, another peer review is required (mostly involving also foreign evaluators). Both reviews are conducted independently of the Ministry of Education, by evaluators and panels set up either by Agency for Support of Science and Technology and/or other independent agencies and/or experts

selected by representatives of science and technology community (scientists, researchers and entrepreneurs themselves, not by administrative staff of the Ministry).

Slovakia is considering ISTC to be one of major steps towards development of economy, social sphere and international relations. Our attitude to ISTC is based upon following ideas:

- The first precondition is strengthening of quality of science and research in Slovakia, to be on a sufficient level required for co-operation (and competition) with potential foreign partners — measures for reaching this aim are listed in previous parts of this document.
- Bilateral co-operation can be considered in most cases as basis to attract partners and to form multilateral projects.
- Special attention (and resources) of the Government is needed to promote ISTC based upon international agreements in which our Government is a signatory.

It is to be mentioned, that Slovakia is placing a lot of emphasis on research programmes of the European Union (we are full member of the Fifth Framework Programme and expect the same position in the next Sixth Framework Programme), as well as to other multilateral R&D initiatives where Slovakia is a full member (COST, EUREKA, CERN, OECD, European Science Foundation, etc.). The Government takes care of financial issues related to our membership (fees, etc.) and supports active participation of our researchers. There are also other means in force (*e.g.* act on liberation from custom duties for imports of goods aimed for research use). Slovakia is considering its membership in EMBO, in AUSTRON project, in various other multilateral initiatives (both on governmental and on non-governmental levels).

Slovakia has numerous bilateral agreements on governmental level in force, related to ISTC. There are of three different categories:

1. Agreements on co-operation in science and technology: these are very well targeted, with clear rules and dealing with R&D co-operation only.
2. Agreements on economic and technological co-operation: these are much broader, covering mostly issues of co-operation in economy (trade, industry), while clauses on R&D co-operation need to be specified further (therefore these agreements are less efficient compare to the first category – but still considered very important because they keep a close relation between research, development and industry).
3. Agreements on co-operation in culture, education and science: more emphasis is put to co-operation in culture and education.

Therefore our efforts are aimed to broaden and strengthen bilateral co-operation in countries mentioned above in category 1 (*e.g.* Germany, USA, Greece, Czech Republic, China, India, etc.), to finalise already prepared agreements of this kind (*e.g.* Spain, Portugal, Hungary, Slovenia, Poland, etc.), and to move on as fast as possible with agreements of this kind with other countries with which expert negotiations either already started or are about to begin (*e.g.* Japan, Italy, etc.).

We have to mention, however, that in some countries we did not meet understanding to our efforts to put ISTC relations on a high official governmental level. Basically they object, that once there is a freedom of research, there need not (should not) be any formal agreements in place, so that everything should be let on decisions of research (or other) institutes and individuals. This seems to be a misunderstanding – Slovakia does not prevent any individual activities in this field and the only goal we are trying to fulfil via

governmental agreements is to support selectively with additional funds those who will submit proposals being in mutual interest of both countries (*e.g.* research and/or economic priorities of both countries), to those who have proved high quality of their teams, and/or those whose projects have potential for multilateral co-operation, and/or those with possible applications.