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EU enlargement

A new frontier for European research



Editorial

Scientific enlargement

The 13 candidate countries set to join the European Union over the next few years will be considered as full Member States for the purposes of participation in the Sixth Framework Programme. This is a first, both in the history of Community programmes and for the Union itself. Research is the first area of EU policy to open up fully to the candidate countries, on the basis of their own financial contributions.

Clearly, research is seen as a major policy which must help speed up the integration of these countries into the Union. But could it be otherwise in a knowledge society?

Such positive signs must not, however, conceal the difficulties which handicap science and technology in these countries. With the need to renew their infrastructures, halt the brain drain, modernise industry and improve their environment, they face major challenges of crucial importance.

This new approach must also remind us once again of the essential role played by science and technology in many sectors of our society: although their contribution to improving health, protecting the environment, and economic development is well established, this specific situation shows that they also play a necessary part in the general development of Union policy.

In this context, information and communication are essential. That is the reason for this special issue, which in itself is a building block – albeit a modest one – in the construction of the new Europe.

INTRODUCTION

3 New frontiers for an enlarged European R&D

INTERVIEW

4 Historic enlargement on track

At the end of this year – after a decade of negotiations – European Union enlargement is expected to become a reality for at least ten candidate countries. On the eve of this historic occasion, RTD *info* talks to Günter Verheugen, the European Commissioner responsible for enlargement, about the latest state of play on the enlargement process, the role of R&D in an enlarged union, and the benefits awaiting candidate countries participating in FP6.

INTERVIEW

5 Gearing up for FP6

What impact does research have on the economic development of the candidate countries? How well prepared are they for FP6? What new opportunities will it bring to scientists and researchers in the candidate countries? Polish Minister for Science, Michal Kleiber, gives his point of view on these and other pertinent issues.

SIXTH FRAMEWORK PROGRAMME

6 Widening the horizons of European research

The candidate countries have a long and fruitful history as regards EU research Framework Programmes. Participation over the past ten years has brought home considerable benefits – speeding up their integration into the S&T community at European level on the one hand and boosting their overall competitiveness on the other. The new Framework

Programme will move this process along even further. RTD *info* reports on the research collaboration to date and how the changes introduced under FP6 will affect these countries.

NAS RESEARCH IN ACTION

8 The story of successful collaboration

Candidate country participation in EU research programmes began in 1992 under the Third Framework Programme. Since then, the number of projects involving partners from the candidate countries has increased steadily to the benefit of the entire European research community. Case studies of FP4 and FP5 projects demonstrate the wealth of scientific expertise and know-how on offer in the candidate countries.

WHO'S WHO

10 R&D address book for the candidate countries

A list of National Contact Points, Centres of Excellence and Innovation Relay Centres.

RESEARCH SUCCESS STORIES

16 International co-operation to the fore

The network of Innovation Relay Centres (IRC), which aims to support and promote the cross-border transfer of new technologies, has recently been extended. It is already yielding successful results. Similarly, the Commission's Joint Research Centre (JRC) has now opened its full range of activities to include scientists from the candidate countries.

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Research is one of the fields where EU enlargement looks set to offer the first immediate potential benefit to both existing Member States and candidate countries. From the start of 2003 these countries will have full access to financial support under FP6. Extending the EU's R&D capacity to include up to 13 new countries gives increased impetus to efforts to create a European Research Area (ERA) – the ultimate aim of which is foster scientific excellence, to drive innovation, boost economic growth, create new jobs and improve the overall quality of life for European citizens.

New frontiers for an enlarged European R&D

FP6 represents a break from previous Framework Programmes in ambition and scope. With an increased budget and an innovative approach, FP6 will run until 2006 and will be the EU's main tool in the creation of a European Research Area (ERA). The ERA aims to create a common science and technology policy across the European Union by integrating existing and future Member States' scientific and technology capacities. It will foster scientific excellence, competitiveness and innovation through the promotion of better co-operation and coordination between R&D actors.

The new Framework Programme will lead to more focused and integrated research at EU level by concentrating on a well-defined set of thematic priorities: genomics and biotechnology for health; information society technologies; nanotechnologies, multifunctional materials and new production processes; aeronautics and space; food quality and safety; sustainable development and global change; and citizens and governance in a knowledge-based society.

These priorities will offer increased opportunities for candidate countries to use their various multidisciplinary competences and very often internationally recognised expertise – in fields such as mathematics, theoretical physics, mechanics, chemistry, materials, optics and biology – while the Networks of Excellence and Integrated Projects will create important opportunities for sharing know-how and skills with research partners in the EU and the candidate countries. To reap the benefits of FP6, candidate countries must however develop their



R&D infrastructures, focus on networking their centres of excellence, and take time to build strong partnerships with other research organisations. The November FP6 launch conference in Brussels, and the parallel event in Warsaw later this month, offer a perfect starting point. ●

Historic enlargement on track



Interview with Enlargement Commissioner, Günter Verheugen.

As Enlargement Commissioner, you are responsible for concluding accession negotiations with at least 10 countries by the end of this year. Are things on track?

This is an enormous challenge for the candidate countries and Member States, but I believe we will be successful. This enlargement is better prepared than any other and, providing progress is maintained until the end of the year, I am convinced we will manage to complete an enlargement like no other in the history of the EU. The European Council under the Danish Presidency has accepted our recommendations about those countries the Commission considers ready for accession. Between now and the Copenhagen Council we will be working to finalise the accession talks, paving the way for these countries to take part in the European Parliament elections in 2004. For those not part of this first wave, the process will continue; an updated road map and pre-accession strategy will be put in place, together with a renewed effort to finalise negotiations.

Figures show that only four out of 56 regions in the candidate countries have a per capita GDP of at least 75% of the EU average. How long do you think it will take the others to catch up?

It is hard to make such a prediction as regions in the candidate countries, as in the EU, vary considerably – some will prosper quicker than others. While there will be no quick fix to these economic disparities, effective use of EU Cohesion Funds and other funding measures will go a long way to reducing these gaps. But of course it will be up to each new Member State to make the most of the tremendous advantages EU membership will bring; unrestricted access to the biggest market in the world creates a powerful dynamic for growth.

What role do you think research and development plays in speeding up this process?

R&D is the main driver for innovation and economic development of any industrial society. In an enlarged EU, exploiting our knowledge, skill and entrepreneurial creativity will be key to turning the EU into the most competitive knowledge-based economy in the world in the next ten years, with more and better jobs and sustainable growth. The involvement of the research community, industry, policy-makers and other stakeholders in candidate countries is essential if we are to meet the

March 2002 Barcelona European Council objective of raising average EU R&D spending to 3% of European GDP. Recent studies⁽¹⁾ suggest that, while some candidate countries compare well to the EU in information society and telecommunications, others will face a challenging task in stepping up their R&D expenditure — as will some Member States, in fact.

Within FP6, candidate countries will be treated under exactly the same conditions as Member States, making research the first EU policy to be fully open in this way. While the negotiations are not yet completed, can we say that enlargement is already a reality within the European Research Area?

Actually enlargement in the research domain was already a reality under FP5. Researchers from candidate countries and Member States participated in FP5 projects under the same conditions. Under FP6, active participation of the candidate countries from day one is essential. This is in the interests of us all. The new instruments put in place by FP6 to ensure greater coherence between research efforts across Europe will benefit candidate countries, as the focus will not be on the size of project, but on integrated projects. FP6 encourages closer links between researchers, pooling of resources, and collaboration among different countries, essential if the Union and candidate countries are to compete both scientifically and economically in the global market place.

Are the financial contributions of the candidate countries already fixed for FP6? Will the EU's Phare⁽²⁾ programme continue to finance their participation?

The Commission will offer candidate countries a reduction of 30% and 20% during the first two years of FP6. There will be no reduction during the last two years, but this could be reviewed in 2004. Candidate countries from central and eastern Europe will also have the possibility to use Phare funds to cover part of their contribution. ●

(1) See "The Lisbon Review 2002-2003: An Assessment of Policies and Reforms in Europe", World Economic Forum, September 2002, available at <http://www.weforum.org/pdf/Europe/LibsonReview.pdf>

(2) Poland and Hungary Assistance for Economic Restructuring Programme.

Gearing up for FP6

Interview with Polish Minister for Science and Chairman of the State Committee for Scientific Research, Michal Kleiber.



To what extent does research contribute to the integration of candidate countries in the EU?

Research was the first negotiation chapter to be closed by the majority of the candidate countries and is the first policy area where candidate countries are now fully integrated into the EU. All candidate countries acceded to the Fifth Framework Programme – some very effectively. Poland got off to a difficult start but our participation has increased rapidly thanks mostly to the special NAS actions – Polish centres of excellence recently won 65% of all contracts and our contribution return rate for FP5 will probably reach 85%. Although this figure is much higher for other countries, for example, Estonia, it is not bad for the largest candidate country. Furthermore, everybody knows that shared results of co-operative research are much more valuable than balancing the books.

The research sector acts as a positive forerunner for other sectors. The scientific community are powerful opinion-makers committed to European integration. Examples of such commitment from my own country include the recently inaugurated programme “The Polish Research for European Integration”, and plans for a Polish Foresight Centre supporting long-term transformation of Polish industry.

What new opportunities do you think FP6 will bring to the research community in the candidate countries?

I believe FP6 will offer a long list of opportunities. The new thematic priorities correspond to our S&T policy, as does the concept of centres and networks of excellence. Real progress can be made in the candidate countries through co-operation on an equal footing with strong, innovative European consortia. Active participation in FP6 will bring other benefits, too. For example, it will promote and strengthen links between research in the candidate countries and the needs of industry, which is urgently needed. It will also help develop a new culture in S&T governance resulting in more open procedures in these countries, along with a regular evaluation of research output, socio-economic impact, and project management skills. Last but not least FP6 will help us achieve full EU membership.

How well prepared are universities, research institutes and private firms in candidate countries to take advantage of FP6?

For the R&D sector in the candidate countries, participation in FP5 was an effective learning experience. We have become familiar with the FP system, gained self-confidence, and raised the level of scientific competence following years of pressure exerted by highly competitive funding systems. Strong support measures, implemented by candidate country governments to

assist researchers in FP5, proved important. In Poland, significant financial support will continue for successful participants in FP6.

On the other hand, candidate countries currently suffer from low science budgets and far too few orders from industry. In brief – the situation is not unique. A number of highly ranked units in the science sector can compete although many innovative firms remain far behind. No doubt researchers will achieve a high participation rate in FP6, but it will be more difficult for candidate countries’ industrial partners to take full advantage of it.

How do you compare the research facilities in the candidate countries with those in the EU Member States?

Overall, research funding in the candidate countries is at a much lower level than in the EU Member States. In Poland it amounted to 0.72% of GDP in 2001. As a result, the science infrastructure tends to be weaker, although selective investments during the 1990s led to the setting up of a large number of laboratories at a competitive international level. Such a positive development is by, among other things, the growing level of participation in the FP5. We plan to capitalise on this by linking together in networks and consortia from leading laboratories – centres of excellence – to enhance both national and international competitiveness and to benefit from the added value of joint projects.

How aware are scientists and the general population in the candidate countries that they can benefit from EU research programmes?

Polish research teams and innovative companies participating in FP5 have already recorded significant benefits from collaboration. They also get co-funding from the FP5 budget and extra financial support from the state budget. Consequently, more and more research teams are being motivated by these visible results. The scientific community sees full accession to the EU as a step in the right direction to becoming more competitive at an international level.

However, the perception of potential benefits from EU research programmes seems to be lower in other social groups, although the relatively strong support for EU membership shows that the society at large clearly sees the benefits of European collaboration.

It is now ten years since the candidate countries first became involved in European Union Research Framework Programmes. Participation has progressively had a huge impact on R&D policies in these countries, speeding up their integration into the EU research community and improving their research conditions, training and facilities. This progress is expected to continue at full speed under the Sixth Framework Programme.

Widening the horizons of European research

As the main driver for innovation and economic development, R&D plays a key role in reviving the economies of the candidate countries and ensuring their full integration into the global market. Policy-makers in these countries know that to become truly competitive they must increase inward investment and restructure their science and technology capacities. In this respect, access to EU-funded research programmes – and future EU membership – is critical.

Co-operation with the research community in the candidate countries began in 1992 under the Third Framework Programme's PECO/Copernicus programme. This was set up to preserve the valuable scientific potential and expertise of ten countries of central and eastern Europe, all of which were facing drastic cuts in national research funding in the post-Communist era. Over 3 200 projects totalling €93 million were funded under FP3 from the 12 393 proposals received.

Under FP4, all Community programmes were open to candidate country participation. Copernicus, part of the specific programme for international co-operation (INCO), was the main instrument for S&T co-operation and played a large part in helping to stabilise and eventually restructure the R&D systems through the candidate countries. More than €300 million was allocated under FP4 to candidate country projects.

Improved status, stronger ties

The arrival of FP5 in 1998 brought with it a change of status for candidate countries. Twelve states⁽¹⁾ signed an association agreement to FP5, allowing their research institutes, universities and industries to participate fully in the research projects under the same conditions as Member State organisations. This new status, which involves a

financial contribution by each country to the overall FP5 budget, based on their GDP ratio, makes research the first area where the applicants were treated as fully-fledged Member States.

FP5 created many opportunities for both Member States and the newly associated states (NAS). It had a real impact on the national research policies in the NAS, speeding up their integration into the S&T community at European level and improving their research conditions and facilities.

Special initiatives were put in place to integrate the future Member States into European R&D community, the most important of which was the setting up of a network of independent, multidisciplinary centres of excellence. Thirty-four R&D institutions in 11 candidate countries were picked to establish these centres in the NAS. The Commission provided funding to a tune of €24 million to enable the centres to carry out research and to build strong partnerships.

In the case of existing Member States, FP5 created opportunities to co-operate with the NAS, providing a source of qualified research personnel, with world-class expertise and a high potential in terms of intellectual capacity and know-how. Furthermore, association also meant that the national RTD programmes in the NAS were now open to EU participation, giving new research opportunities to EU researchers. With FP5, 17.6% of all contracts – i.e. 1 500 research projects⁽²⁾ – included at least one candidate country partner.

But experience shows that certain NAS have difficulties taking advantage of the opportunities, mainly because of the diversity in approach, policies and research structures already in FP5. To encourage more researchers to participate in FP5, the Commission allocated almost €90 million to special initiatives during 2001.

Participation of research entities in FP5 projects by candidate country

Bulgaria – 126 projects
 Cyprus – 72 projects
 Czech Republic – 387 projects
 Estonia – 99 projects
 Hungary – 358 projects
 Latvia – 83 projects
 Lithuania – 62 projects
 Malta – 16 projects
 Poland – 457 projects
 Romania – 154 projects
 Slovakia – 136 projects
 Slovenia – 198 projects

Source: European Commission, May 2002

FP6 heralds a new ERA

In a break with tradition, the Commission's new Framework Programme has introduced two new instruments – Networks of Excellence and Integrated Projects – to help give EU activities a greater impact and bring about a stronger structuring effect on EU research.

Networks of Excellence aim to reinforce and integrate European expertise in certain research sectors. Network members will be based in different countries – either at universities, research centres or companies – and will implement a joint programme of research activities.

Integrated Projects will become the key tools used to implement the seven priority areas in FP6. Each project will bring together a critical mass of scientific and industrial partners in order to meet well-defined research goals.

For the candidate countries, the launch of FP6 comes at a critical moment in the enlargement negotiations. By the end of the year, it is hoped that at least ten countries will conclude talks with the EU, paving the way for full accession by 2004. In the interim period, all are expected to apply for associated status to FP6, once again giving them the same entitlements as Member States. The Commission is keen for the candidate countries to get involved in FP6 from day one and has met with representatives from their research ministries to discuss the legal basis for involvement and, in particular, what their financial contribution should be in the period prior to full membership. During this time, the candidate countries will pay a contribution into the FP6 budget based on their GDP ratio. The Commission intends to offer candidate countries rebates of 30% and 20% for the first two years of participation, respectively. Once they become full Member States, their direct contribution to the FP6 budget will end and will come from the overall EU budget.

Seizing the opportunities

One major development in FP6 is that research projects can now involve organisations from the candidate countries only, so as a result, the number of proposals is expected to increase. To encourage maximum participation in FP6 priority thematic areas, the Commission is planning to introduce several special support actions:

- **Funding for centres of excellence:** Under FP6, funding will continue for the 34 centres of excellence set up under FP5, to encourage co-operation between centres in the 12 countries and with existing Member States.
- **Matching partners:** An inventory of potential research partners in the candidate countries is also under consideration. This would involve, for example, a dedicated CORDIS webpage giving details on candidate country expertise in particular research fields, contact details, etc.
- **Support for SMEs:** To encourage the participation of SMEs, small research teams, and research centres in FP6, the Com-

mission seems likely to introduce an incentive scheme called the 'Success Awards'. This would offer a financial award to SMEs submitting an eligible proposal and to those organisations helping to put successful proposals together.

- **Encouraging mobility:** Funding will be made available for scientists to visit colleagues elsewhere to discuss projects, to participate in international conferences and to organise high-level conferences in their home countries.
- **Improving information flow:** Special measures will be supported to improve information flow on FP6 projects between Member States, candidate countries and the Commission.
- **Evaluating research systems:** To help candidate countries improve their research structures, the Commission will fund independent, unbiased evaluation of their research systems and policies in various R&D fields.
- **Tailor-made training:** Workshops for research managers and administrators will be set up on topics such as how to write and evaluate an FP6 project proposal, how to manage a project, and how to fully exploit research results.

Previous Research Framework Programmes have given a strong indication of candidate countries' skills and competencies. FP6 acknowledges this by creating new instruments to capitalise on these strengths to move the enlarged EU ever nearer to its goal of becoming the most dynamic and competitive knowledge-based society in the world by 2010.

- (1) Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.
 (2) European Commission data from December 2001.

Statistical overview of R&D in the candidate countries

Country	R&D expenditure as % of GDP	R&D personnel as % of workforce
Bulgaria	0.59	0.89*
Cyprus	0.25	0.52
Czech Rep	1.25	0.90
Estonia	0.75	0.94
Hungary	0.69	1.03
Latvia	0.40	0.54
Lithuania	0.52	0.82
Poland	0.75	0.74
Romania	0.41	0.42
Slovakia	0.68	0.88
Slovenia	1.51	1.28
Turkey	0.63	1.02
EU-15	1.92	1.33

* Data for 1996.

Source: Eurostat. Data for 1999.

No data available for Malta.

By opening EU research programmes to institutes and companies in the applicant countries, the Commission has promoted a valuable exchange of knowledge and expertise in the period before they become Member States. Starting with a few key priorities in the Fourth Framework Programme (FP4), Newly Associated States (NAS) partners are now involved in all major thematic programmes of FP5. Case studies from both FP4 and FP5 illustrate the depth and breadth of expertise to be found in the applicant countries.

The story of a successful collaboration

Assessing industrial risk

Inspection and maintenance of industrial procedures are vital to prevent damage to safety, health, the environment or economic activity. The RIMAP⁽¹⁾ project seeks a European risk-based best practice for inspection and maintenance in petrochemicals, chemicals, steel and power, which could also apply to other industries. Part of FP5's Growth Programme, RIMAP has an RTD phase, a demonstration phase and a new thematic network involving NAS members. Phase 1 will examine present inspection and maintenance planning in the four industrial sectors, and define a common framework. Practical plans for each industry, and maybe a European standard, should follow.

The demonstration phase will test the RTD results, and the thematic network will collect, analyse and disseminate information. The NAS will contribute their own experiences of industrial practices, and RIMAP will help them restructure their practices towards accession. Network coordinator Professor Alexander Jovanovic, of Stuttgart University, feels that input from the NAS will enable adaptation of technologies without the constraints

of western infrastructure. "Our technology," he says, "will become more robust and more applicable worldwide by building on the experience of the NAS."

Modern freight, ancient streets

Bestufs⁽²⁾, a thematic network in the Growth Programme, links freight transport user groups, national, regional and local administrations, urban transport experts and interested cities. The original project team from three EU countries and Switzerland has been joined by Hungary, the Czech Republic, Estonia,

Poland, the Slovak Republic, and Slovenia. "The aim," says network coordinator Dieter Wild from PTV Planung Transport Verkehr in Stuttgart, "is to bridge the gap between national information and the use which could be made of it by other countries. It is an extremely good example of how an existing project can gain value for existing members by bringing in new partners from the candidate countries, and also offer a great deal to the new ones."

Bestufs focuses on themes such as the impact of tolls on road users, how e-commerce and night deliveries are affecting goods transport,



(1) Risk-based Inspection and Maintenance Procedures for European industry.

(2) Thematic Network "Harmonisation of strategies and highlighting best practice to determine optimum urban freight solutions".

Secure information technologies

Nastec⁽¹⁾, a two-year project in the FP5 Information Society Technology (IST) Programme, has been set up to build confidence and trust in the application of electronic networks in e-commerce, e-administration and teleworking. It will also contribute to the use of EU technology and services by helping the uptake of common European standards for authentication and secure transmissions. The project links partners in Slovenia, Poland and Romania with EU Member States Germany and Italy.

Nastec will establish a public key infrastructure with certification and registration rules. This will guarantee the security of basic services including messaging by signed and encrypted mails, anti-spamming devices, and secure data transactions. Further work could include the validation of electronic transactions, on-line administration services and, most importantly, dissemination and training aimed at NAS professional organisations, industry and business.

(1) Building trust in networking in Newly Associated States through the use of secure information society technologies.

and ways of reducing congestion and pollution. The information gathered is being analysed by a steering committee whose recommendations will be disseminated via workshops, conferences, newsletters and the internet.

Insider information

When selecting fresh fruit or vegetables, the customer is most interested in the quality of the inside flesh, which is not visible and has proved difficult to assess in a consistent manner. To help solve this problem, the **NIQAT**⁽³⁾ project, part of FP5's Quality of Life Programme, is developing near infra-red spectroscopy methods to determine the quality inside fruit and vegetables. Used with a photometric camera, the method can detect internal blemishes or diseased areas, alongside factors such as maturity and flavour development. NIQAT, coordinated by the Canning Research Institute of Plovdiv, Bulgaria, has partners in Finland and the UK.

Food-borne diseases

Another food-related project, **Novacsal**⁽⁴⁾, concentrated on one of the most serious sources of food-poisoning: salmonella infection. The three-year project in FP4's FAIR programme has been completed by experts from animal health research institutes in the Czech Republic and Hungary working with five EU Member States. It built on the observation that oral inoculation of young chickens with wild-type salmonella or live, attenuated vaccines resulted in intestinal colonisation and resistance to other salmonella strains. Studies in inoculated pigs had demonstrated development of a similar non-specific immunity, their intestines showing none of the damage suffered by non-inoculated pigs following salmonella infection.

Novacsal studied the mechanisms involved in generating immunity, both at a theoretical level and as a practical means for salmonella control, including an assessment of how effective inoculation would be under field conditions in preventing infection by a highly virulent salmonella strain.

Protecting Europe's cultural heritage

The candidate countries, with their rich cultural history, are playing a key and growing role in protecting Europe's heritage from environmental degradation. Three partner organisations from these countries took part in FP4, 29 contributed to FP5 and even more are expected to participate in FP6.

Two projects from very different research programmes are currently contributing valuable knowledge to the preservation of Europe's cultural heritage:

- **Arcchip**⁽⁵⁾ is the first centre of excellence for cultural heritage in Eastern Europe, and is part of FP5's INCO-2 programme. Based in the Czech Republic's Institute of Theoretical and Applied Mechanics, Arcchip is a centre for the study of state-of-the-art techniques for protecting cultural heritage, gathering the latest information and promoting the exchange of best practice. By June 2002 it had organised 12 workshops on key aspects of conservation. Each event establishes a core network of experts for future studies. Milos Drdacky, Arcchip coordinator, feels that the project's major contribution has been to bring together participants from 50 to 60 countries at these workshops: "The Arcchip centre of excellence programme was intended to support the dissemination of results rather than research itself, although the networks it established have helped create new research projects."

- **Enviart**⁽⁶⁾, an FP4 project, was finalised in 1998 and focused on the restoration of artificial or stucco marble which consists of gypsum mixed with natural glues and pigments, laid down and polished. The technique was perfected around 1700 and became an important feature of baroque church and palace architecture in central and southern Europe. But changes in humidity and temperature, along with the leaching and crystallisation of minerals, has resulted in serious deterioration. Enviart studied weathering damage to the stucco marble of the Dukes' Chapel in Krzeszow, Poland. Scientists from three Polish institutes worked alongside experts from Germany, Austria and Belgium to define the factors involved and to develop restoration methods.



Dukes Chapel in Krzeszow before and after restoration work. Telč: the ARCHHIP centre of excellence has research units in this World Heritage City and in Prague.

(3) Non-destructive NIR technology for fruit and vegetable internal quality assessment, eliminating the skin disturbing effect.

(4) Novel mechanisms of live bacterial vaccines in protection against salmonella and other food-borne zoonosis.

(5) Advanced research centre for cultural heritage interdisciplinary projects.

(6) Baroque artificial marble: Environmental impacts, degradation and protection.

Centres add value to enlargement process

The Commission has backed the development of 34 centres of excellence in 11 candidate countries⁽¹⁾ to help restructure their science and technology sectors. All are now fully operational and are helping to integrate those countries into EU research programmes.

The EU has spent more than €24 million to establish a network of centres. Those selected for support (from 184 applicants) already had a good track record in their chosen fields as independent academies, universities or other scientific institutions. Together, they cover eight scientific disciplines: biology, ICT, physics, mathematics, engineering, socio-economics, medicine, and environmental sciences.

Their remit is to support the social and economic development of their particular region by harnessing a multidisciplinary approach to their work. Although they work on their own projects, the centres network with each other and with similar bodies across the EU. Links are also forged through conferences and seminars, and by offering exchange opportunities to visiting fellows – both teachers and researchers.

Improving integration

The development of external links means that ideas and information can be exchanged between the EU and candidate country scientists and institutions. Indeed, the work undertaken by the centres must have some conformity with the interests of the Union as a whole. The centres have already played a key role in developing and aligning research activities in the candidate countries with the goals of EU research programmes, and that will continue in FP6 and the European Research Area.

The second annual meeting of the centres of excellence took place in Budapest in June 2002. Presentations were made by centre consortia outlining possible activities to be undertaken in FP6.

(1) The candidate countries and number of centres they host are: Bulgaria (3); Cyprus (2); Czech Republic (3); Estonia (2); Hungary (6); Latvia (1); Lithuania (1); Poland (9); Romania (4); Slovakia (2); Slovenia (1).

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Knowledge-based Estonia

R&D expenditure in Estonia reached 0.75% of Gross Domestic Product (GDP) in 2001. During the next five years, the aim is to increase this to 1.5%. Government spending on research and development totalled EEK 30.9 million (€27.5 million) last year.

In December 2001, the parliament passed the Estonian Research and Development Strategy "Knowledge-based Estonia" (2002-2006). On the basis of this strategy, annual action plans will be compiled defining specific programmes and measures to promote Estonian R&D. The key areas outlined in the strategy are: user-friendly information technologies and development of the information society, biomedicine and materials technology.

Estonia has made considerable progress in recent years in terms of its information and communications technology (ICT) infrastructure and the use of ICT in society. 36% of the population are regular internet users, 25% have a computer at home and 56% of which have an on-line connection. All schools in Estonia are connected to the internet, while 52% of citizens own a mobile phone.



Hungary reinforces the foundations

In Hungary, the percentage of Gross Domestic Product (GDP) spent on research and development stood at 0.69% in 1999 – more than 60% of this comes from the state budget. The government aims to increase GDP expenditure on R&D to 1.5% by the end of this year, with the private sector's share reaching at least 50%. More than half of Hungary's R&D capacity is concentrated in Budapest.

The Hungarian R&D system is made up of the following five components: the institutions of higher education; the research institutes belonging to the Hungarian Academy of Sciences and the Academy's research groups based in universities; the R&D institutes belonging to government ministries; the institutes of the Zoltan Bay Foundation for Applied Research; and the R&D facilities of companies.

Source: *Science and Technology Policy, 2000.*



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Latvia learns through collaboration

Co-operation with European research institutions within the framework of EU programmes has contributed both financially and content-wise to research in Latvia. Knowledge-intensive co-operation programmes, visits abroad by Latvian researchers, and the efficient dissemination of publications have all proved essential for the rapid acquisition of basic western theories and practice. Consequently, today Latvian researchers are able to enjoy equal status with their partners in international research projects.

At the end of 2001, the Ministry of Education and Science developed a "Programme for the development of higher education and science 2002-2010" – 'guidelines' for the development of science. The document advances the idea that all research must be integrated into universities. Hence, a larger part of the science budget must be allocated within universities, while only a small part should go to state research centres.

Today, the main sources of financing research in Latvia are the state budget, local government budgets, local private companies, foreign owned foundations, international organisations, funds and programmes, especially EU programmes. Local expenditure on research in Latvia is currently the lowest in Europe. In 2002, the financing of science from the state budget is equal to a modest 0.2% of GDP. Therefore Latvian scientists will have to participate actively in the Sixth Framework Programme if they are to reap the full benefits of collaboration and networking.



Romania sets future research priorities

The Romanian government's "National Plan for Research, Technology Development and Innovation (1999-2005)" covers ten priority areas, including: innovative products, information society, biotechnology, the environment, agriculture and food, technologies and services delivered and used by companies, standardising the research infrastructure and increasing the international scientific and technical co-operation.

At the moment, R&D in Romania is financed mainly by public funds. For the past few years, the Research Ministry has made substantial efforts to try to attract private financing. The most important research work is currently undertaken by the country's 227 public institutes, in coordination with several government ministries and the Romanian Academy. There are also 400 R&D centres operating in universities and national companies providing public services. Approximately 310 small private enterprises are concentrating on R&D activities. They can all have access to public funds by participating in a national project competition.



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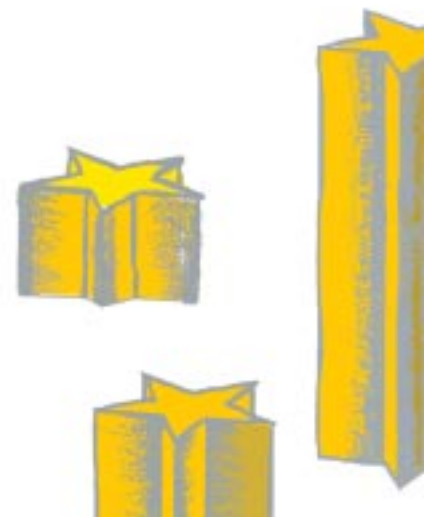
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Slovenia strengthens international ties

Slovenia may be one of the smallest candidate countries but, in terms of research and development, it is certainly one of the strongest. In 1999, its R&D expenditure reached 1.51% of Gross Domestic Product (GDP) – the highest percentage of all the candidate countries and close to the EU average of 1.92%.

Since Slovenia became independent in 1991, the government's policy in the field of international S&T co-operation has been to maintain previously established ties, to institutionalise co-operation with other countries, and to attain full membership of the most relevant international S&T/R&D programmes and organisations, especially at European level. This policy has proved successful: Slovenia co-operates in science and technology with more than 71 countries worldwide. As of December 2001, Slovenia had signed formal intergovernmental agreements on S&T co-operation with 20 countries, including the United States, China and the UK.



International co-operation to the fore

IRCs - a valuable asset

UAB Technologija, based in Kaunas, Lithuania, is one of several spin-off SMEs from the Kaunas University of Technology (KUT). Having developed ultra-hard, wear resistant surface coatings for-load bearing metallic components and commercialised the new products in their domestic market, the firm asked the Lithuanian IRC to help find international partners. DG Enterprise's 68 Innovation Relay Centres (IRCs), which span 30 countries including EU Member States and the Newly Associated Countries⁽¹⁾, specialise in European innovation and introducing regional SMEs to technological opportunities.

"Lithuania is a very small country, so markets are naturally very limited. If technology-based SMEs are to grow – or even survive – they must be internationally orientated," explains Eigirdas Žemaitis, a project consultant for IRC Lithuania. "International cooperation is a necessity, not an option."

The first step was to carry out a technology audit before helping the SME to prepare advertising and promotional material and send a technology offer across the network via the IRC database.

Right place, right time

The technology was presented during the international 'Baltic Dynamics' exhibition and conference on innovation, in Latvia, which was devoted to the improvement of business environments for innovative companies in the Baltic Sea Region. There, UAB Technologija was introduced to the Latvian metal processing firm, Liepajas Metalurgs which recognised immediately the potential cost savings using this new technology. Some months later a commercial and technical assistance agreement has been signed and UAB scientists have trained their Latvian partner's technicians to use the new technology.

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JRC action on enlargement

The European Commission's Joint Research Centre (JRC), which provides scientific support to EU policy-making, has opened up its activities to scientists and organisations from the accession countries since 1999. Some 60 organisations are participating in around 40 shared-cost projects with the JRC. And, since early 2002, researchers from the accession countries have had the opportunity to work directly for the JRC. Communications initiatives are also being undertaken to inform scientists in the accession countries about the JRC.

Set up in 2000, the JRC Enlargement Action comprises 18 projects supporting the extension and implementation of EU policies in the accession countries. Among the areas covered are environment, for example supporting implementation of EU policies on air quality, emissions and toxic-waste management; nuclear safety, including safety assessment methods and combating illegal trafficking in nuclear materials; food safety testing; agriculture monitoring; and harmonisation of chemical measurement.

Likewise, the JRC's Futures foresight project now covers the accession countries, helping policy-makers respond to the challenges of socio-economic change.

Further information:

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FP6 launch – at home and away

To make the most of the opportunities offered under FP6, it is essential for the research community in the candidate countries and the Member States to have access to as much information as possible on the main areas of specialisation, and know-how available to them. Support actions proposed by the Commission will go a long way to make this happen.

Therefore, in addition to the official launch of FP6 in Brussels, the Polish State Committee for Scientific Research is organising a parallel conference in Warsaw on 25-26 November. This will provide an ideal opportunity to forge partnerships between the research communities in existing and future Member States. Speakers include the Polish President, Aleksander Kwasniewski and EU Research Commissioner, Philippe Busquin. The event will take place in English.

For further information and registration details, see
www.npk.gov.pl/konf-6PR/index_en.html