



Analysis of the Present State of Affairs and Mapping Trends of Innovation Development in the ICT Sector

Resume

Sofia
09.02.2012



List of Abbreviations

ARC Fund – Applied Research and Communications Fund

ASTEL – Association Telecommunications

BAIT – Bulgarian Association of Information Technologies

BASSCOM – Bulgarian Association of Software Companies

GDP – Gross Domestic Product

ICT – Information and Communication Technologies

IT – Information Technologies

ITS – Intelligent Transport Systems

MEET – Ministry of Economy, Energy and Tourism

NSI – National Statistical Institute

ODA - Bulgarian Official Development Assistance

OPC – Operational Program Competitiveness of the Bulgarian Economy

R&D – Research and Development

STP – Science and Technology Park

The present resume highlights the main conclusions and recommendations from the final report of the project “Analysis of the Present State of Affairs and Mapping Trends of Innovation Development in the ICT Sector”.¹

Based on the research and analysis, carried out, the report presents a set of recommendations aimed at improving the national innovation system, especially with regard to realization of effective public regulation and implementation of business policies for stimulating the development of innovations in products and services in the ICT sector and Internet industry. These recommendations are based on:

- Review of the state of affairs and the driving forces in the development of the ICT sector and the Internet industry in developed countries. On the basis of this review, the report evaluates the national and corporate policies of the developed countries, as well as the approaches and practices used by them, for successfully addressing the effects of the economic crisis through innovation development in the field of ICT;
- Descriptive analysis and evaluation of existing state and company policies in Bulgaria, directed towards development and further strengthening of innovations in ICT;
- Critical assessment of the readiness of the ICT firms and the national innovation system (including the innovation environment in the ICT sector) for active, market-orientated innovation policy and research and development.

¹ The project „Analysis of the Present State of Affairs and Mapping Trends of Innovation Development in the ICT Sector” is financed by the Bulgarian-Korean IT Coordination Center (ITCC), hosts by Sofia University “St. Kl. Ohridski”. The project team includes: Todor Yalamov, coordinator of the IT Group, ARC Fund; assoc. prof. Teodora Georgieva, senior fellow, ARC Fund; dr. Todor Galev, senior fellow, ARC Fund; prof. Antoni Slavinski, New Bulgarian University; prof. Zelyu Vladimirov, Sofia University; Alexander Varov, consultant business development for web companies. The team is grateful to all companies’ managers that shared their experience with us.

1. Driving Forces behind ICT Development in the Near Future

1.1. Internet of Things

In the contemporary world of technological advancement, almost every electrical device is plausible candidate for a free IP address. Important new stage in the development of integrated systems is the gradual evolution from a network of interconnected computers to network of interconnected devices and systems – from mobile phones to automobiles, from electrical appliances to food packaging. This creates the “*Internet of Things*”, which requires a combination of safety and security on the one hand (privacy and data protection of the individual) and openness and interoperability on the other.

Engaging the entire political spectrum (European, national and regional) is an essential precondition for effective development and embedment of internet of things, thus highlighting the importance of regional and local management authorities, which are to play a major role in the development of the new technology. Local authorities would be able to make wide use of the *Internet of Things* in various areas, such as the organization of public transport, waste collection, calculation of pollution levels, traffic management, etc.. In light of this, the adoption of Internet Protocol ver. 6 (IPv6) as soon as possible would be of great significance for the implementation, future expansion and simplification of the Internet and in particular, of the *Internet of Things*.

1.2. Cloud Computing Services

During the past several years, consumers, corporations, as well as governments, have begun relocating data into the so-called “Cloud”, using web-based applications and online storage capacities. Cloud Computing services provide consumers with large volumes of cheap, but at the same time stable, online storage space and the opportunity of immediate access to their data from any internet-connected computer or other device, anywhere in the world.

The move towards Cloud Computing, however, exposes the consumers to several considerable risks – risk of disclosure of confidential information and hacker attacks; vulnerability to intrusion into their personal data, which is in breach of privacy, private life and correspondence.

There are three distinct models of Cloud Computing services. The first is Cloud Software as a Service (SaaS), where the consumer controls only limited settings, which can configure for him or herself. Cloud Platform as a Service (PaaS) is the second model, where the opportunity for embedding applications directly to the Cloud's infrastructure is provided to the consumer. With the Cloud Infrastructure as a Service (IaaS) model, the user can integrate and launch any kind of software that may include operating systems and/or applications.

Based on to-date development, four models could be identified for implementing and using cloud services. These are Private cloud (exclusively available to a single organization), Community cloud (shared among several organizations), Public cloud (available to the general public), and Hybrid cloud. The infrastructure of the latter consists of two or more Clouds (private, community or public), which remain unique but are linked by standardized or commercial technology, allowing for multiple deployment models of applications and data.

1.3. Intelligent Transport Systems

According to Directive 2010/40 EC, increasing the volume of road transport in the EU, mainly linked to the growth of the European economy and the need for mobility of the EU citizens, is the prime reason for congestion of the road infrastructure and increase in energy consumption, as well as a source of ecological and social problems. Innovations are to play the major role in solving these issues in the EU by developing a relatively new ICT segment – Intelligent Transport Systems (ITS).

The Directive defines ITS as highly sophisticated applications, which, without including intelligence as per se, aim at introducing innovation services for different types of transport and traffic management. ITS should provide for greater consumer awareness, as well as for safer, more coordinated and “more intelligent” exploitation of transport networks. ITS integrate telecommunications, electronics and information

technologies with transport engineering, thus aiming at planning, design, exploitation, maintenance and management of transport systems.

2. Convergence of ICT Services - regulatory responses

On a global scale, there is a diverse range of regulatory responses to the many participants in the ICT sector. Regulatory frameworks are processed differently, depending on specific circumstances and legal factors. **Two distinct regulatory principles can be distinguished.** The first covers a regulatory framework, the main purpose of which is to encourage direct competition. In the case of the second, the regulatory frameworks are designed in a way which ensures that markets, and not regulations, determine the winners.

The legal framework, governing ICT sector and Internet-related businesses, telecommunication networks, electronic communications, e-commerce and e-governance in Bulgaria encompasses a considerable number of regulations. **Despite the intense regulatory activity and the available EU funds, the government has failed in creating a thriving environment for innovation.** Among the main reasons remain insufficient administrative capacity; institutional rivalry between the executive structures (including in the management of IT and communications); the lack of an integrated approach to convert innovation as policy priority into actually implemented practices; ineffective judicial system; a significant share of gray economy in the country, leading to reduced state budget revenues; high levels of corruption; inefficient and underdeveloped electronic government; etc. Such weaknesses are emerging as permanent features of the country during the last decade, setting the major challenges in front of various governments over the years. These are also potential obstacles to the integration of various European programs, documents and regulations on ICT (i2010 Initiative; Digital Agenda for Europe; Europe 2020; Horizon 2020 and the Seventh Framework Programme; and etc.).

The liberalization of the telecommunication market, which has started within the EU, has reached the bigger part of the developed countries. It can be stated with relatively high certainty that the task of the liberalization process, namely the creation of favourable environment for private capital investments in the telecommunication sector, has been accomplished. **The liberalization of the telecommunication sector in Bulgaria is considerably lacking behind**, not only due to very late initiation, but also due to its slow and inefficient development, compared to the average European trend.

During the last decade, **the technological development** of the ICT sector exhibits the presence of bi-polar model for research and development (R&D) and for production of ICT equipment. The model shows concentration of the development of new technology mainly in the US, as well as several other countries, specialized in specific technological niches. Afterwards, the commercial mass production is outsourced to countries with significantly lower cost per unit of production. Two main trends can be distinguished in the framework of the model. The first encompasses the development of commercial products, targeting the global technological market and manufactured in great quantities. The second trend is characterized with the development of highly specialized (or particularly customized) products, manufactured in limited series. **Bulgaria falls within the latter trend and many Bulgarian companies have championed various narrow market niches on European or international level.** The development of this bi-polar model narrows the cycle of business initiatives for small countries, such as Bulgaria, where developing engineering activities is dominant, at the expense of R&D and mass commercial production.

After being pronounced a top priority and supported through the European Structural funds in recent years, **broadband access** and its deployment have become a top priority. **Despite its leading position in Europe regarding the deployment of high speed internet and despite the available public resources, Bulgaria is yet to spend its first “public” cent for the deployment of broadband infrastructure.** The main reason for this remains the failure of planned policies, largely due to a combination of low administrative capacity and inter-institutional rivalry. After several years of delay, a project to build broadband

infrastructure in rural areas has been initiated on a state level. If successful, the project is to become the first EU funded effort in this particular area.

With the aim of accomplishing the goals of the Digital Agenda for Europe, with regard to the development of fast and ultra-fast networks, the European Commission (EC) published, in September 2010, a package of political documents and rules for development of broadband internet sector. The Bulgarian policy in the area of broadband internet is based on the “National Program for Accelerated Information Society Development in Bulgaria for the period 2008-2010”, as well as on the followed “National Strategy for the Development of Broadband Access in the Republic of Bulgaria” (November 2009). The latter has several priority goals, among which are increased penetration of broadband internet access, through development of broadband infrastructure in rural areas; integration of the existing national electronic communication networks; and provision of appropriate conditions, aiming at encouraging innovation and technological upgrading of public and private broadband networks and their gradual transition to Next Generation Access Networks (NGA).

Meeting the specified targets, as well as successfully absorbing EU funds, would require the creation of favourable conditions, by both the private and public sectors, for development of services, which are to serve as stimulus for growth of demand and use of internet.

Despite the low broadband penetration rate of 13.9% according to the NSI / Eurostat data (14.9% according to the CRC data),² in Bulgaria by the end of 2010, the competent authorities of the EU stressed that modern technological developments in some countries, including Bulgaria, is based on FTTx + LAN technologies. As a result, Bulgaria and Portugal are ranked first in the EU, with regard to share of broadband lines, offering access speeds over 10Mb, where both Member States have little over 70% (EU27 average is 38.9%).

In 2010, about 70% of broadband lines in Bulgaria relied on technology other than xDSL. The dominant technologies for broadband access are LAN and RLAN (57.3%

² According to NSI/Eurostat, in January 2011 the percentage is 15%.

of broadband lines), followed by xDSL (29%) and cable access (12.7%). WiMax technology is relatively new for the Bulgarian market (WiMax services are available since the end of 2007) and still has a small share (less than 1%) of the total subscribers.

3. Innovation Activity of the Bulgarian ICT Companies

3.1. Scope of the national ICT sector

The validation of the country and the ICT sector as a successful model, not only in terms of low cost manufacturing of software and hardware elements, but also with respect to providing favourable conditions for development of research and innovation activities, meeting the high requirements of the multinational companies, has taken nearly a decade and has been a direct result of the advancement of individual and highly innovative firms, which have succeeded in establishing themselves on the market and even in creating specific international niche markets. Their performance, mainly directed towards foreign clients, highlighted the opportunities that Bulgaria has to offer, despite the almost non-existent support on the part of the official state institutions. The presence of big ICT companies in Bulgaria, as well as the existence of local firms, engaged in the creation of innovative products and services for large scale multinational companies or in partnership with them, has created positive preconditions for continuously increasing visibility of Bulgaria, **establishing the country as an outsourcing destination not only for maintenance services, but also for high-tech R&D intensive developments.** According to analyses by the “Applied Research and Communications Fund” (ARC Fund), **a new type of innovation model has been gradually establishing its presence in the ICT sector during the past five to ten years.** It combines the common characteristics of the traditional outsourcing with high-tech (mainly) corporate innovation entrepreneurship. Features of this model include outsourcing of development activities towards Bulgarian firms or towards local development units of the multinational companies themselves. Within the model, intellectual

property rights remain with the client, while the Bulgarian firms acquire the right of use / representation with limited geographic scope - the country itself or certain areas in proximity (e.g. Eastern Europe and/or Central Asia).

3.2. The ICT sector: manufacturing, productivity and innovation

During the last years, the ICT companies have generated between 9.5% and 10% of the Bulgarian GDP. This indicator ranks the ICT sector among the top five sectors in the country, alongside the energy sector, retail sales, utilities, and the food industry. Two-thirds of the ICT sector falls within the sub-sector of communication technologies, with the rest – within the information technologies.

According to the Top 400 ICT Companies Panel, sampled for the first time in 2006 by the ARC Fund, the ICT sector is in a state of constant evolution (14% growth in revenues and 83% profit increase), increasing its staff (18% total increase) and enhancing its productivity since then. The average employment per company increased from 68 people in 2006 to 81 in 2010, while in 2010, 41% of the firms operating in the ICT sector were employing more people, compared to 2006. Another 10% retained the same employment levels. As far as the companies with reduced staffing for the 2006-2010 period are concerned, this mainly occurred due to increase in efficiency (steady increase in revenue per employee indicators over the past five years amounted to 20% and a trend of increase in profit per employee with a decline only in 2008) and not because of market loss.

Table: Indicators of productivity in the ICT sector

Average per employee (thousand BGN)	2010	2009	2008	2007	2006
Income from operations	188.97	188.81	191.09	195.23	197.69
Income from operations of firms with reduced staff	155.97	152.37	146.34	138.93	129.66
Income from operations of firms with increased staff	118.11	165.74	185.38	200.03	190.94
Profit from operations	53.65	48.59	52.06	54.58	34.97
Profit of firms with reduced staff	20.15	15.03	14.29	18.68	16.99
Profit of firms with increased staff	43.32	54.71	66.83	71.50	36.50

Employed	81	76	77	73	68
----------	----	----	----	----	----

Source: Applied Research and Communications Fund, 2011

Basis: Panel of Top 400 companies in the ICT sector

Decrease of the average income per employee is observed in firms with increased staff. On the one hand, the majority of firms with staff increase are telecommunication companies, while the increase is mostly a result of the process of absorption of small ISPs, which is accompanied by a surfacing of employment (which up until that moment was part of the gray economy in the country), thus without leading to an overall increase in revenues. On the other hand, the presence of competition among mobile operators, as well as the replacement of mobile telephony by internet, Skype telephony and social networks, has led to revenue decrease of the two out of three mobile operators, which has been only partially compensated by the growth of the third. The fact that optimization processes were undertaken by the group of firms with increased personnel (mostly cost optimization) is reinforced by salary increase per employee.

3.3. Research & Development in the ICT sector

Official R&D statistics, prepared by the National Statistical Institute, are hardly reliable and using them in attempt of analyzing the Bulgarian ICT sector could be misleading. Data from the ARC Fund argues that the official statistics on R&D expenditure, as well as employment in the ICT sector, are considerably underestimated by the NSI (averagely from 3 to 10 times).³

Table: Formal reporting R&D units of the ICT sector to the NIS

	2005	2008	2009	2010
Number of enterprises	29	41	48	67
Personnel		422	458	526

Source: NSI, 2011

³ See InnovationBG 2009, ARCF Fund and InnovationBG 2010, ARC Fund.

Despite the increased number of enterprises, reporting to the NSI (67 in 2010), still a considerable part of the most innovative companies, exercising significant R&D, do not report these activities to the NSI. The growth of approximately 25-30 new ICT ventures that are accounted for in NSI is mainly due to the requirements of the Ministry of Economy Energy and Tourism (MEET) on reporting of R&D as evidence of innovation activities in the enterprise, necessary for determining their eligibility to apply for Operational Programme “Development of the Competitiveness of the Bulgarian Economy” (OPC) or as evidence for participation in other programs providing public project (co-)financing. Another aspect, contributing to the increased accountability is the NSI itself, which investigates, through external objective factors (e.g. funding resources from the National Science Fund and the National Innovation Fund or the prizes for innovative enterprise, awarded by Applied Research and Communication Fund, etc.), and identifies potential enterprises, which are highly probable to conduct R&D. In-depth interview with many ICT and other innovative firms has shown that the main reason for not reporting R&D is managerial unawareness and the fact that such tasks as commonly left to their respective accounting departments, the personnel in which lacks the capacity to distinguish between which expenditure does and which does not constitute an innovation R&D activity. In addition, no administrative sanctions are being put forward on the part of the NSI. In this context, direct calls to companies from the NSI have their obvious benefits. Nevertheless, the major stimulus remains the requirements of the funding institutions, which provide access to European and national funds for innovation.

Even when the companies listed be name in this analysis (VMWare Bulgaria, Johnson Controls, SAP Labs, Interconsult Bulgaria, Sirma Group, Daisy Technologies, AMK – Bulgaria, Thimbleweed, Intercomponentware Bulgaria SPL, Rila Solutions, Technologica and its R&D spin-off – Ditra, etc.), which undoubtedly exercise R&D through the majority of their personnel, the Bulgarian firms, which participate in R&D project of the European Commission, as well as companies with autonomous R&D departments, are considered, it is sufficient for the conclusion to be derived that the **total R&D personnel accounted for is significantly underestimated**. Expert but conservative estimates by the Applied Research and Communications Fund speak of

at least 120 Bulgarian companies engaged in R&D and of total staff employed in R&D at least 5 times higher than officially reported.

Table: Total R&D expenditures (in thousand BGN)

	2005	2008	2009	2010
GERD	208 142	325 855	361 060	420 105
BERD	44 804	101 112	108 174	210 600
ICT	11 249	19 481	14 152	13 934

Source: NSI, 2011

Having in mind the increased official R&D expenditures on the part of enterprises in 2010 (almost three time in absolute size, when compared to 2005) and the higher public spending in the area (almost two times), the fact that R&D expenditures in the ICT sector increased with merely 24% represents a real concern. Such discrepancy, however, can be explained in light of two factors. On the one hand, more non-ICT firms had been selected beneficiaries for European projects than ICT companies. On the other hand, the increased accountability in 2010 and, to a certain degree, in 2009, led to this unexpected growth (and respectively lack of growth) from pure market perspective.

4. Bulgaria as an Outsourcing Destination for Innovations

Changes in the geo-economic space create opportunities for Eastern European countries to become an attractive centre for outsourcing services and remote support, as well as for software and hardware development. **Bulgaria has established itself firmly among the newly popular outsourcing countries during the past several years.** According to one of the existing studies for 2010, the country ranks first in Europe and fourth worldwide, among 38 countries, for preferred outsourcing destinations by international companies.

This is mainly a result from combination of two factors – relatively high quality and well-trained personnel, and relatively low labour cost. The high ratings are also

aided by the low corporate taxes, as well as by the lower than other EU countries, though still sufficient, evaluations of the national business environment. Lowest ratings remain associated with the availability and level of education for the labour force, where language abilities and general educational level perform best, followed by the availability of expertise and know-how, while at the bottom, with severely negative evaluation, remains the availability of sufficient labour force on the market, especially with respect to highly skilled personnel.

Another substantial deficiency in the country remains the presence of corruption, and informal networking business practices, which change slowly under the influence of the economic globalization and the facilitated opportunities for mobility of highly skilled personnel. The judicial system is also of severe need for serious reforms, in order to improve its effectiveness.

From the perspective of the innovation level in the ICT sector, the country's attractiveness for outsourcing call centres and remote support services actually entails strategic positioning in activities at the low-end of innovation, but simultaneously, this also creates a favourable environment for expansion of outsourcing activities related to the development of software applications and, in rare cases, hardware, which are considered high-end innovations and are located at the other end of the innovation scale.

5. The Education System as Precondition and Instrument for the Development of the Innovative ICT

Considering the existing objective interaction between the higher education system and the ICT sector, **there is a trend of passive, instead of proactive, institutional behaviour from the education sphere.** In this respect, indicative is the fact that the "Higher Education Rating System" in Bulgaria does not rely on indicators, such as ones to assess the student's computer skills, computer provision, training in computer literacy and ICT, etc., instead these are absent altogether.

As a result, there is a **lack of operating policies and measures for encouraging the use of contemporary ICT in the education process**, passiveness on the part of the higher education institutions in “pulling” innovative solutions, and missed opportunities in the process of preparing highly skilled personnel, to effectively compete in the international marketplace.

The discrepancy between the demanding and fast-developing ICT industry and the training of specialists in the context of the more conservative education system results in a certain “mismatch” of education areas, upon which the human resources of the sector are being reported and analyzed.

Despite the effects of the economic crisis and the reduced growth rate of the ICT sector, **the tension on the labour market of ICT specialists is persistent**. There is a lack of personnel not only in terms of quantity, but also in terms of suitable skill sets, which are to respond to the fast-changing requirements and trends for business development. Outsourcing and foreign investments in Bulgaria are also contributing to the increasing market pressure for skilled staff.

The number of personnel, employed in the ICT sector, increased in 2011, reaching 41 579 people (in 2005 the number was 37 690), which constitutes 1.36% of total employment, according to a marketing research company CBN. The forecasts for 2012 are mainly positive – the expected growth varies between 1% and 3% due to the fact that companies are increasingly altering their business models, focusing not solely on large scale clients, but on the entire spectrum of potential customers. Companies are look for innovations and expanding their client base. The sector will filter off low skilled personnel. In this respect, the hardware and retail sectors are in worrying situation due to low skilled personnel.

RECOMMENDATIONS

1. NSI: Improving the coverage of R&D activities of the Bulgarian IT firms

It is necessary, through the aid of public-private partnership between the National Statistical Institute, the Ministry of Economy, Energy and Tourism, the Ministry of Transport, Information Technology and Communications, the sectoral business associations (BASSCOM, BAIT, ASTEL, etc.) and other NGO representatives, to develop and apply a programme for increasing the reporting of R&D activities of the IT companies. Such programme should generally include the following:

- Information and explanatory campaign on the need for R&D accountability and the public policy consequences associated with underreporting.
- Direct collaboration with foreign companies, which conduct R&D in the country but do not report these activities in Bulgaria in contrast to their official reports issued by their headquarters.
- Provision of funding for the development of accounting modules for reporting R&D as part of the standard accounting software used in the country, education/training programmes for IT sector accountants, aimed at facilitating easier bookkeeping on R&D.
- Creation of stimuli for increasing R&D activities of IT companies (and the rest), through adequate amendments in tax legislation. This could be aided by the Law on Innovation, which is currently in the phase of internal governmental discussion.
- Establishment of more favourable conditions for IT firms to invest in R&D, through the OPC's funds and through improving the coordination between the work of the National Innovation Fund at MEET and the National Science Fund at the Ministry of Education, Youth and Science.

2. Increasing state subsidy and intake rate in university programmes, which prepare ICT specialists (bachelor level); increasing the number of PhD students in

ICT programmes and creating special scholarships, targeting the best performers; creating specific programmes for retention of ICT specialists in Bulgaria, through partial remission of student loans, with the condition of remaining in Bulgaria for X number of years post-graduation; creating a special financial instrument, targeting researchers, for stimulation of publishing in specialized ICT magazines with high impact factor; increasing the funding and attractiveness of science and technology in secondary schools, thus resulting in higher quality and quantity of candidates for ICT engineering and software programmes.

3. Creating a working programme for the InvestBulgaria Agency (IBA), prioritizing the search for foreign companies, which are willing to offshore their R&D activities and not only to establish support centres. These companies should be provided with opportunities for collaboration in mutual programmes for funding and training ICT-focused students, which will in turn guarantee them minimal level of available personnel. It is necessary to work with big foreign production companies, mainly in the area of electronics, in order for these to transfer, partially or entirely, their R&D units from other countries. Example in this respect could be “Epiq Electronics” in Botevgrad, which is the world’s largest factory of the Epiq Group, though the R&D theme is lightly only involved.

4. In the planned “Science and Technology Park – Sofia” (STP - Sofia) to only be invited firms, which are strongly R&D intensive; having big number of employed personnel in R&D; having patents (submitted or obtained), even when speaking of multinational companies, patenting abroad, but having Bulgarians as co-authors; avoiding attracting big renowned names from the global ITC market, if their Bulgarian operations solely involve low innovation activities, such as support and/or call centres. In the meantime, the STP – Sofia should be used as an instrument for innovative application of ICT in companies from other sectors. The following three options could provide an example of plausible directions in that line of thoughts, though they do not exhaust all available possibilities. **The first scenario** is the establishment of laboratories in the area of ICT, which would attract regional

interest. Appropriate model in that respect is the World Bank's mLab (mobileLab), which can be exploited in realization of the Bulgarian firms' potential in the area of mobile applications. **The second option** is making use of available computational resources for solving actual industry problems. This has to do with the so-called super-computer, currently under the management of the Ministry of Transport, Information Technology and Communications, as well as with the available, in some universities and the BAS, high performance specialized computational resources (GRID clusters, specialized computers, etc.). The obstacles, which have to be overcome in this case are channelled in two directions – on the one hand, the industry is not familiar with the abilities that these computational resources have to offer, and on the other hand, the scientists who operate them, lack specific resources and knowledge on how to commercialize the available opportunities. **The third option** includes involvement in the STP – Sofia of companies and research organizations that have a high-intensive R&D in ICT field but belong themselves to other sectors of the economy and are able to develop narrow niche competencies – e.g. Bulgarian innovative companies in the field of avionics. Last, but not least, in view of encouraging the creation of new enterprises in the areas of ICT and ICT-intensive industries, establishment of IT-orientated business incubator could be included as part of the “Science and Technology Park – Sofia”.

5. Creating conditions for the introduction of pre-commercial procurement as legislation and practice

Pre-commercial procurement is an effective funding instrument for competitive R&D, the results of which could later on be used by both the public and private sectors. This measure has much broader influence over governmental policies, stimulating the development of innovation processes, products and services, than over the purely sectoral implications, but the ICT firms are the ones, which are going to be fully prepared for benefiting from the pre-commercial procurement, if it is to be implemented. The potential search for R&D on the part of the government is mostly associated with the development and implementation of the e-governance in Bulgaria.

Pre-commercial procurement tenders can be related to national (centrally managed) projects, such as e-Health, as well as to municipal-level initiatives, such as implementation of new, currently non-existent, public online services. In particular, the following is necessary:

- the concept of pre-commercial procurement should be popularized, in order for the business sector and society to demand fast adoption of legislation amendments in this direction;
- the Law on Public Procurement should be amended in a way that requires greater competitiveness with regard to R&D procurement, though not complying with exactly the same requirements, applicable to the normal public procurement;
- a financial instrument to be introduced by 2013, for the realization of at least several pre-commercial procurements in the area of ICT, with a condition that opportunity is made available for coordinated funding of programmes, directly managed by the EC, or funds, managed by Bulgaria, and funding, provided by national or municipal budgets.

6. The start of the national foresight in the area of ICT, coordinated by the Ministry of Education, Youth and Science, should foresee the effective inclusion of the Ministry of Transport, Information Technology and Communications due to the fact that the latter has been planning at least one large specific project (concerning broadband internet) with a horizon of at least ten years (3 years for realization and another 7 years of minimum period for exploitation). The foresight initiative could be based on the pilot foresight for e-government (governance) conducted in 2002-2004, with a 2015 horizon.

7. A specialized programme for journalism in the areas of innovation, R&D and ICT. More adequate representation of the achievements of the Bulgarian technological firm in the press would establish higher and more prestigious position for the engineering disciplines, while the politicians, who are deriving the bigger share of their information through the press, would have a more adequate idea of the

national economy – its potential; firms, with what kind of characteristics should be eligible for state aid; and how should such companies be supported outside the state aid.

8. The development of official national positions should be democratized with regard to the negotiations on international trade agreements; the formulation of the Bulgarian official position on various European directives, in their preparation phase, as well as on legislation in the European Parliament. This needs to be done in order to avoid negative outcomes (the fresh example with The Anti-Counterfeiting Trade Agreement /ACTA/), as well as to limit the expected negative impact on the Bulgarian ICT business.⁴ The Bulgarian civil society is more prepared and more determined, than the public administration, to participate in these processes and to protect both civil and business interests.

9. It is of significant importance that all interested, in the development of the ICT sector, stakeholders (business associations, individual firms, IT faculties, NGOs) collaborate and work with all political forces until the consensus is reached that there is a clear need for separate centre of accountability in the form of ministry, with a Minister and in the meantime, Vice-Minister, who will be responsible for ICT, innovations and e-governance. This idea is commonly being discussed on a political level but the political parties are yet to reach a consensus, which delay is to a certain degree caused by the lack of this “political champion” in the area of ICT and innovation.

10. The Ministry of Foreign Affairs should work more effectively with regard to the Bulgarian Official Development Assistance (ODA). The ODA could include the development of information society in the developing countries among its priorities. Using not only the expertise of the Bulgarian ICT entrepreneurship, but also the civil

⁴ For instance, BASSCOM and the Association of Internet Providers strongly opposed the adoption of ACTA.

society experience, could aid Bulgaria in undertaking various mutual projects with the developing countries. The ODA could be used as a tool to economize the Bulgarian foreign policy and export of good practices, which could in turn become basis for consequent outsourcing and offshoring of local companies to new destinations. The purely market initiative, which has implemented Bulgarian model for broadband connectivity in India could be replicated in other countries, which have serious issues in terms of Internet price and quality. Combination of Bulgarian ODA programs with other countries' programs for development assistance, could have improved spill-over effects on both the results of these programs and the cooperation countries themselves.

11. There should be an integrated national strategy for the development of innovations, technologies and research. Having a single document would avoid the fragmentation and duplication of measures, the irregular update and revision of the various strategies (sometimes with a delay of 4-5 years) and their adoption on different legislative and executive levels (the Council of Ministers, the Parliament, Advisory Councils at the ministries, etc.) without coordinated financial framework, which almost always entails – without financial resource.