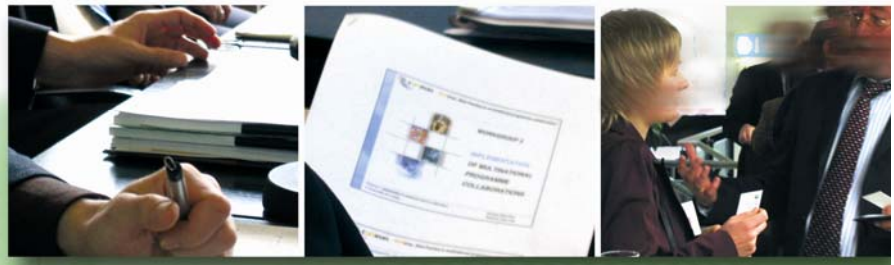
National Policy Priorities and R&D Programmes in the field of ICT



Report on CISTRANA Workshop
Brussels, 8 November 2005

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National Policy Priorities and R&D Programmes in the field of ICT, Brussels, 8 November 2005

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Rapporteur and Author of the Report: Marjo Uotila, Tekes Finland

Introduction

The major part of publicly funded R&D in Europe is conducted at national level. At present it has been, however, difficult to identify and access information about these national research policies and activities.

The primary aim of the Workshop was to increase understanding of the country-specific approaches of organising national public R&D funding in the field of information and communications technology. To accomplish this, the Workshop offered insights on national approaches, as well as the highlights from the survey on national priorities and R&D programmes. The workshop was held in Brussels on 8th of November 2005, and it is the first one in a series of workshops organised by CISTRANA IST ERA project (see Appendix).

Several country cases were presented from the following perspectives:

1 The rationales and backgrounds which have led to the current approaches of organising the national public R&D funding in the field of information and communications technology.

2 Current ways of organising public ICT R&D funding in the selected countries.

a) Especially: to what extent is public R&D funding for ICT channelled by R&D programmes and to what extent by other types of instruments?
b) What is the definition/description of 'R&D programmes' in the countries? Are they EU Framework Programme types of funding instruments? Do they have predefined specified ICT sub-fields which they aim at covering within a limited time-frame (top-down approach)? Do they aim at covering ICT as widely as possible without predefined scope (bottom-up)? Are they technology-oriented or application-oriented, etc.?

3 Considerations for future development of the national approach.

c) What kind of lessons can be learned from the current approach?
d) Has the current approach succeeded in reaching its objectives?
e) Are there needs for developing the approach? If yes, to what direction?
f) A summary of the Strengths, Weaknesses, Opportunities and Threats (SWOT analysis) of the approach

The EU supported IST ERA project, CISTRANA, has conducted an extensive survey on national priorities, R&D programmes, actors and procedures of programmes in 32 European Union member and associated states.

The main findings of the survey were presented in the workshop, including identification of ICT priority areas and R&D programmes in the surveyed countries. Communications infrastructure, telecommunications, micro- and nanotechnology, software technologies and optoelectronics are the top priority areas at least in nine of the surveyed countries. ICT application areas identified by at least 8 countries cover eBusiness and eCommerce, eHealth, eGovernment, eEducation and eLearning, security and safety. The analysis of the 20 biggest national R&D programmes in terms of public funding has revealed 3 major clusters, which are micro-nano, communications and software clusters.

Agenda

The workshop agenda was organised in two parts. The first presentations described the findings of the CISTRANA survey, laying the general framework and introducing the variety of ways of solving the national R&D funding in the ICT field. The second part of the day was devoted to in-depth presentations of selected national approaches. Each presentation was followed by a discussion.

09:30	Arrival, Coffee
10:00	Opening and Introduction Ilpo Reitmaa, Tekes (Counsellor, Research and Technology)
10:15	CISTRANA Survey: Highlights on national priorities and RTD programmes: Ms Marjo Uotila, Tekes (Senior Technology Advisor) Dr. Kari Tilli, Tekes (Director, telecommunications and electronics)
11:15	Comments
11:30	Case Germany Dr. Herbert Zeisel, German Aerospace Center (Coordinating Director, ICT Head)
12:00	Lunch
13:00	Case Hungary Mr Sándor Bottka, National Office for Research and Technology (ISTC delegate)
13:30	Case Netherlands Mr Wolfgang Tostmann, Ministry of Economic Affairs (Policy Advisor, Innovation Department)
14:00	Case Finland Mr Jarmo Raittila, Tekes (Development Manager)
14:30	Coffee
15:00	Case Israel Mr Zev Adelman, Ministry of Industry, Trade and Labour (Director of Computer and Electronics Research)
15:30	Case Slovenia Dr. Andreja Umek Venturini, Ministry of Higher Education, Science and Technology (Counsellor to the Government)
16:00	Discussion and conclusions
16:30	Closing Remarks Mr. Hannu Nurmi, Tekes (Senior Technology Advisor)

Chairman of the morning session: Ilpo Reitmaa, Tekes (Counsellor, Research and Technology)
Chairman of the afternoon session: Kimmo Ahola, Tekes (ISTC delegate)
Rapporteur: Marjo Uotila, Tekes (Senior Technology Adviser)

CISTRANA Survey: Highlights on national priorities and RTD programmes

Ms Marjo Uotila, Senior Technology Adviser, the National Technology Agency of Finland (Tekes)

Dr. Kari Tilli, Director, telecommunications and electronics, the National Technology Agency of Finland (Tekes)

All presentations can be found on the CISTRANA web-site[1]

The presentation described the IST ERA project, CISTRANA, focusing on the main results of the survey conducted on national priorities, RTD programmes, actors and procedures of programmes in 32 European Union member and associated states. The analysis is more extensively presented in the CISTRANA Interim Report, which was delivered to the workshop participants. The analysis is currently a confidential work-in-process, being validated and up-dated by the national IST delegates, and complemented by a series of five workshops, including the present one. After this process the final report will be published in spring 2006.

CISTRANA aims at facilitating coordination of national ICT programmes with each other and with European RTD programmes, thus contributing to improving the impact of the RTD efforts in Europe and to reinforcing European ICT competitiveness. To accomplish these aims, the first step is to increase understanding of the national approaches of organising public R&D funding.

In most countries, four main types of actors responsible for the national strategy coordination, policy formulation and R&D funding of ICT can be identified. Science councils are typically governmental advisory bodies responsible for strategic science and technology issues, often chaired by or operating under the prime minister. There may be one or several ministries responsible for coordination and policy making in the field of ICT or R&D policy. In some countries R&D funding is organised directly from the respective ministry, but it is also typical that specific agencies are founded, often separate ones for applied or industry driven research and for basic research. In addition to these, a variety of other organisations operate in the field, such as mission units, committees and authorities, to name but a few.

One crucial element, before any attempts to compare R&D programmes can be made, is a common definition of a 'programme'. In the survey the scope was restricted to "National public funding given to companies, public research institutes or universities etc. through calls or similar procedures to be used for research and technological development (RTD) in the field of information and communications technology (ICT)", as opposed to a variety of policy programmes not entailing direct financing nor R&D, for instance.

Typical programme procedures were also briefly presented, with focus on three main phases involved: programme initiation, implementation and evaluation.

[1] http://www.cistrana.org/149.htm

As for the policy analysis, the survey had posed two main questions to the national delegates of the EU IST programme committee: 'Is ICT a priority field of RTD in the country in comparison to other fields of RTD' and 'What are the strategic focus areas of the national public RTD policies within the ICT sector, in terms of technology and application areas'. In 23 out of 30 countries ICT holds an officially high priority.

The findings of the survey on national policy priorities were compared to the priorities of the EU Seventh Framework Programme for R&D, which were available at the time of the survey.

When thinking of ICT, many countries do not really look at application oriented matters, which may be one explanation for the fact that not all countries mentioned ICT application issues in the survey on ICT policy priorities. Further, thinking of the R&D programmes foci, e.g. in Tekes most programmes include ICT matters to some extent, but if the main focus is not ICT, they are not actually considered ICT programmes.

In order to understand and compare programmes, a common definition was used in the questionnaires, and the programmes were also classified into three categories to better enable comparison. These programme categories were All ICT, Defined, and other (councils, institutes, foundations etc.). Some countries are using a combination of many different programme types. In the workshop, a hypothesis was presented that opting for defined programmes (rather than All ICT types of programmes), would be reasonable because they would be easier to manage. Also, ideally, there would be better impact with a focused approach, a clear investment to a specific ICT area.

In the discussions, it was generally considered an impossible task to draw a flawless and comprehensive picture of the whole national ICT R&D landscape and programmes. Nevertheless, it was said that this is not even necessary, as the most important objective of CISTRANA is to identify collaborative possibilities. The report thus shows the part of the story which is good enough for collaboration.

An example of the challenges faced in the analysis include, that in the Netherlands nanotechnology is not defined under ICT at all, which is problematic, and that is why the Dutch nano-programmes are not included into the survey. In Germany, R&D on embedded systems has been financed for a long time, but the term as such has not been used in the recent years because it is not the 'buzz word'. However, projects on embedded systems are funded, integrated in software, nanoelectronics etc.

Also, the visibility of ICT application areas (such as E-health, E-government etc.) in ICT R&D programmes varies. In the current sample of 122 programmes, there are 2 programmes predominantly concerned with ICT in healthcare. In many programmes healthcare is mentioned as one possible application area among others. In the Netherlands, for example, ICT for healthcare is considered to be so close to the market that there is no ICT R&D programme in that area, although funding is available for ICT for healthcare through other types of channels. In Germany most application oriented programmes are not run by the ministry of research, but by other sectoral ministries (e.g. Ministry of Transport), which may not entail purely research. Also, looking at the success and return rates from the on-going EU Sixth Framework Programme, it was mentioned that the German return rate for e.g. nanoelectronics is very high but for ICT for health very low, although there are many health related programmes in Germany, but they are not in the ICT field. This discussion confirms the assumption, that the national realities are more complex than any survey can reveal. Further, in the discussions, it was generally viewed that it is not possible, even within one country, to be able to identify, let alone coordinate, all programmes.

Dr. Herbert Zeisel, Coordinating Director, ICT Head, German Aerospace Center

All presentations can be found on the CISTRANA web-site[2]

The German system can be described by the term consensus society. In the context of ICT R&D, this term entails the idea of engaging all possible players in the respective field in the process of programme preparation. In Germany the main players involved include the Federal Government (e.g. Ministries, Chancellors Administration), Federal Länder and their research facilities and universities (e.g. Bavarian ICT funding), industry and industrial foundations (e.g. Volkswagen foundation) and a variety of associations (e.g. BITKOM, AIF). Federal R&D funding is of two main types: institutionalised funding for R&D institutions or project funding for R&D projects. The German responses to the CISTRANA survey cover the federal level of the ICT R&D.

Most of the basic research is funded on federal level, and the more the R&D work goes towards the market on the innovation curve, the more there are institutes and industry involved also in the funding.

However, in the basic research area there are usually no programmes, and the researchers are allowed to apply for grants. In this bottom-up process the type of ICT which has been funded can be stated only afterwards.

As an example, the Fraunhofer Institute, which is one of the major R&D institutions receiving federal institutionalised R&D funding, has a Senate (highest level of decision) with people from various parts of the society who decide what the topics to be funded are. They receive 30% of their budget money from the federal budget. Even labour unions have to be included in the process of deciding their targets for funding, and people from other areas of the society, with understanding of what the market wants. Consequently, the answers to the question 'who sets the priorities' vary considerably from one organisation to another. Also at the federal level, after the recent elections, Germany now has a new national coalition which is currently agreeing on their objectives. After the negotiations, the issues that will eventually end up in the coalition contract could then be called 'official national policy priorities'.

In the R&D field the budgets are typically planned for five years. This signifies that the German programmes are very stable instruments.

There are 16 Regions (Länder) in Germany, investing substantially, but it is very difficult to find out what kind of issues they spend on. Judgements on that should be done at project level in order to define what is ICT and what is not.

[2] http://www.cistrana.org/149.htm

Programmes are usually not only instruments for supporting new technologies; another important objective is to encourage people to work together, even after the end of a programme.

There has been a clear shift from very specifically targeted R&D programmes to bigger entities, such as IT2006, which is actually an umbrella for 10-15 smaller scale programmes. The rationale is to go through the parliamentary negotiation process less frequently but with larger scale R&D programme proposals rather than several smaller scale ones which would take the same time in the process each.

SWOT analysis of the German approach

Major strengths

- consensus based approach involves all stakeholders in the decision making process
- typically 5-year R&D programmes: ensure stability
- major resources
- well-organised programmes
- national priorities are decided on the highest possible level: strong support to the launched programmes

Major weaknesses

- consensus based approach entails relatively slow and time-consuming processes
- complexity of structures may hinder effective decision-making
- large-scale country

Major opportunities

- shift into larger scale R&D programmes has streamlined the process of launching new programmes

Major threats

- national priorities are decided on the highest possible level: priorities may change with changes in the parliament

CASE HUNGARY

Mr Sándor Bottka, ISTC delegate, National Office of Research and Technology (NKTH)

All presentations can be found on the CISTRANA web-site[3]

In the early 1990s the Hungarian R&D system covered only bottom-up R&D schemes, with the ideology of letting all flowers flourish. In the 90s the funding schemes promoted the development of the knowledge base and networks; the generic technologies - including ICT; the companies' innovation; the R&D infrastructure and the international S&T collaboration. Nowadays, the main strategic principles are focusing, utilization and regional decentralization in order to develop an effective National Innovation System. The recent program portfolio includes elements for the promotion of:

- strategic research - including ICT;
- innovative clusters in certain sectors - e.g. mobile communications;
- university-industry alliance;
- local innovation networks and services, and
- international mega-projects.

Currently the national development programme includes four sub-programmes, one of which is the economic competitiveness programme, and R&D is one part of that together with the Information Society programme among other initiatives.

77% of the industrial R&D in Hungary is currently conducted by big multinational companies. The biggest user in the ICT market is the government; the biggest winners are the multinationals.

Hungary has also a variety of taxation measures to boost R&D, such as 100% RTD tax credit (also available for subcontracted R&D activities if the partner is a public or non-profit university or research institute) since 2001; 300% RTD tax credit if the company lab is located at a university or public research institute (from 2004); and tax free employment of students up to 53 kHUF/month (equals to the official minimum wage)(from 2004).

[3] http://www.cistrana.org/149.htm

SWOT analysis of the Hungarian approach:

Major strengths

- Internationally recognized, high level research tradition at university and academic level
- Good track record in natural sciences, engineering and medical sciences
- International companies with R&D activities are locating into Hungary
- Research is integrating into international R&D networks (Framework Programme)

Major weaknesses

- The amount of R&D expenditures is low
- R&D is predominantly state funded
- R&D infrastructure is obsolete and the research staff is an ageing population
- The innovation activity of corporate sector is low
- The link between the R&D sector and businesses is weak: the spin-off activity is low

Major opportunities

- A closer economic integration with the EU-countries
- Increasing demand on the faster spread of results in the field of R&D
- Rapid development of high-technology sectors
- Increasing weight of knowledge intensive sectors
- An expanding service sector

Major threats

- Unfavourable external macroeconomic conditions
- Increasing regional disparities
- Brain drain
- Rural regions falling behind
- An increasing gap in IT use between sections of society

CASE NETHERLANDS

Mr Wolfgang Tostmann, Policy Advisor, Innovation Department, Ministry of Economic Affairs

All presentations can be found on the CISTRANA web-site[4]

The Dutch presentation was from the point of view of the Ministry of Economic Affairs, mostly concerned with industrial R&D. Many other ministries are also involved in the national ICT policy, but with a very application oriented and close-to-market focus.

At the moment a shift in thinking is going on, towards what is called a 'dynamic open innovation system'. Elements of this idea include a bottom-up approach, involvement of also other players than the government, public-private partnership, aiming at longer-term effects than just the duration of a project, and specific focus on SME involvement. Also knowledge transfer and education are important features of this approach. Initiatives named 'Pôle de Compétitivité's (PdC) are public-private partnerships, led by industry, focusing on these aims. The idea of PdCs originates from a visit of a Dutch minister to France early in 2005.

An example of a PdC is in the field of microelectronics. The USA, Japan and the Netherlands are major countries that are home to leading players in semiconductor manufacturing equipment, semiconductors and electronic applications with recognized competitiveness on a global scale. PdC initiatives can build on this strength. The microelectronics PdC is geographically located around Leuven-Aachen-Twente-Delft area. A major industrial player in the field is Philips, industry-academia networking plays an important role, as well as SMEs as suppliers to the big industry. Also EUREKA clusters (ITEA and MEDEA) have a strong presence in this area, and there are facilities (such as clean rooms) available. The underlying idea is that if you put industry together, there is a possibility to collaborate, learn and prosper like in the Silicon Valley. Further, from an administrative viewpoint, one big-budget programme is easier to pass in the policy process than many small-scale programmes. The Dutch PdC was commented to resemble the idea of European Technology Platforms.

The idea is to root the big industry to the Netherlands with these measures, in order to keep them from going to other countries such as China, at least to some extent.

In the CISTRANA survey the Netherlands is the country with the highest number of individual R&D programmes with defined technological scope (20). As a background for this, it was presented that there is a philosophy in the Netherlands that you have to do something for everyone. Also, many of these R&D programmes are basic research oriented.

[4] http://www.cistrana.org/149.htm

SWOT analysis of the Dutch approach:

Major strengths

- strong microelectronics cluster
- strong presence in Eureka ICT clusters (ITEA, MEDEA)
- high number of R&D programmes with defined technological scope

Major weaknesses

Major opportunities

- R&D policy concerned with finding ways to increase industry's commitment to locate in the Netherlands

Major threats

- escape of multinationals to China

CASE FINLAND

Mr Jarmo Raittila, Development Manager, the National Technology Agency of Finland (Tekes)

All presentations can be found on the CISTRANA web-site[5]

The main focus of the Finnish presentation was on the National Technology Agency (Tekes), which is the main public funding agency for industry-driven R&D. The main agency for basic research is the Academy of Finland, and these two organisations are responsible for the national ICT R&D programmes. Tekes operates under the Ministry of Trade and Industry, and the Academy of Finland under the Ministry of Education.

Tekes receives a yearly budget from the ministry, and decides on the allocations of the budget independently. Total Tekes' R&D funding was 409 million euros in 2004, more than ¼ of which was devoted to ICT. Tekes operates by three core processes: innovation activities, project funding and technology programmes.

The technology strategy is a continuous process, a dialogue between the clientele, which is up-dated yearly. With this strategic work the main aim is to gain sight of the future, i.e. where to invest in the future. As Finland is a small country, it is necessary to make choices, and it is important that Tekes does not make these decisions alone.

The recognized trends having an effect on the technology strategy entail at least:

- globalisation and competition in business and innovation environment
- knowledge and competence and their management
- innovative networking
- sustainable development
- demographic changes (ageing) and social development
- safety, security, health and values
- driving technologies

The strategic focus areas can be divided into technological and application focus areas, which are chosen based on a thorough analysis of the Finnish strengths and features of the global market in those areas.

The key application areas are environment and energy, security and safety, services, health and well-being, work and leisure, and renewing products and business concepts. Utilisation of ICT is linked with all these application sectors.

As for the key technological focus areas, ICT plays an important role in biotechnology, nanotechnology, materials technology, and business competence and business

[5] http://www.cistrana.org/149.htm

development. The most important sub-sectors of ICT are mobility, broadband communications, software intensive products and systems, knowledge and content management, and test environments for new applications and services.

Technology programmes are the tools to implement the technology policy, and the programme portfolio is managed by a clustering approach: programmes are running and planned within each cluster. Most currently running programmes are in the ICT field.

The definition of a technology programme entails that they are multiproject programmes initiated, steered and part-financed by Tekes, typically running for 3-6 years. They focus on key technology sectors which are identified in Tekes strategy's focus areas, and implemented in cooperation with companies and research units. Companies can participate with their own projects or by joining a common research project. The projects and results are partially public, and presented on the web pages (www.tekes.fi). A major feature is the networking of the projects funded under a programme.

The programme model is currently being developed towards a life cycle of innovation –type. This means that although the programme process may be fairly stable, there is a kit of 'added-value programme services', which are additional to single project funding, and from which the most suitable ones can be chosen according to the needs of each programme. The services include support to internationalisation of R&D and business, commercialisation and technology-based entrepreneurship, exchange of information, knowledge and know-how, activation of new actors in innovation, regional activities, and image and credibility raising. From the customers' viewpoint these services are of importance, for example technology road maps are available without costs, and most SMEs would not be able to produce them themselves.

The volume of the programme portfolio is growing: 50-60% of Tekes' total from 180 M€ towards 250 M€ (2005-2007). Also the scope of the programmes is expanding, aiming at answering not only to the needs of knowledge for business life, but also increasingly to the needs of the society, such as healthcare and environment.

SWOT analysis of the Tekes technology programmes:

Major strengths

- Good imago (brand)
- Technology programme tradition (about 20 years)
- All stakeholders involved in programme preparation
- Experience on multinational programme-level collaboration
- Large-scale investments on R&D compared to the size of GDP

Major weaknesses

- Long programme preparation
- Programme management diversity
- Lack of modular programme services

Major opportunities

- More diversified types of programmes
- Portfolio control based on technology strategy
- Development of modular programme services

Major threats

- Unsuccessful implementation of the new strategy
- Keep the creativity of new programmes

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CASE ISRAEL

Mr Zev Adelman, Director of Computer and Electronics Research), Ministry of Industry, Trade and Labour

All presentations can be found on the CISTRANA web-site[6]

From the mid 1970s onwards, a consensus in Israel began to emerge that technology was considered as a basis for economic growth. To compensate the lack of natural resources it was considered crucial to build on human capital. Before this, Israel was primarily an agrarian economy, and the defence played an important role.

To overcome the handicaps, multinational companies' subsidiaries have played an important role in introducing technology and skills into the local company. They are also instrumental in shrinking the geographic barriers (e.g. Motorola, Intel, Microsoft). Government assistance, especially in the forms of R&D grants and the Yozma (government venture capital fund) aims at improving the R&D conditions. Also, 'bootstrapping' is a phenomenon important in Israel, meaning that one company's success makes it easier for the next to succeed.

In general, the policy can be claimed to be sectorally neutral, although there is very strong support for the ICT sector (ca. 60-70% of the support goes to the ICT sector). Research institutes play a minimal role in hi-tech development, especially in the ICT sector. There is very strong emphasis on start-ups and small firms, and there are relatively few large companies. The high-tech industry is leading the export statistics.

The Office of the Chief Scientist (OCS) is part of the Ministry of Industry, and operating since 1973. The OCS is responsible for implementing government policy regarding support and encouragement of industrial R&D, with the aim of sharing the risk of industrial R&D. Under OCS, there are a variety of instruments: the R&D Fund is targeted to competitive R&D (accounting for 73% of the total OCS annual budget), the Magnet Consortium to generic R&D, the Technological Incubators as well as the Tnufa provide support for pre-seed and seed R&D. There are also Bi-National R&D Fund activities with five countries (USA, Singapore, Canada, UK, and South Korea) and almost twenty bi-national Parallel Funding Agreements.

A special feature of the OCS funding is that companies pay back royalties based on their sales, and that money currently makes up over one third of the OCS budget (in 2004, 178 million USD came from the governmental budget and 117 million USD from the royalties). Over 60% of the OCS grants are allocated into the ICT sector.

Until recently, no budget was pre-allocated to any particular sector, including ICT, so the approach is by nature horizontal and bottom-up. There is very little regional influence in supporting R&D, as Israel is a small country. A characteristic feature is also the strong

[6] http://www.cistrana.org/149.htm

emphasis on retaining the intellectual property rights in Israel. Further, the Venture Capitalists (VC) are gaining increased importance, even to the extent that companies with VC funding do not feel need for the public funding provided by the OCS. There are also some big multinational companies on whose R&D efforts there is little government involvement.

A recent development is, that the OCS budget is perceived as a significant part of the national budget, but there is no longer enough money for all as the industry has been growing to such an extent. The Venture Capitalists are shouldering an increasing part of industrial R&D, which can be seen both positive (e.g. not public form of additional funding, commercial direction) but also negative (exit-mindedness instead of long-term commitment). There are also some critical arguments worrying about over-emphasizing the ICT sector.

Also recently, the OCS has began prioritizing some specific areas for the first time (such as biotech, nanotech), and there is a strong university base in biotech. The emphasis is shifting towards international activities, and there are new activities to encourage innovation in traditional industry.

Trends in Israeli R&D:

Previous Situation	Recent Developments
Relatively insular	Emphasis on international cooperation
No formal sectoral prioritization	For the first time, two areas will receive increased funding (biotech, nanotech)
Virtually no support for institutes	OCS is participating in setting up a nanotech centre in the Technion, biotech incubator was initiated
Extremely hi-tech oriented	In process of setting up support system for traditional industry

The recognised future challenges include:

- Should the Government take a more proactive role?
- Should preference be given to certain sectors? (Targeting – Biotech, Nanotech)
- To what extent should the Government protect the IP of its co-investments?
- How to promote both foreign & local investments?
- What about traditional industries & unemployment?

SWOT analysis of the Israeli approach:

Major strengths

- It worked so far!
- Very much in line with entrepreneurial nature of our population, matching the growth of the ICT industry
- Market-driven approach

Major weaknesses

- Things change!
- Some of the changes: globalization, maturing of the local industry
- Need to start to think more strategically, longer term

Major opportunities

- To foster growth in traditional industries, using ICT technology
- Gaining cooperation with global leaders

Major threats

- The world isn't standing still, new emerging contenders

CASE SLOVENIA

Dr. Andreja Umek Venturini, Counsellor to the Government, Ministry of Higher Education, Science and Technology

All presentations can be found on the CISTRANA web-site[7]

The Slovenian R&D system is a small-scale one, in a country with 2 million inhabitants. R&D in the public sector was described as of relatively high quality with well established international collaboration. Brain drain is not an issue, but the cooperation between and within the research, education and business spheres can be seen as a handicap. Also, the academic research has been very bottom-up, and it can be noted that it is not driven by 'joint goals of understanding and use'.

The main organisation responsible for the R&D policy is the Ministry of Higher Education, Science and Technology, which covers 80-85% of the public R&D funding, but also the Ministry of Economy has a major role in the sector for technology development and innovation. Other ministries are also involved in partial funding of R&D and innovation actions, but to a lesser extent.

There are two public funding agencies, founded quite recently in the year 2004: the Slovenian Research Agency and the Slovenian Technology Agency.

The plan for the National R&D Programme 2006-2010 is currently in the final stage, to be adopted by the Parliament. For the first time, in this policy programme, there are five thematic R&D focus areas identified (information and communication technologies, advanced materials and nanotechnologies, complex systems and innovative technologies, technologies for sustainable development, and health and life sciences).

The main national funding instruments are the research and infrastructure programs, which resemble the Integrated Projects (IP) of the EU Framework Programmes, and typically last for five years each. With this definition of a programme, there have been 262 research programs running in 2004-2008.

Other funding instruments are 2-3-year research projects, postgraduate education, research infrastructure, institutional funding, international co-operation and scientific communication.

Until today, these funding instruments have operated by a bottom-up approach, and there has only been division by the field of science. 54% of the 132 M€ budget of the Ministry of Higher Education, Science and Technology is devoted to research programmes and projects (2004). The budget is divided by fields of science, which means that ICT shares as such are not possible to trace, but the share of engineering sciences, for instance, was 31 % (2003).

[7] http://www.cistrana.org/149.htm

Slovenia emphasises the importance of bilateral cooperation, which until recently has entailed mobility of researchers. Currently, a higher level of institutionalised bilateral cooperation with states which are considered as Slovenia's most important partners is strived for, as well as redirection of the cooperation towards multilateral or regional joint R&D projects contributing to the European Research Area (ERA). This is seen especially important with the neighbouring regions of the West Balkan.

As for the definition of a research programme, in the Slovenian context it is a term used in the National R&D Programme for a research field expected to be relevant in the next 10 years and important for Slovenia from social or economic point of view. Every five years there is a public call for a new round of research programmes according to the National R&D Programme. The preparation, implementation and evaluation is conducted in-house by the Slovenian Research Agency (since its establishment in 2004), and the decision to start the research programmes is taken by the government. The research programmes are implemented by so called programme groups in public research institutes, universities, higher education institutions and private and/or public legal entities with research activities. A minimum requirement for a research programme is 5 PhD researchers, plus professional and technical staff. There may also be doctoral students from one or several institutions. The Slovenian Research Agency supports the research programmes administratively, for example in the delivery of funding to the partners.

The research programmes are evaluated by annual short reports, and the final ex post evaluation is conducted after the 5-year period, focusing on a variety of indicators such as scientific excellence, social and economic relevance, human resource development and international cooperation.

Out of the 262 currently running research programmes, 17 can be said to focus on ICT, with systems and cybernetics, telecommunications, and computer and information sciences as the main sub-fields. They are all included in the CISTRANA survey. As for the field of science, 15 of them are classified under engineering sciences, one under natural sciences and one under social sciences.

The research project instrument called for interdisciplinary and proactive research projects for the first time in the annual call of 2005. IST related topics included e-life style, information systems supporting national and cultural heritage, security and new product development.

There are also so called targeted research programmes which also last for 2-3 years. They are co-funded by several ministries and the idea is to fund research dedicated to certain topics which are of interest to the ministries involved. The research results are utilised by the ministries for their policies. Two of these targeted research programmes involve also IST related topics. The targeted research programme 'Competitiveness of Slovenia 2001-2006' has Information Society as one thematic priority area and the 'Knowledge for security and peace 2004-2010' includes 'Communications and information systems' and 'Security and defence' as thematic priorities.

SWOT analysis of the Slovenian approach:

Major strengths

- relatively low level of costs
- small system is more adaptable
- relatively high share of young people included in education on every level
- not significant brain-drain
- relatively well developed research information infrastructure
- very broad scientific and research activities in public sector, especially in basic research
- developed international scientific cooperation

Major weaknesses

- evaluation criteria not oriented enough toward object-driven research'
- small country: difficult to organise independent evaluation
- no thematic priorities or systematic mechanisms to encourage new promising areas
- too few opportunities to reintegrate Slovenian researchers from abroad
- not enough survey of transfer of research results into practice

Major opportunities

- membership in the EU and NATO, and good connections with South Eastern Europe
- increasing investments of private sector in R&D and increasing of the number of researchers in private sector
- potential of the information society is not completely used in Slovenia yet

Major threats

- further decrease of global competitiveness of EU (and Slovenia)
- pouring away of high tech and development activities to East (India, China)
- possibility of more intensive brain drain

Tasks that will be tackled during the new National R&D Programme:

- definition of thematic priorities and priority instruments with which to fund the defined topics
- increase R&D financing and change its structure
- improve conditions for R&D activities (such as research infrastructure, human resource development)
- improve transfer of research results into practice
- encourage international cooperation which is considered crucial for a small country

The role of companies joining the national research programmes and projects has to involve research if they want to apply for public money. It is not possible for companies only to be the users in the projects.

Conclusions

The conclusions presented below are based on the presentations and discussions which took place during the Workshop, and have been accepted by the speakers.

One of the main aims of the EU ERA NET scheme in general is to achieve coordination of national programmes, and CISTRANA is focusing on the national programmes in the ICT field. Judging by the evidence we have on the variety of national R&D programmes, it seems unlikely that coordination in a strict sense could be reached in the near future.

However, the first step of a mutual learning process has been taken by the ERA NET scheme, and, as such, is already of value. The national R&D funding organisations are now in a phase where R&D conducting organisations were in the beginning of the EU Framework Programme scheme. It was considered important to join the projects for the sake of networking and learning, and the benefits in the form of concrete results were more likely to occur after a solid base for mutual trust had been achieved.

The workshop has described different national approaches of organising public R&D funding in the field of ICT.

How each country uses its palette of different tools to support R&D is inextricably linked with the national reality and the needs identified in the countries' industrial base. In the recent years, the multinational companies play an increasingly important role in conducting R&D work, consequently challenging the national R&D systems.

There are countries where R&D policy is more likely to raise different ambitions across the political arena. This can be considered as a potential risk of unbalanced continuity, as changes of political dominance may also entail radical changes in the R&D policy. In countries where views on national R&D policy are to great extent shared, irrespective of the political party, it may better facilitate long-term development of R&D policy. A critical question remains, how to ensure sufficient amount of stability with longer term commitment and flexibility to meet the challenges of unforeseen future changes?

It seems that where long parliamentary processes are needed in order to pass an R&D programme, the trend is towards larger-scale programmes with an umbrella function, which is the case in Germany. In turn, if the decision of launching a new R&D programme can be made by a fairly simple mechanism, it seems more likely to find a larger number of individual programmes with a more defined technological scope.

A focused approach, with several targeted R&D programmes such as in the Netherlands and Finland, seems feasible for increasing networking and providing tailored services for a specific community within an ICT sub-field.

The Slovenian case suggests that R&D programmes focusing on supporting 'all ICT' can be considered feasible when there is no significant industry in specific ICT fields, and there is a need to support all potential within the field.

As a further remark, the national approaches also vary according to whether programme-like instruments are characteristically targeted at funding basic research or applied/industry-driven research: we have learned that in Germany there are typically no programmes in the basic research area, but grant-based funding is organised for the researchers. The Dutch presentation described a different approach, where a large part of the basic research funding is channelled via programmes. In the CISTRANA survey, 7 of the 20 identified Dutch R&D programmes are targeted to university participants, and do not entail industry funding.

In the conclusive discussions, the possibilities of already existing well-functioning frameworks such as EUREKA were considered important when looking for ways of better coordination of national R&D programmes.

Key findings of the Workshop:

1 All countries seem to have possibilities towards bilateral collaboration, and good examples of this already exist.

2 Bilateral programmes are manageable. If three or more participating countries are added, the complexity and restrictions increase dramatically. In such cases the already existing multinational frameworks such as EUREKA-like concepts could be exploited more thoroughly.

3 Joint programme evaluations and exchange of best practices could be one feasible form of cooperation.

How the national programmes could deepen co-operation within European Research Area (ERA):

STRENGTHS	**WEAKNESSES**
- there are examples of well functioning bi-lateral collaborative 'programmes' already - project level multinational collaboration has already been possible in most national R&D programmes - EUREKA and EU Framework Programme have paved the way already - most already existing multinational programmes are basic research oriented	- programme mechanisms and procedures are very different - currently there are not many genuinely multinational R&D programmes: not much experience yet - limited experience of industry driven multinational programmes outside EUREKA - Joint Technology Initiatives (JTI) and their potential have been communicated but are currently not yet sufficiently explored by the stakeholders
OPPORTUNITIES	**THREATS**
- there are already similar objectives and priorities in different countries - similar technological and application fields are important in almost all countries - R&D programmes can be seen as an organised, already existing framework on which future international collaboration could be built	- in practice there cannot be found a feasible way for collaboration, when all countries look at the problems from their own viewpoint - differences and complexity of national systems hinder the collaboration in practice - budgets are country-specific: how to solve the cross-border distribution of funding - does programme level collaboration offer any significant added value as compared to the project level collaboration? → important to be able to identify the areas where a number of projects is not enough, but only a joint programme is capable of solving the problem

Annex: Participants

Name	Organisation	Function	Country
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Ahola Kimmo, Chairman of the Workshop	Tekes	ISTC delegate	Finland
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Lankes Stefan	RWTH Aachen University	Chair for Operating Systems	Netherlands
Marek Martin	Eutema	Project Manager	Austria
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Reitmaa Ilpo Chairman of the Workshop	Tekes	Counsellor, Research and Technology	Finland
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Uotila Marjo, Rapporteur of the Workshop	Tekes	CISTRANA team, Senior Technology Adviser	Finland
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