National ICT Sector and Policy Appraisal Report

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GATEWAY TO UKRAINIAN & BELARUSIAN ICT RESEARCH

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PREFACE

The present document has been elaborated under the joint efforts of the SCUBE-ICT project consortium.

SCUBE-ICT is an innovative EU funded initiative aiming to upgrade the cooperation in the field of Information and Communication Technologies (ICT) between EU, Belarus and Ukraine in key areas of mutual interest in order to create substantial socio-economic benefits in all three regions. A wide range of diversified activities will be implemented at two levels:

Research / industrial level

- ✓ Analyse the Belarusian and Ukrainian research and industrial ICT domain,
- ✓ Create a 'pool' of key ICT players from Belarus and Ukraine to promote collaboration with their EU counterparts.
- ✓ Advise and consult highly motivated ICT actors from the three regions and support their collaboration under FP7-ICT research activities.

Policy level

- ✓ Identify and analyse existing and future commonalities and differences in ICT R&D policies between EU and the targeted countries.
- ✓ Support and facilitate policy dialogue towards future cooperation directions in the ICT Research and Development field.

SCUBE-ICT identity

Title:	*"**Strategic Cooperation in Ukraine, Belarus and EU in Information and Communication Technologies**" (Contract No 231148)*
Duration:	*January 1, 2009 – December 31, 2010 (24 months)*
Website:	*http://www.scube-ict.eu*
Coordinator:	*International Environment and Quality Services North Greece Ltd (Q-PLAN N.G., Greece, www.qplanng.gr) -*
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Consortium

The project was implemented by a multidisciplinary and multicultural consortium of 10 partners, 4 from EU-27 and 6 from Belarus and Ukraine:

- **International Environment and Quality Services North Greece Ltd**
  Q-PLAN N.G., Greece, www.qplanng.gr
- **Intelligentsia Consultants Ltd**
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- **ALTEC SA Information and Communication Systems**
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Introduction

The present document has been elaborated under the SCUBE-ICT project and is a part of the **deliverable D2.1** "***National ICT Sector and Policy Appraisal Report"*** for the case of ***Belarus***. It reviews the national ICT policies and priorities and it identifies socio-economic factors influencing the ICT sector in Belarus, providing a summary of the current status and trends of Belarusian ICT sector. It identifies the *strengths* and *weaknesses* of the ICT sector of Belarus at both research and business levels, while highlights *emerging opportunities* and *potential threats* for the development of the ICT sector. Furthermore, it briefly outlines existing collaborations between Belarusian and EU-based organisations in several ICT fields involving either private organisations or public research institutions. Finally, it concludes with a set of preliminary Policy recommendations to support future ICT co-operation with the EU.

The document is structured into the following chapters:

- **Chapter 1** summarises the *structure and status* of the National ICT sector and its governance system.
- **Chapter 2** provides an overview of the *main trends* in the Belarusian ICT Sector as well as the National Policy Objectives and Priorities.
- **Chapter 3** summarises the *lessons learned* from the evaluation of past ICT Policy Measures and provides a number of 'good practice' examples from past ICT policy making and implementation.
- **Chapter 4** describes *existing cooperation* between Belarusian and EU27 organisations, in the ICT business and research domains, as well as relevant policies and programmes that support such collaborations. Importantly, it also describes the *barriers to cooperation* in ICT area between Belarusian and EU27 organisations.
- **Chapter 5** concludes with a set of *preliminary policy recommendations* to support future ICT co-operation between Belarus and the EU. These recommendations were classified per level of importance to strategic (medium-to-long term) and operational (short-to-medium term)) as well as per different target group involved (i.e. research community, private industry and government) in each region (namely in Belarus and in EU). The *key findings* and *preliminary recommendations* constituted the *main background documents both for the consultations* (i.e. consultation questionnaire and workshops) as well as for *the policy workshops* organised in Belarus.

Changes in May 2010 (revised 1st version)

The revised 1st version of the document contains ***expanded policy recommendations in Chapter 5***, which identify critical points for attention in Belarus and provide suggestions for concrete steps towards tangible results in improving cooperation between Belarus and the EU within the ICT sector. These suggestions address instruments for improving policy at strategic and operational levels as well as different target audiences (RTD, Private Industry and Government) with regards to potential actions at national and EU level

Changes in December 2010 (2nd version)

The 2nd (and final) version of the document contains updated statistical data and new legal norms, programmes and strategic initiatives, reflecting the ongoing changes and further development of the ICT sphere in Belarus, what became available and initiated during 2009 and 2010, both at national and international level regarding the economic trends, as well as ICT related issues.

Remark

The title of this deliverable initially was "White paper on ICT R&D in Belarus and Ukraine" but following the discussions (during the negotiations) regarding the EECA cluster, it was renamed to address the common activities (p.23 of ANNEX I).

Executive Summary

1. The National ICT Sector and its Governance

The National ICT Sector

The national ICT sector in Belarus contains many types of organizations and institutions, which play a role in the system of ICT development and implementation (public, private and semi-private). Overall, there are six main types of organizations: a) governmental, b) bridging organisations, c) private enterprises, d) professional unions and associations, e) universities, and f) other public and private organisations.

Governmental organisations (state and regional) play a key role in the definition of the main directions of ICT development. Management of ICT development in Belarus is assigned to the Ministry of Communications and Informatization of Belarus. The Ministry of Communications and Informatization organizes and controls the implementation of several state and branch programmes including "e-Belarus", which was the national programme that included the principal goals of the national ICT policy from 2003 - 2010.

Almost all industrial ministries have their own programmes involving ICT development such as the Ministry of Education, Ministry of Agriculture and Foodstuffs, and National Statistical Committee. The administrative office of the President of Belarus is engaged in ICT development for the supreme bodies of government including the Administration of the President, Parliament, Constitutional Court and the Central Election Committee. Programmes concerning scientific research (applied and fundamental) in the field of ICT are defined and executed by the State Committee on Science and Technologies of Belarus.

The main bridging organization - that acts as an intermediary between the government and the rest of the ICT system – is the Interdepartmental Commission on Informatization Issues at the Cabinet of Ministers of the Republic of Belarus. However, the key ministries - Ministry of Communications and Informatization and Ministry of Education – also have branch coordination councils for the State Programme of Informatization "e-Belarus" and the State Programme of Informatization of Education.

Unlike in other parts of the national economy, private enterprises are thriving in the ICT sector. Broadly speaking, private ICT enterprises can be separated into the following clusters: 1. Services in the development of custom-oriented software; 2. Telecommunication services; 3. Manufacturing of the telecommunication equipment; and 4. System integration.

Professional unions and associations start to play a significant role in the development of the ICT sector in Belarus. Public association NGO "Information Society" facilitates the application of ICT in all spheres of Belarusian society and has more than 500 members. The scientific and technological association "Infopark" was created in 2001 and supports the development export-oriented software.

In 2005, the Belarus Hi-Tech Park was created following the Decree of the President of Belarus to stimulate high technology production. Today, most Hi-Tech Park residents are involved in information technology development. Currently, the park has 88 enterprises and their export of software development services exceeded $110m during 2009.

Belarus has numerous universities and related institutions that provide key research, education and training in ICT. The main ones include Belarusian State University of Informatics and Radio Electronics, Belarus State University, Belarusian National Technical University, Belarusian State Technological University, Belarusian College of Telecommunication and Minsk Radio Engineering College.

Belarus also has a number of other public and private organizations that play an essential role in the ICT sector. For example, the National Academy of Sciences of Belarus (NASB) has several departments involved in ICT research. In particular, it includes the Departments of Physics, Mathematics and Informatics containing the United Institute of Informatics Problems (UIIP-NASB), Institute of Physics, Institute of Mathematics.

The ICT Governance System

The Belarusian ICT sector governance system started in the early 1990s with the establishment of the special Fund of Informatization for financing and managing ICT projects.
In 2005, the Fund was liquidated due to the transfer of its activities to the newly formed Department of Informatization of the Ministry of Communications and Informatization. The Ministry is responsible for

regulating the telecommunication market, granting licenses for activities in the field of telecommunications, and also prepares ICT related legislative acts. The Coordination Council of the Ministry is responsible for projects of "e-Belarus" programme. Management and financing of projects is carried out by the Department on Informatization.

Interdepartmental coordination of projects and preparation of proposals on ICT state policy are assigned to the Interdepartmental Commission on Informatization Issues of the Ministers Council of Belarus, established by Presidential Decree in 1998. Meanwhile, ICT policy for the banking sector is determined by the National Bank of the Republic of Belarus.

In order to develop an advanced data transmission network, attract domestic and foreign investment, improve quality and reduce the cost of data transmission, the Presidential Decree №515 "On some measures for development of data transmission network in the Republic of Belarus" was adopted on 30 September 2010. The Decree stipulates the creation of the "National Centre for Traffic Exchange" (NCTE).

Thus on 15 November 2010 the Republican Unitary Enterprise "National Centre for Traffic Exchange" (NCTE) was registered on by the Operational and Analytical Centre (OAC). This enterprise has the right to stream international Internet traffic and supervise the Unified Republican Data Transmission Network (URDTN).

The National Centre for Traffic Exchange concentrates on solving the following tasks:

1. protect against unauthorized access to the URDTN and the data transferred within it, manage the Unified Republican Data Transmission Network and take measures for its development;
2. ensure interoperability of data transmission networks, as well as government agencies and organizations, and other legal entities and individual entrepreneurs while providing telecommunication services using the URDTN;
3. ensure equal access for government agencies and organizations, other legal entities and individual entrepreneurs to the URDTN;
4. provide calculations for connection of data transmission networks to the URDTN and providing telecommunication services using the URDTN;
5. exercise technical control over international traffic transmission and connection to telecommunication networks of foreign states;
6. create data procession centers, information networks, systems and resources, points of interconnect to telecommunication networks of foreign countries and ensure their functioning.

Policy Making and Implementation Practices

Different government organisations are responsible for different areas of ICT policy making, (e.g. the Ministry of Communications and Informatization, the State Committee on Science and Technologies, the National Academy of Sciences, etc). However, the Ministry of Communications and Informatization is the leading body, while the Interdepartmental Commission for Informatization Issues of the Ministers Council of Belarus undertakes the proposal and programmes preparation on ICT policy. ICT policy implementation takes place through dedicated ICT programmes. Within last 5 years there were numerous state, branch and regional programmes. Referring in particular to R&D programmes and projects, those are managed by the National Academy of Sciences and the State Committee on Science and Technologies. Overall, during the last 15 years, considerable budgetary funds have been invested in ICT development with positive outcomes. However, the desired impact on social and economic development as well as efficiency improvements in state institutions has not been fully reached.

Policy Benchmarking and Evaluation – Utilisation of International Experience

Currently, reviews of specific ICT sectors and policies are carried out on a departmental level (the Ministry of Communications and Informatization, the State Committee on Science and Technologies, and the Ministry of Education) and are not open to independent expert evaluation. Only the Ministry of Communications and Informatization routinely engages external experts to deal with specific technological questions. Consequently, up to now, ICT policy has not been considered as a subject requiring concise research, benchmarking and impact assessment on a governmental level. In addition, most of the State programmes have independent and complex objectives, different methodical and information bases and weakly correspond with each other. Consequently, it is difficult to compare and evaluate their integrated contribution to national social and economic development. Finally, regarding the international cooperation and the exchange of experiences in the field of formation, realization and management of state ICT policy, at the moment it is in a nascent condition and limited to rare study trips of individual ministry heads. As a result,

state employees involved in ICT policy development, implementation and evaluation have limited possibilities to take advantage of the global experience in this area (with the exemption of representatives of scientific organisations that are quite actively involved in cooperation with scientific centres of Europe in the framework of international projects and international conferences).

However, a considerable change in the Belarusian policy benchmarking and evaluation practice is currently under way. One of the key tasks defined in "Strategy of Information Society Development in Belarus during the period 2010-2015" is the issue of creating a unified system of indices for ICT development in the country (called "ESPRIO") as well as high quality monitoring, analysis and evaluation of the efficiency of production and use of ICT products. The new national system of indicators will be consistent with the rest of the applied international systems (e.g. the International Union of Telecommunication, the United Nations, etc). Respectively, Belarusian researchers involved in ICT policy development use public surveys and analytical materials published by the EU, individual countries, and international organisations (e.g. OECD, ITU, World Bank, etc.)

Overall appraisal of ICT governance

Overall, the existing ICT governance system does not support effective management of ICT development in Belarus. In reality, the governance system does not facilitate interdepartmental coordination, independent and qualitative examination of programmes and projects, effective utilization of the global experience and international cooperation.

However, considerable changes are currently underway. Overall, more and more attention is paid to studying global experience in the formation and realization of ICT and innovation policy. Furthermore, it is more and more recognised as key requirement for the development of information society the need for increased cooperation and coordination among the governmental bodies as well as with all concerned sides – business, civil society, regional and international organisations. Finally, the completion of the unified system of indices (ESPRIO) for the monitoring and evaluation of the ICT development in the country as well as the rest of the related new strategies and actions are expected to upgrade considerably the policy benchmarking and evaluation practices and hopefully facilitate more effective ICT policy making and implementation processes in the country.

2. Trends in the National ICT Sector and in National ICT Policy Objectives

Recent Trends in Macroeconomic and Market Developments

Belarus has shown steady economic growth over many years. During the past ten years, the country's gross domestic product has practically doubled. The National Statistics Committee of Belarus reported that during the first nine months of 2010 the country's GDP increased at an annual rate of 6.6% compared to 2009. GDP stood at Br116.6 trillion (approx €30 billion). The country's main economic activities include machine-building, mechanical engineering, chemical and petrochemical industry, fuel and energy sector, agricultural and wood industry. Almost half of all enterprises operating in Belarus are privately owned. They produce more than 60 percent of all industrial output in the country.

The economy of Belarus is strongly export-oriented. More than half of all production in Belarus is exported. In 2009 Belarus' export reached almost $49bn. Based on the ratio of foreign commerce to GDP, Belarus is ranked in the top ten for European countries. However, also during 2009, Belarus imported more goods than it exported. Consequently, the foreign trade balance was negative and stood at over $7.2bn.

In the first half of 2010 the amount of foreign investment in the economy of Belarus increased by 4,4% compared to the same period last year and totalled $4.4 billion. According to the National Statistics Committee, the main investors in the economy of Belarus in January-June 2010 were economic entities of Russia (71.5% of all foreign investments), Austria (9.3%), Netherlands (5.9%), Cyprus (3.8%), the United Kingdom (3.5%). The largest amounts of foreign investment were directed at such industries as transport (50.7% of total), industry (23.2%), trade and public catering (15.6%).

Direct foreign investment (DFI) amounted to 60.2% of all foreign investment compared with the first half of 2009 their volume increased by 7.2% to $ 2.6 billion, 92% of DFI came from the residents of Russia. The proportion of residents of the United Kingdom and Cyprus comprised the 1% each, Latvia – 0.8%, China and Germany – 0.7%, USA – 0.6%. The share of fixed capital investment in GDP in the 1st quarter 2010 amounted to 26.1%.

Belarus was listed amongst the ten most reformed countries in the World Bank's "Doing Business Report for 2009". According to "Doing Business Report for 2011" in terms of conditions for doing business, Belarus now occupies 68th place. Following the results of "Doing Business Report for 2010" Belarus took 58th place, having improved its ranking by 24 points compared to the report of the previous year. The government's measures to reduce "red-tape" also partially help to explain the phenomenal growth in new small and medium sized enterprises in recent years. By the end of 2008, there were 66,000 SMEs registered, which represented a 21,500 or 48% year-on-year increase. In 2008 SMEs accounted for 9.3% of GDP (in 2007 the same share of small business in GDP was 8.3%). As of 1 January 2009, there were 68,000 small companies of all forms of ownership, up 32.7% from 2007.

More than 10% of SMEs are based in small and medium-sized towns. 535,700 people were employed in small business in 2008 (429,000 in 2007). Of them 34.9% work for industrial companies, 29.3% are employed in trade and public catering, 14.6% in construction and 9.1% in transport. As of April 1, 2009, there were 216,700 sole traders in the country.

In 2007, the relative contribution of telecommunication services to GDP was 2.2%. This was driven by the rapid growth of the cellular telecommunication network market. Furthermore, growth of exported telecommunication services reached 114.9% compared to 2006.

Recent Trends in ICT Performance

Belarus' ICT performance is quite favourable when compared to other countries. It tends to be ranked in the upper quarter to upper third of country lists in international surveys. For example, in the United Nations e-Government Survey 2010, Belarus was ranked 64 out of 183 countries based on the e-Government Development Index, and 51 out of 179 based on the e-Participation Index.

Belarus' information society is based upon current information and communication infrastructure.

The main fibre-optical network was created and is maintained by the national operator - Republican Unitary Telecommunication Enterprise (RUE) "Beltelecom". It is based on technology employing the synchronous digital hierarchy concept, which is introduced not only on the primary trunk network, but also on city telephone systems of all regional centres and large cities. Today, there are more 4 million automatic telephone station (ATS) numbers located on the country's fixed public switched telephone network. There are 43.2 phones per 100 people. According to this index Belarus occupies the leading position among the CIS countries and is one of the top twenty countries in the world. The number of rural settlements with fixed telecommunication constitutes 98.6% according to the Ministry of Communications and Informatization. Overall, 72.7% of the population has access to digital connections.

At present, around 170 organizations in Belarus have special permission (license) from the Ministry of Communications and Informatization to provide data transmission services. According to a 2009 survey, the installed capacity of the national data transmission network is approximately 470,000 ports. Following the results of 2009 external Internet gateway of the operator was 22 Gbps. By April 2010 the total external Belarusian Internet gateway comprised 37 Gbps. In 2008 the width of the Belarusian Internet channel reached 5.2 Gbps, in 2007 – 3.1 Gbps. About 3.029 m people, or 30% of the population, use the national network in order to access the Internet. Belarus has relatively poor Internet resources. Today, there are about 20,000 sites registered in the .by-zone and 30,059 Belarusian resources are registered in the catalogue of the Belarusian search system (www.tut.by).

According to the Ministry of Communications and Informatization 9.6 million people, or 97% of the population, subscribe to the country's GSM mobile telecommunication network. Strong market competition encourages mobile communication operators to expand their services, cut costs and introduce state-of-the-art technologies. Meanwhile, the national operator RUE "Beltelecom" has established zones for wireless access in Minsk city and the whole territory of the country. Today there are 640 WI-FI access points in Belarus, 392 of them are public. The number of WI-FI hot-points in Minsk is 144.

National Policy Objectives and Trends

During the past 5-10 years, Belarus has been extremely active in designing and implementing a broad range of ICT related policy measures to establish and develop its information society. The key policy measures implemented during this period are listed in the table below.

Exhibit i: ICT Policy Measures

IPM N°	Title	Organisation responsible
BY_1	National ICT Programme of the Republic of Belarus from 2003-2010 "e-Belarus" (e-Belarus)	Ministry of Communications and Informatization
BY_2	State Programme of Innovation Development of Republic of Belarus for 2007 - 2010	State Committee on Science and Technologies
BY_3	Continuous Acquisition and Lifecycle Support - CALS (Product Lifecycle Management - PLM)	Ministry of Industry
BY_4	Electronics and Optics Programme	Ministry of Education
BY_5	Scientific fundamentals of information technologies and systems (INFOTECH)	Ministry of Education
BY_6	Development and implementation of science intensive computer technologies "TRIADA"	United Institute of Informatics Problems of the National Academy of Sciences of Belarus (UIIP NASB)
BY_7	Telecommunications Development Programme for the Republic of Belarus for 2006 – 2010	Ministry of Communications and Informatization
BY_8	State Programme for the Introduction of Digital Television and Radio Broadcasting in the Republic of Belarus until 2015	Ministry of Communications and Informatization
BY_9	State Programme for the Development of Satellite Television Broadcasting in the Republic of Belarus until 2010	Ministry of Communications and Informatization
BY_10	ICT for the education system of the Republic of Belarus for 2007-2010	Ministry of Education
BY_11	Belarus Hi-Tech Park	Hi-Tech Park Administration
BY_12	Strategy of Information Society Development in Belarus until 2015	Ministry of Communications and Informatization

The principal goals of national ICT policy during recent years have been captured in the "National ICT Programme of the Republic of Belarus from 2003-2010 (e-Belarus)" approved by the Council of Ministers of Belarus in December 2002 with amendments issued by The Ministry of Communication and Informatization. The objectives are to create a unified ICT environment that will provide conditions to improve the economy; enhance state and regional management; and provide citizens with the right to freely search and distribute information on the economic and social status of society.

The main organizations responsible for implementing e-Belarus are the National Academy of Sciences of Belarus, Belarusian State University, Belarusian State University of Informatics and Radio electronics, Institute of Applied Software systems, National Cadastre Agency, Centre of Information Security, State enterprise "Geoinformation systems", and Enterprise "Beltelecom".

Looking ahead over the medium-to-long term, the next set of high-level goals for national ICT policy is defined in the "The National Program of IT services Development in Belarus in the period 2011-2015". In the action plan to implement the National Program 130 specific actions have been defined, responsibility for their implementation allocated to different government bodies, and deadlines set for their implementation.

3. What lessons can be drawn from Policy Implementation

Lessons from the Evaluation of ICT Policy Measures

The main ICT policy measures in Belarus are state programmes approved by the Council of Ministers of Belarus. In accordance with the Regulation of the Government of Belarus (Law of Scientific Activity of the Republic of Belarus), the results of each measure (programme and project) must be evaluated. Upon completion of the first stage of a measure (or its part), the scientific council of a research institution evaluates the results of the measure and appoints an acceptance inspection group, including the representatives of the contractor and customer and a high qualified ICT specialist from the country.

In some special cases, a Coordination Council is organized to control a programme execution which includes representatives of the Scientific and Administration Boards of Belarus. The Council evaluates each project after completion and issues recommendation on how to maximise the impact of the project's results.

Over just a few years, the ICT situation in Belarus has been significantly improved. Governmental support of ICT projects (e.g. state programme "e-Belarus") has had a major positive impact on this process. This support has included: assisting enterprises to implement advanced software for design and management; increasing greatly the number of talented students and young specialists involved in ICT projects; and opening many off-shore legal entities working for world known ICT companies with advanced software packs and organizing several national innovation associations. Nevertheless, many ICT issues still need to be addressed in Belarus including: still low availability and access to the Internet for the population; low level of coordination between ICT organizations (public and private); and deficiency of highly skilled ICT specialists in certain sectors.

Review of Good Practice

Belarus can cite several notable examples of good practice in ICT policy making and implementation since 2003. The National ICT Programme of the Republic of Belarus from 2003-2010 "e-Belarus" (e-Belarus) aims to create a unified ICT environment to provide the conditions for improving the economy, state and regional management, provision of citizens right for free search, transfer, and distribution of information of economic status and social development of the society. The results of over 100 projects of the programme have been positively evaluated by a group of ICT specialists.

The COSMOS-SG programme (2004-2007) was the second successful programme of Belarusian-Russian cooperation in space technologies. The results of the COSMOS-SG were evaluated positively by the International Acceptance Commission which includes specialists on space technologies from Russia and Belarus. A new follow on programme - COSMOS-NT - based upon the results of COSMOS-SG started in 2008.

A cluster supercomputer family SKIF was the first created in UIIP NASB in cooperation with Russian scientific centres during the period 1999-2004. Following a successful evaluation of the initial stage of supercomputer development, a new programme TRIADA started in 2005 and was successfully completed in 2009. The results of TRIADA have been evaluated positively by an international acceptance commission including high rank scientists and engineers from Russia and Belarus.

State scientific-engineering programme CALS (2005-2010) is designed to develop and implement information technology in industry to support the whole lifecycle of product design, manufacturing, use and utilization. As a result of the CALS technology programme, over 16 integrated information and software systems have been developed and installed in industrial enterprises including Minsk Tractor Works, Minsk Truck Works and others.

The State Programme for the Introduction of Digital Television and Radio Broadcasting in the Republic of Belarus until 2015 led to the introduction in July 2005 of digital television broadcasting in Minsk on a regular basis. By January 2009, digital television broadcasting coverage reached 46.77% of the population in the Republic of Belarus.

The INFOTECH programme (2006-2010) aims to support the creation of new intelligent information technologies and systems, the development of models, mathematical methods and hard-software facilities to increase the product competitive abilities and improve social sphere of the country. The leading organizations responsible for execution of the programme are the United Institute of Informatics Problem and Belarusian State University.

The Telecommunications Development Programme for the Republic of Belarus (2006-2010) aims to improve the telecommunications environment – in particular in the area of business. The export of telecommunication related services increased by 114.9% between 2006 and 2007 compared with the programme's forecast of 113.5%. Meanwhile, the import of such services increased by 99.1% over the same period compared with the programme forecast of 105%. Overall, the foreign trade balance surplus for telecommunication related services was 29.5m euros in 2007 compared to a forecast of 28.6m euros.

The State Programme for the Development of Satellite Television Broadcasting in the Republic of Belarus until 2010 aims to support the development of electronic media and information space in the country. Since

2007, three Belarusian television programmes have been broadcast via satellite systems: Belarus-TV, STV, and First Music Channel.

4. ICT Co-operation with the EU

Co-operation involving private industry

According to experts, about 450-500 companies and informal development teams are engaged in software development in Belarus. Altogether about 15,000 IT experts work in Belarusian software development companies - approximately 6500 on projects for the domestic market and 8500 for international markets. However, there is rather low awareness around the world of the potential benefits of cooperation with Belarusian software companies. As a consequence, there are almost no international software development centres in Belarus.

Overwhelming, the majority of software development companies are orientated either exclusively to the domestic market or to foreign markets. In a recent Government survey, almost half of respondents (49%) indicated that they receive 80% or more of their revenue from orders in Belarus, while a slightly small number (41%) receive 80% or more of their revenue from export. However, software and IT services export is almost three times larger than the domestic market. If one excludes the contribution of foreign development centres of Belarusian companies, then pure software development export amounts to about $410 m.

Amongst the customers of Belarus' software development companies are global leaders in telecommunication and computer technology sphere: Alcatel, IBM, British Telecom, Microsoft, SAP, Siemens, Sun Microsystems and Xerox. There are also other international corporations and institutions that order IT support and development services from Belarusian companies: Coca-Cola, Ford, Goodyear, Honda, Johnson & Johnson, London Stock Exchange, Procter & Gamble and World Health Organization.

In 2005, the Hi-Tech Park was founded in Minsk following a Presidential decree. Today, 88 companies are residents of the High Tech Park, with the software development companies amongst them enjoying major tax benefits. Most of these companies cooperate with business partners in the EU in areas such as outsourcing, licensing, analysis, design and software development for information systems, data processing, consumer software support and upgrade, custom-designed software, fundamental and applied research, experimental development and engineering combined with implementation of results, service provision and etc.

The main barriers to ICT cooperation between European and Belarusian private firms are highlighted in the following table along with an evaluation of the policy measures from the Government of Belarus and/or European Commission.

Exhibit ii: Main barriers to ICT co-operation and policy responses

Description of barrier	Measures addressing the barrier (if any)	Relevance of policy response	Evidence of impact
1. Withdrawn, or reduced, international support for science and technology cooperation with Belarus. E.g. Belarus cannot participate in the US' CRDF programme and Swiss SCOPES programme, which include other former Soviet countries. Similarly, Germany and Poland have lowered their support for bilateral S&T programmes.	It is difficult to describe specific measures. However, improvement in political relations between Belarus and the European Union (and steps towards a basic agreement on Belarus-EU cooperation) will serve as the basement for more intensive S&T cooperation. Some steps from the EU side were undertaken: in June 2009 the EU's Commissioner for External Relations and European Neighbourhood Policy - Benita Ferrero-Waldner visited Belarus for discussions with President Lukashenko. The European Commissioner for Enlargement and European Neighbourhood Policy Stefan Fule visited Minsk on 8-9 July 2010 and met with President Lukashenko.	3-4	3-4
2. Lack of awareness in Europe of the strengths of the Belarusian ICT sector. Lack of awareness of the	a) Establishment of the ICT association "Infopark" in 2001 under State Committee for Science and Technology	a) 4-5 b) 4-5 c) 4-5	a) 4-5 b) 4-5 c) 3-4

Description of barrier	Measures addressing the barrier (if any)	Relevance of policy response	Evidence of impact
potential technical and economic benefits of cooperation with Belarusian ICT companies (including IT outsourcing).	b) Establishment of Belarus Hi-Tech Park in 2005 by Presidential Decree on High-Tech Park, 2005 c) Establishment of the Republican Centre for Technology Transfer in 2003 under State Committee for Science and Technologies and National Academy of Sciences of Belarus d) 3 EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011)	d) 4	d) Too early to say
3. Lack of awareness amongst Belarusian ICT companies of the FP7 ICT programme and lack of understanding and skills on how to effectively participate	a) Establishment of a National Information Point on FP6/7 – including IST/ICT programmes - at Belarusian Institute of System Analysis (BelISA) first; and then - creation of NCPs network in the country b) 3 EC funded FP6 Support Actions TRISTAN-EAST, IDEALIST34 and IDEALISTFP7 that collectively organised FP6/7 ICT awareness/training events and helpdesks (2004 – 2008) c) 3 EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011).	a) 5 b) 5 c) 5	a) 4 b) 4 c) Too early to say
4. Lack of government ICT policy monitoring system based on standardised, internationally recognised ICT indicators/statistics. Lack of experience of ICT policy development, monitoring, evaluation and impact assessment based on standardised ICT indicators.	One of the actions identified in the action plan for the "Strategy of Information Society Development in Belarus until 2015", foresees establishment of a system for monitoring and statistical measurement of indicators for information society development. Work to be done by National Statistic Committee and the Centre of Information Processes Monitoring Institute.	5	Too early to say

Policy response ranking scored from 1 to 5: 1. No specific measures addressing the challenge (possibly a debate but no evidence of any real policy development); 2. Policy development under way to respond to challenge (policy debate or design launched); 3. Specific measures existing for some time but insufficient to respond fully to challenge; 4. Existing measure plus one or more newly launched measures (during last 18 months); 5. A comprehensive set of measures which potentially responds fully to the challenge.

Evidence of impact scored from 1 to 5: 1. Trend for indicators has worsened since measure(s) introduced, 2. No observable change in trend since measure(s) introduced, 3. Too early to appraise (measures introduced in last 24 months), 4. Trend for indicators has improved since measure(s) introduced, 5. Evaluation or study indicates measure(s) has clearly contributed to improving performance of country.

Cooperation involving universities and public research organisations

Over 50% of international projects involving Belarusian organizations are performed by Belarusian higher education institutions. There is a continuous increase in the scientific-industrial cooperation of Belarusian universities with foreign partners. During the past 5 years, the number of such cooperation agreements has virtually doubled. In total, Belarusian universities have partnerships with universities from 57 countries.

However, only 5% of Belarusian universities are involved in ICT research with EU partners. Arguably, the three strongest organisations in the field of ICT research are the Belarusian State University of Informatics and Radioelectronics (BSUIR), Belarusian State University (BSU), and National Academy of Sciences of Belarus (NASB).

Over the course of the European Commission's fifth and sixth framework programmes, besides several accompanying measures/support actions, there has only been a small number of IST/ICT research projects involving Belarusian higher education institutions: FP5 IST project "Research and training action for System on Chip design" (REASON, IST-2000-30193); FP6 IST project "Nanophotonics to realise molecular-scale technologies" (PHOREMOST, 511616); and FP6 IST project "Engineered Quantum Information in Nanostructured Diamond" (EQUIND, 034368).
On the other hand, there have been many ICT focused collaborative research projects involving Belarusian partners that have been funded by the intergovernmental organisation International Science and Technology Center (ISTC) and now discontinued International Association for the promotion of co-operation with scientists from the New Independent States of the former Soviet Union (INTAS).

The main barriers to ICT cooperation between European and Belarusian research groups are highlighted in the following table overleaf together with an evaluation of the policy measures – from the Government of Belarus and/or European Commission

Exhibit iii: Main barriers to ICT co-operation and policy responses

Description of barrier	Measures addressing the barrier (if any)	Relevance of policy response	Evidence of impact
1. Withdrawn, or reduced, international support for science and technology cooperation with Belarus, pending improvement in Belarus-EU political relations. E.g. Belarus cannot participate in the US' CRDF programme and Swiss SCOPES programme, which include other former Soviet countries. Similarly, Germany and Poland have lowered their support for bilateral S&T programmes.	Difficult to describe specific measures. Steps to improve political relations were undertaken e.g. the European Commissioner for Enlargement and European Neighbourhood Policy Stefan Fule visited Minsk on 8-9 July 2010 and met with President Lukashenko.	3-4	3-4
2. Lack of awareness in Europe of the strengths of the Belarusian ICT research groups.	a) Unaware of any government measures b) 3 EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011)	a) 1 b) 4	a) - b) Too early to say
3. Lack of awareness amongst Belarusian ICT research groups of the FP7 ICT programme and lack of understanding and skills on how to effectively participate	a) Establishment of a National Information Point on FP6/7 – including IST/ICT programmes - at Belarusian Institute of System Analysis (BelISA) first; and then - creation of NCPs network in the country b) 3 EC funded FP6 Support Actions TRISTAN-EAST, IDEALIST34 and IDEALISTFP7 that collectively organised FP6/7 ICT awareness/training events and helpdesks (2004 – 2008) c) 3 EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011).	a) 5 b) 5 c) 5	a) 4 b) 4 c) Too early to say
4. Lack of ICT related technology-transfer between universities/public research organisations and (European) private industry.	Establishment of Republican Centre for Technology Transfer in 2003 under State Committee for Science and Technologies and National Academy of Sciences of Belarus	4-5	3-4
5. Lack of government ICT policy monitoring system based on standardised, internationally recognised ICT indicators/statistics. Lack of experience of ICT policy development, monitoring, evaluation and impact assessment based on standardised ICT indicators.	One of the actions identified in the action plan for the "Strategy of Information Society Development in Belarus until 2015", foresees establishment of a system for monitoring and statistical measurement of indicators for information society development. Work to be done by National Statistic Committee and the Centre of Information Processes Monitoring Institute.	5	Too early to say
6. Lack of international mobility of researchers, in particular, young ones.	There are some mechanisms supporting the mobility, but the existing schemes are working mostly to support RTD carried out by Belarusian partners in bi-lateral research projects with those countries who have an intergovernmental agreement on S&T cooperation with Belarus. But there is no targeted support for wider types of mobility.	3	3

Policy response ranking scored from 1 to 5: 1. No specific measures addressing the challenge (possibly a debate but no evidence of any real policy development); 2. Policy development under way to respond to challenge (policy debate or design launched); 3. Specific measures existing for some time but insufficient to respond fully to challenge; 4. Existing measure plus one or more newly launched measures (during last 18 months); 5. A comprehensive set of measures which potentially responds fully to the challenge.

Evidence of impact scored from 1 to 5: 1. Trend for indicators has worsened since measure(s) introduced, 2. No observable change in trend since measure(s) introduced, 3. Too early to appraise (measures introduced in last 24 months), 4. Trend for indicators has improved since measure(s) introduced, 5. Evaluation or study indicates measure(s) has clearly contributed to improving performance of country.

ICT policies and programmes facilitating co-operation with the EU

The key existing measures supporting ICT cooperation between the EU and Belarus are listed in the following table.

Exhibit iv: ICT Policy Measures facilitating co-operation with the EU

N°	Title	Organisation responsible
1	FP7 ICT Programme	DG Information Society, European Commission
2	Tempus	DG Education and Culture, European Commission
3	FP7 Marie Curie Actions	DG Research, European Commission
4	European Neighbourhood and Partnership Instrument (ENPI) Cross Border Cooperation (CBC) scheme: Poland/Belarus/Ukraine, Latvia/Lithuania/Belarus and Baltic Sea Region Programme	DG External Relations, European Commission
5	Infopark	State Committee for Science and Technology
6	Belarus Hi-Tech Park	Hi-Tech Park Administration
7	Republican Centre for Technology Transfer	State Committee for Science and Technology and National Academy of Sciences of Belarus
8	ISTC Regular Projects and Partner Projects	International Science and Technology Center

5. Recommendations to support future ICT Co-operation with the EU

Recommendations for Belarusian ICT R&D actors

Based on an analysis of the gaps in policy response to EU-Belarus research cooperation barriers for universities and public research organisations (Exhibit 11) and private industry (Exhibit 11), we propose the following policy recommendations for Belarusian ICT R&D actors.

Exhibit v: Recommendations for Belarusian ICT R&D community

RTD Community
Strategic Level
Recommendation #1 Recommend to DG Information Society and Media (DG INFSO) to fund future dedicated SICA projects as well as support actions aiming to support cooperation between the EU's and Belarus's ICT RTD Communities in FP7 ICT throughout the FP7 programme (up to 2013), as well as prepare the ground for FP8-ICT (beyond 2013). Responsible Organisation(s): ICT RTD Community actors (Belarusian Institute of System Analysis and Information Support in the Scientific and Technical Sphere (BELISA), United Institute of Informatics Problems of the National Academy of Sciences of Belarus (UIIP-NASB), Belarusian State University of Informatics and Radioelectronics (BSUIR), ICT Technology Business Incubator "Hi-Tech Park", etc). EECA-ICT cluster – to present the findings on country's ICT priorities until 2015, as well as results of SICA workshop on ICT projects Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 3*
Recommendation #2 Elaborate a concise draft and recommend to the Ministry of Communications and Informatization and the Ministry of Education to launch a competitive "ICT technology transfer" programme where consortia comprising of High Educational Institutes (HEI), public research organisations and industrial partners

implement technology-transfer projects (from academic/public research organisations to industry). The programme should be largely "bottom-up" driven, where government defines broad ICT themes but consortia formulate their own specific proposal ideas and compete against each other. The programme should allow the participation of EU RTD actors well as private companies at their own costs.

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11): 4

Recommendation #3

Ask the European Commission's Delegation to Belarus about the potential for funding a project focused on transferring EU know-how and expertise of ICT technology-transfer (e.g. via the Europe-aid Country-based support scheme in Belarus "Non-state actors and local authorities in development").

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11): 4

Recommendation #4

Belarusian scientific centers should strive to be the members of European and world associations and organizations (ECSA, EURO, ESF, ERA, ESA, etc)

Responsible Organisation(s): Belarusian universities and institutes of the National Academy of Sciences of Belarus

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11): 2

Operational Level

Recommendation #1

Organise annual SICA (Special International Cooperation Action) EU-Belarus scientific workshops in Belarus focussed on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshops will be to pinpoint ICT research topics which could form the basis of EU-Belarus SICA calls in future FP ICT work programmes. Present and recommend findings to the Ministry of Communications and Informatization, the State Committee of Science and Technologies, the Ministry of Education and the DG Information Society and Media (DG INFSO).

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing: 2011-2012.

ICT Cooperation Barrier Addressed (Exhibit 11): 2

Recommendation #2

Recommend to the State Committee of Science and Technologies of Belarus to organise and/or financially support regular/annual FP7 ICT awareness raising/training workshops involving European ICT experts from RTD Community and Private Industry.

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing: 2011-2012

ICT Cooperation Barrier Addressed (Exhibit 11): 3

Recommendation #3
Recommend to the State Committee of Science and Technologies of Belarus to organise and/or financially support the strengthening of national (and possibly regional) FP7 National Contact Point (NCP) system/network. The existing EU experience in NCPs network building could be of great support in this process. The support should be based on the funding needs of the NCPs for training, travelling in EU and within the country, improving their service capacity as well as developing tools for monitoring and assessment of their work to increase Belarus participation in FP7.

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)
Timing: 2011-2012

Recommendation #4
Ask the Republican Centre for Technology Transfer (ICTT) to organise a workshop/plenary session about ICT technology-transfer to support the Belarusian ICT RTD Community (e.g. during the 2nd Belarusian Innovation Forum to be organised on 17-18 November 2010, Minsk).

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing:2011-2012

ICT Cooperation Barrier Addressed (Exhibit 11): 4

Recommendation #5
Increase the mobility of Belarusian researchers. Set-up agreements with EU leading RTD organisations for joint RTD experiments, internships, etc. To develop a dedicated scheme to provide financial support to the researchers, including young ones, to be able to take part in different types of international mobility(conferences, face-to-face meetings, contacts, brokerage events, participation in international projects etc)

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park); State Committee of Science and Technologies, Belarusian Foundation of Fundamental Research

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11): 4

Exhibit vi: Recommendations for Belarusian ICT Private Industry

Private Industry
Strategic Level
Recommendation #1 Recommend to DG INFSO to fund future dedicated EECA SICA research projects as well as support actions aiming to support cooperation between the EU's and Belarus's ICT Private Companies in FP7 ICT throughout the FP7 programme (up to 2013), as well as prepare the ground for FP8-ICT (beyond 2013). Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. "Hi-Tech Park", Infopark, Belarusian Scientific and Industrial Association, IT Enterprises Association) Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 12): 2 and 3*
Recommendation #2 Recommend to the Ministry of Communications and Informatization and Ministry of Education to launch a

competitive "ICT technology transfer" programme where consortia comprising of High Educational Institutes (HEI), public research organisations and industrial partners implement technology-transfer projects (from academic/public research organisations to industry). The programme should be largely "bottom-up" driven, where government defines broad ICT themes but consortia formulate their own specific proposal ideas and compete against each other.

Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. InfoPark, Belarus Hi-Tech Park and ICTT)

Timing: 2011

ICT Cooperation Barrier Addressed (Exhibit 12): 2

Recommendation #3

To recommend strongest Belarusian private companies (EPAM, IBA, Itransition and others) to find possibilities and resources for engineering and scientific research in cooperation with leading national and European scientific centres and universities, as well as with their EU business partners, involved in FP7.

Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. InfoPark, Belarus Hi-Tech Park and ICTT)

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11: 4, Exhibit 12: 2)

Operational Level

Recommendation #1

Encourage Belarusian ICT Private Industry to make greater use of the ISTC's (International Science and Technology Centre) technology transfer and research partnerships programmes, as well as to use the ISTC for promotion of their new technologies and R&D competencies via the ISTC website (www.istc.ru). These are programmes that enable ISTC partners (e.g. various EU member states) to utilise the R&D and technology know-how of science and technology organisations from Belarus.

Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. "Hi-Tech Park", Infopark, Belarusian Scientific and Industrial Association, IT Enterprises Association), ISTC Belarus Branch Office.

Timing: 2011-2012

ICT Cooperation Barrier Addressed (Exhibit 12): 2

Recommendation #2

Encourage Belarusian ICT Private Industry to make greater use of the Republican Centre for Technology Transfer (ICTT) to promote their ICT capabilities. For example, ICTT could organise a workshop/plenary session dedicated to ICT technology-transfer during the 2nd Belarusian Innovation Forum (17-18 November 2010, Minsk).

Responsible Organisation(s): Republican Centre for Technology Transfer (ICTT)

Timing: 2011-2012

ICT Cooperation Barrier Addressed (Exhibit 12): 2

Recommendation #3

Recommend to the State Committee of Science and Technologies of Belarus to organise and/or financially support regular/annual FP ICT awareness raising/training workshops involving European ICT experts from RTD Community and Private Industry.

Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. "Hi-Tech Park", Infopark, Belarusian Scientific and Industrial Association, IT Enterprises Association)

Timing: 2011-2012

ICT Cooperation Barrier Addressed (Exhibit 12): 2 and 3

Exhibit vii: Recommendations for Belarusian Government

Government
Strategic Level
Recommendation #1 Recommend to DG Information Society and Media (DG INFSO) to fund future dedicated SICA projects as well as support actions aiming to support cooperation between the EU's and Belarus's ICT RTD Communities in FP7 ICT throughout the FP7 programme (up to 2013), as well as prepare the ground for FP8-ICT (beyond 2013). Responsible Organisation(s): The Ministry of Communications and Informatization, Ministry of Education, the State Committee for Science and Technologies Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 3*
Recommendation #2: The State Committee for Science and Technologies of the Republic of Belarus should ask the European Commission's Delegation to Belarus about the potential for a joint project focused on transferring EU know-how and experience of ICT RTD policy development, ICT indicators, monitoring and evaluation (e.g. via the European Country-based support scheme in Belarus "Non-State Actors and Local Authorities in Development"). *NB: The work should complement current activities being done by the Belarusian Government.* Responsible Organisation(s): State Committee for Science and Technology Timing: 2011-2013 *ICT Cooperation Barrier Addressed - Exhibit 11: 5 and Exhibit 12: 4*
Recommendation #3 The Ministry of Communications and Informatization and Ministry of Education should launch a competitive "ICT technology transfer" programme where consortia comprising HEI, public research organisations and industrial partners implement technology-transfer projects (from academic/public research organisations to industry). The programme should be largely "bottom-up" driven, where government defines broad ICT themes but consortia formulate their own specific proposal ideas and compete against each other. The programme should allow the participation of EU RTD actors as well as private companies. Responsible Organisation(s): Ministry of Communications and Informatization and Ministry of Education Timing: 2011-2015 *ICT Cooperation Barrier Addressed - Exhibit 11:4 and Exhibit 12:2*
Recommendation #4 To stimulate the participation of IT organisations in EU R&D projects, to recommend to the State Committee of Science and Technologies of Belarus to initiate a procedure on a special tax reduction on income received for working in the frame of such projects. Responsible Organisation(s): State Committee of Science and Technologies of Belarus Timing: 2011 *ICT Cooperation Barrier Addressed - Exhibit 11:4*
Recommendation #5 Recommend to the Government of Belarus to support the system of National Contact Points in Belarus and to find the ways of funding their job, in some cases on full-time mode.

Responsible Organisation(s): State Committee of Science and Technologies of Belarus.

Timing: 2011

ICT Cooperation Barrier Addressed - Exhibit 12:3

Recommendation #6

To support the developing a national statistics system for monitoring social and economic transformation influenced by implementation of ICT programs, e.g. via the EuropeAid country based support scheme

Responsible Organisation(s): State Committee of Science and Technologies of Belarus.

ICT Cooperation Barrier Addressed - Exhibit 11:4

Operational Level

Recommendation #1

Organise bi-annual SICA (Special International Cooperation Action) EU-Belarus policy workshop focussed on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshop will be to agree on ICT research topics which could form the basis of EU-Belarus SICA calls in a future FP ICT work programmes.

Responsible Organisation(s): State Committee of Science and Technologies of Belarus, Ministry of Education of the Republic of Belarus and DG INFSO.

Timing: 2011-2013

ICT Cooperation Barrier Addressed - Exhibit 11: 2 and Exhibit 12:3

Recommendation #2

The State Committee of Science and Technologies of Belarus should fund the Belarusian RTD community to regularly organise (e.g. on annual basis), FP ICT awareness raising/training workshops involving European ICT experts from RTD Community and Private Industry (through a bi-annual competitive call).

Responsible Organisation(s): State Committee of Science and Technologies of Belarus

Timing: 2011-2015

ICT Cooperation Barrier Addressed - Exhibit 11: 2 and 3 and Exhibit 12: 3

Recommendation #3

The Ministry of Communications and Informatization and Ministry of Education and Belarusian Entrepreneurs Association, High-Tech Park, NGO “Information Society” should ask the European Commission’s Delegation to Belarus about the potential for funding an ENPI Project focused on transferring EU know-how on how to run an ICT based business incubator.

Responsible Organisation(s): The Ministry of Communications and Informatization and Ministry of Education and Belarusian Entrepreneurs Association, High-Tech Park, NGO “Information Society”.

Timing: 2011-2013

ICT Cooperation Barrier Addressed - Exhibit 11: 4 and Exhibit 12: 3

Recommendations for EU target audiences

Based on an analysis of the gaps in policy response to EU-Belarus research cooperation barriers for universities and public research organisations (Exhibit 11) and private industry (Exhibit 12), we propose the following policy recommendations for EU target audiences.

Exhibit viii: Recommendations for EU ICT RTD community and private industry

RTD community and Private Industry
Strategic Level
Recommendation #1 Urge ETPs, EECA cluster, etc to recommend to DG INFSO to fund future dedicated EECA SICA projects as well as support actions aiming to boost cooperation between the EU's and Belarus's ICT research and industrial communities in FP7 ICT throughout the FP7 programme (up to 2013) as well as prepare the ground for FP8 ICT (beyond 2013). Responsible Organisation(s): EECA cluster, SCUBE-ICT consortium, ETP's international relations secretariat. Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 2 and 3*
Recommendation #2 The European Commission's Delegation to Belarus should discuss with the State Committee of Science and Technologies of Belarus, Ministry of Education of the Republic of Belarus about the potential for a joint project focused on transferring EU know-how and experience of ICT RTD policy development, ICT indicators, monitoring and evaluation (e.g. via the Europeaid Country-based support scheme in Belarus "Non-State Actors and Local Authorities in Development"). *NB: The work should complement current activities being done by the Belarusian Government.* Responsible Organisation(s): European Commission's Delegation to Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 5*
Operational Level
Recommendation #1 Urge the Belarusian research diaspora (i.e. Belarusian researchers working in EU) and ETPs to support the organisation of SICA (Special International Cooperation Action) scientific workshops in EU focussing on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshops will be to pinpoint ICT research topics which could form the basis of EU-Belarus SICA calls in future FP ICT work programmes. Present and recommend findings to DG INFSO as well as the Ministry of Communications and Informatization of Belarus, Ministry of Education and the State Committee of Science and Technologies of Belarus Responsible Organisation(s): Belarus research diaspora, ETP international relation secretariat, DG INFSO as well as the State Committee of Science and Technologies of Belarus, Ministry of Education and Ministry of Communications and Informatization of the Republic of Belarus. Timing: 2011-2012 *ICT Cooperation Barrier Addressed (Exhibit 11): 2*
Recommendation #2 Set-up agreements with Belarusian leading RTD organisations for joint RTD experiments, internships, etc through suitable funding (e.g. FP Capacities programme) or other funding instruments. Responsible Organisation(s): EU leading ICT RTD actors Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 4*

Exhibit ix: Recommendations for the European Commission

DG Information Society and Media (INFSO), DG Research and EU Delegations
Strategic Level
Recommendation #1 The European Commission's Delegation to Belarus should discuss with Ministry of Communications and Informatization and Ministry of Education of Belarus about the potential for funding a project focused on transferring EU know-how and experience of ICT R&D policy development, indicators, monitoring and evaluation. Responsible Organisation(s): European Commission's Delegation to Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 12): 5*
Recommendation #2 The DG INFSO should fund future dedicated EECA SICA projects as well as support actions aiming to boost cooperation between the EU's and Belarus' ICT research and industrial communities in FP7 ICT throughout the FP7 programme (up to 2013) as well as prepare the ground for FP8 ICT (beyond 2013). Responsible Organisation(s): DG INSFO, EECA cluster Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 3 and 4*
Recommendation #3 The European Commission's Delegation to Belarus in cooperation with the Ministry of Communications and Informatization and Ministry of Education and Belarusian Entrepreneurs Association, High-Tech Park, NGO "Information Society" should check the potential for funding an ENPI Project focused on transferring EU know-how on how to support the development of technoparks and innovative clusters to support innovation and technology transfer, how to run an ICT based business incubator. Responsible Organisation(s): European Commission's Delegation to Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 2*
Recommendation #4 The European Commission's Delegation to Belarus should support with the renovation and activisation of the basic cooperation agreement in science, technology and innovation between the EU and Belarus ratification process, as well as bi-regional policy dialog for framing mentioned above cooperation. Responsible Organisation(s): European Commission's Delegation to Belarus, State Committee of Science and Technologies, Ministry of Foreign Affairs of Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 12): 1*
Operational Level
Recommendation #1 DG INFSO in cooperation with the Ministry of Communications and Informatization and Ministry of Education should organise a bi-annual SICA EU-Belarus policy workshop focussed on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshop will be to pinpoint ICT research topics which could form the basis of EU-Belarus SICA calls in future FP ICT work programmes.

Responsible Organisation(s): DG INFSO as well as State Committee of Sciences and Technologies Ministry of Communications and Informatization and Ministry of Education

Timing: 2011-2013

ICT Cooperation Barrier Addressed - Exhibit 11: 3 and Exhibit 12: 3

Recommendation #2

Encourage key Belarusian and European ICT research organisations to participate in the following three European Neighbourhood and Partnership Instrument (ENPI) programmes:

- Latvia-Lithuania-Belarus Cross Border Cooperation (CBC)
- Poland-Belarus-Ukraine Cross Border Cooperation (CBC)
- Baltic Sea Region

Although not explicit schemes to support ICT cooperation, the priorities of the programmes allow such activities to be funded e.g. Priority 1 of P-B-U CDC increasing competitiveness to the border area (which covers such activities as improving accessibility to education services (e.g. e-Learning), and joint actions to promote and support research and business institutions. The programme Poland-Belarus-Ukraine Cross Border Cooperation is open to regional and local authorities, non-governmental organisations and non-profit organizations, as well as organisations, providing services in the fields of culture, research and science.

Responsible Organisation(s): Joint Technical Secretariat (JTS) Cross Border Cooperation Programme and the Delegation of the European Union to Belarus.

Timing: 2011-2015

ICT Cooperation Barrier Addressed (Exhibit 11): 2

Recommendation #3

The European Commission's Delegation to Belarus should discuss with the Ministry of Communications and Informatization and the Ministry of Education about the potential for funding support action focused on transferring EU branding know-how and export promotion experience for the national IT outsourcing sector.

Responsible Organisation(s): European Commission's Delegation to Belarus

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 12): 2

Recommendation #4

The European Commission's Delegation to Belarus should discuss with the Ministry of Communications and Informatization and the Ministry of Education, Hi-Tech Park about the potential for funding support action focused on transferring EU know-how on how to run an ICT based business incubator.

Responsible Organisation(s): European Commission's Delegation to Belarus

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11: 4, Exhibit 12: 2)

1 The National ICT Sector and its Governance

1.1 The National ICT Sector

The national information and communication technologies (ICT) sector in Belarus contains many types of organisations and institutions, which play a role in the system of ICT development and implementation (public, private and half private). Overall, there are six main types of organisations: a) governmental, b) bridging organisations, c) private enterprises, d) professional unions and associations, e) universities, and f) other public and private organisations. Each type of these organisational groups is described below.

A) Governmental organisations (state and regional) play a key role in definition of the main directions of ICT development. The formation of an information society and innovation-driven economy are national priorities of the Republic of Belarus, which were officially declared by the President of the Republic of Belarus during the World Summit on Information Society in Geneva. However, the Programme of Social and Economic Development of the Republic of Belarus 2006-2010 and the State Programme for Innovation Development, adopted in 2007, did not include particular sections on ICT and their role in industry and society. Also, the Belarusian Parliament and the Administration of the President of Belarus do not have any special committee for ICT policy.

Management of ICT development in Belarus is assigned to the Ministry of Communications and Informatization of Belarus. The Department of Informatization of the Ministry is legally responsible for regulating communication and telecommunications activities and also grants licenses for the right to be engaged in such activity. In addition, the Ministry provides licenses for publishing and printing activities, registers mass-media, regulates the work of cable television operators, and processes of national content creation for the Internet.

A considerable number of policy measures are currently being implemented in Belarus aimed at developing ICT in different spheres of activity (state and regional governance, industrial production, healthcare, culture, sciences, social attitudes, etc). The Ministry of Communications and Informatization organizes and controls the implementation of the following state and branch programmes:

- State Programme of Informatization of the Republic of Belarus for 2003-2005 and for the period till 2010 “e-Belarus”;
- State Programme for the introduction of digital television and radio broadcasting in the Republic of Belarus for the period till 2015;
- State Programme for the development of satellite television broadcasting in the Republic of Belarus for the period till 2010;
- State Programme for telecommunication development in the Republic of Belarus for the period 2006-2010.

For example, a key element of the government’s ICT policy is the informatization programme “e-Belarus”, which defines the following main directions:

1. Creation of a national automated information system;
2. Development of telecommunication infrastructure and centres of services for access to open information systems;
3. Development and updating of ICT facilities and support of export oriented branches of ICT industry;
4. Improvement of the legislation basis and state registration system for ICT activities;
5. Improvement of the activity of state bodies on the basis of ICT use;
6. Development of informatization processes in the real economic sector including methods of e-trading and logistics;
7. Development of education and retraining of ICT specialists and experiences users;
8. Support to culture and mass-media development through ICT;
9. Improvement of system of national security with consideration of the Conception of National Security

Respectively, almost all industrial ministries have their own programmes involving ICT development - Ministry of Education, Ministry of Agriculture and Foodstuffs, National Statistical Committee, etc - which are financed by the state budget and off-budget funds. There are also regional programmes of innovation and information development financed by regional budgets.

Beyond the ministries, there are also additional administrations authorities that have a considerable role in ICT sector. The administrative office of the President of Belarus is engaged in ICT development for the supreme bodies of government: the Administration of the President, Parliament, Constitutional Court, the Central Election Committee, etc. There is special division in the administrative office responsible for delivering hardware and software as well as maintain information systems. In addition, the Information Analysis Centre in the Administration Office of the President of Belarus is engaged in information security and information protection, and also in introduction of a digital electronic signature (creation of a network of certifying centres of open keys). Also, the responsibility for registration of domain names in the ***.by*** zone is assigned to the centre.

Respectively, the application of information and communication technologies in the banking and financial sphere is regulated by the National Bank of the Republic of Belarus (NB RB), via a number of specialized structural divisions and organisations: the Central Administrative Board of Information Technologies of National Bank, the Financial Settlements Centre of NB RB, the Operating Council for Certification of Software and technical Means in Bank Services and Technologies, Joint-Stock Company "Banking and financial tele-network", Open Stock Society "Bank Processing Centre", Republican Unitary Enterprise and the Centre of Banking Technologies.

Finally, scientific research to develop advance information technologies is carried out in the framework of state scientific–technological programmes. The responsible authority for these kinds of R&D programmes concerning scientific research (applied and fundamental) in the field of ICT is the State Committee on Science and Technologies of Belarus. Meanwhile, registration of intellectual property rights is carried out by the National Centre of Intellectual Property of the State Committee on Science and Technologies.

B) In Belarus, the main **bridging organisation** - that acts as an intermediary between the government and the rest of the ICT system – is the Interdepartmental Commission on Informatization Issues at the Cabinet of Ministers of the Republic of Belarus. However, the key ministries - Ministry of Communications and Informatization and Ministry of Education – also have branch coordination councils for the State Programme of Informatization "e-Belarus" and the State Programme of Informatization of Education. Furthermore, the National Bank of the Republic of Belarus has created a Council on Informatization for the bank and financial sector. The Administrative Office of the President has its own Coordination Council for interdepartmental ICT related issues.

C) Unlike in other parts of the national economy, **private enterprises** are thriving in the ICT sector. Broadly speaking, private ICT enterprises can be divided in to the following clusters:

1. Services in the development of custom-oriented software (e.g. Epam systems, Belhard group, Sam solutions, Softclub, System technologies, BelSoft, Joint-Stock Company IBA);

2. Telecommunication services (GSM operators: e.g. "MTS" ltd, Joint-Stock Company "Best", Foreign Enterprise "Velcom", CDMA operator – "Belcel" ltd);

3. Manufacturing of the telecommunication equipment (e.g. Belrossviaz', Sviaz'informservice);

4. System integration (e.g. IBA, Sviaz'informservice);

D) Professional unions and associations start to play a significant role in the development of the ICT sector in Belarus. The public association NGO "Information Society" was created in 1999 to facilitate the application of information and communication technologies in all spheres of Belarusian society. More than 500 members are experts in the field of information technologies from industry, scientific-educational sector and government. NGO "Information Society" organizes specialized conferences and seminars, examines and provides advice on draft legal acts in the ICT field, and carries out research projects (including international ones).

The scientific and technological association "Infopark" was created in 2001 following the Decree of the President of Belarus. It aims to support the development of export-oriented software and unite information technology developers working in various types of companies and activities. In April 2009, about 60 enterprises, organisations and establishments were members of the association. Some special tax privileges

are granted to members of the association. Also, "Infopark" carries out ICT market research in the Republic of Belarus, conducts scientific conferences (in particular in the banking and financial IT sector), and supports educational projects.

The information technology enterprise association "Belinfocom" unites 13 service provision enterprises involved in data transmission, Internet service provision, and telecommunication equipment manufacture. The association is especially paying attention to development of legislative regulations for the telecommunication services market and the maintenance of a competitive environment.

The association "Belarusian Branch Telecommunication Union" unites cable television operators (94 members from all regions of Belarus). The association represents the interests of cable television operators during contract negotiations with content providers. Also, the association co-operates with the Ministry of Communications and Informatization, as the state body responsible for regulating the activity of electronic mass-media. Since 2008 the chairman of the council of the association is the Deputy Minister of the Communications and Informatization.

In 2005, the Belarus Hi-Tech Park was created following the Decree of the President of Belarus to stimulate high technology production development in the country. Today, most Hi-Tech Park residents are involved in information technology development. Special and exclusive economic conditions are granted to residents of the park. The official body "Hi-Tech Park Administration" is responsible for managing the special economic status of the IT Enterprises. One of the important roles of the park is the maintenance of the IT education system. **Currently, there are 88 enterprises – with various ownership structures – in the Hi-Tech Park and their export of software development services exceeded $110m during 2009. Due to its success, there are plans to expand the park's activities and create a business incubator for IT companies.**

E) Belarus has numerous **universities and related institutions** that provide key research, education and training in ICT. The Belarusian State University of Informatics and Radio Electronics (BSUIR) trains experts in a wide spectrum of ICT specialities: design and construction of radio-electronic equipment, software development, telecommunication, information protection, and micro- and nano-electronics. The university has specialised laboratories in all these research areas.

Various programmers and IT specialists are trained at the Belarusian State University in the Faculties of Applied Mathematics, Radio Physics, Mechanics and Mathematics. Active research is conducted in the field of cryptography and information protection.

Nearly all technical universities in the regional cities and Minsk (e.g. Belarusian National Technical University, Belarusian State Technological University, etc) have faculties dedicated to preparing experts in the field of IT. IT experts are also trained in the Belarusian College of Telecommunication and Minsk Radio Engineering College.

To help with the commercialisation of IT products, the government is taking measures to improve legislation in the field of intellectual property rights. An important step in this direction is the granting of permission for small private enterprises to be legally spun-out of universities.

The National Academy of Sciences of Belarus (NASB) has several departments involved in academic ICT research. In particular, this includes the Departments of Physics, Mathematics and Informatics. The United Institute of Informatics Problems (UIIP-NASB) is the main ICT player in NASB. The main areas of its ICT research are CAD/CAM/CAE systems; images and speech recognition; distributed information systems; remote sensing of the earth; geo informatics; ICT in medicine; cluster supercomputers development and implementation.

F) Belarus also has a number of **other public and private organisations** that play an essential role in the ICT sector.

Also, there are numerous specialized enterprises that develop applied software systems for different economic sectors based in Minsk and regional cities (branch and regional computer centres). For example:

- The State Unitary Enterprise "Institute of Applied Software Systems", within the Ministry of Communications and Informatization, is the leader of several projects under the programme "e-Belarus".

- The Institute Hyprocommunication is engaged in problems of communication networks design, standardization and certification of telecommunication equipment. The Institute is also under the responsibility of the Ministry of Communications and Informatization.
- The Republican Centre of Technologies Transfer is a specialized institution, within the State Committee on Science and Technologies, responsible for marketing of ICT research and development.

- The Interuniversity Centre of Marketing and Techno Park "Metolit" were created within the Ministry of Education for a similar purpose.

- The Belarusian Innovation Fund – which operates under the State Committee on Science and Technologies - was created to distribute financing for innovation related projects.

Questions concerning intellectual property rights regulation are addressed by the National Centre for Intellectual Property, which is a subdivision of the State Committee on Science and Technologies. The National Centre for Intellectual Property - like the Patent Department - maintains databases of intellectual property objects protected by legislation of the Republic of Belarus.

The national telecommunications operator Republican Unitary Enterprise "Beltelecom" maintains and develops data transmission networks, rents telecommunication infrastructure to other operators, and has a monopoly on international telecommunications. Management of a radio-frequency resource and allocation of the frequencies for various users is carried out by the State Commission on Radio Frequencies at the Security Council of the Republic of Belarus. Training and development of telecommunications professionals is carried out by the Higher College of Communication, Belarusian State University of Informatics and Radio Electronics (telecommunications faculty), and the Institute of Informatization and Management Technologies of the Belarusian State University (Information safety). Research and developmental and design works are carried out by the branch institute "Hyprocommunication".

In order to develop an advanced data transmission network, attract domestic and foreign investment, improve quality and reduce the cost of data transmission, the Presidential Decree №515 "On some measures for development of data transmission network in the Republic of Belarus" was adopted on 30 September 2010. The Decree stipulates the creation of the "National Centre for Traffic Exchange" (NCTE).

Thus on 15 November 2010 the Republican Unitary Enterprise "National Centre for Traffic Exchange" (NCTE) was registered on by the Operational and Analytical Centre (OAC). This enterprise has the right to stream international Internet traffic and supervise the Unified Republican Data Transmission Network (URDTN).

The National Centre for Traffic Exchange concentrates on solving the following tasks:

1. protect against unauthorized access to the URDTN and the data transferred within it, manage the Unified Republican Data Transmission Network and take measures for its development;
2. ensure interoperability of data transmission networks, as well as government agencies and organizations, and other legal entities and individual entrepreneurs while providing telecommunication services using the URDTN;
3. ensure equal access for government agencies and organizations, other legal entities and individual entrepreneurs to the URDTN;
4. provide calculations for connection of data transmission networks to the URDTN and providing telecommunication services using the URDTN;
5. exercise technical control over international traffic transmission and connection to telecommunication networks of foreign states;
6. create data procession centers, information networks, systems and resources, points of interconnect to telecommunication networks of foreign countries and ensure their functioning.

A comprehensive list of organisations involved in the ICT sector can be found in Annex 3.1

1.2 The ICT Governance System

The Belarusian ICT sector governance system started in early 1990s with the establishment of the special Fund of Informatization for financing and managing ICT projects. Originally, the Fund was under the responsibility of the State Plan Committee. It was later transferred through various government organisations - Ministry of Economics, State Committee on Science and Technologies, National Academy of Sciences and Ministry of Communications and Informatization.. In 2005, the Fund was liquidated due to the transfer of its activities to the newly formed Department of Informatization of the Ministry of Communications and Informatization.

The Ministry of Communications and Informatization is the leading body in the ICT sphere. The Ministry is responsible for regulating the telecommunication market, granting licenses for activities in the field of telecommunications, and also prepares ICT related legislative acts. The Coordination Council of the Ministry is responsible for projects under the "e-Belarus" programme. Management and financing the projects is carried out by the Department on Informatization. The Ministry represents the Republic of Belarus in international telecommunications bodies such as the International Union for Electro Communication and PCC. The Ministry disposes state budget allocated to ICT development within the framework of the Programme "e-Belarus", and also branch funds, including universal service fund.

Interdepartmental coordination of projects and preparation of proposals on ICT state policy are assigned to **the Interdepartmental Commission on Informatization Issues of the Ministers Council of Belarus**, established by Presidential Decree in 1998. The Interdepartmental Commission for Informatization Issues is responsible for proposal preparations on ICT policy, corresponding programmes preparations as well as their budgets, for perfection of logistic and economic mechanisms of informatization implementation, forming the legal bases of informatization process, forming the national information resources, international cooperation development in ICT area, establishment or liquidation of informatization related state bodies, as well as for initially assessing proposals for ICT programmes before they are introduced to the Cabinet Council. In fact, the Commission is mostly engaged in actual implementation of the State Programme of Informatization "e-Belarus". The Commission structure includes the heads (or their assistants) of ministries and regional authorities.

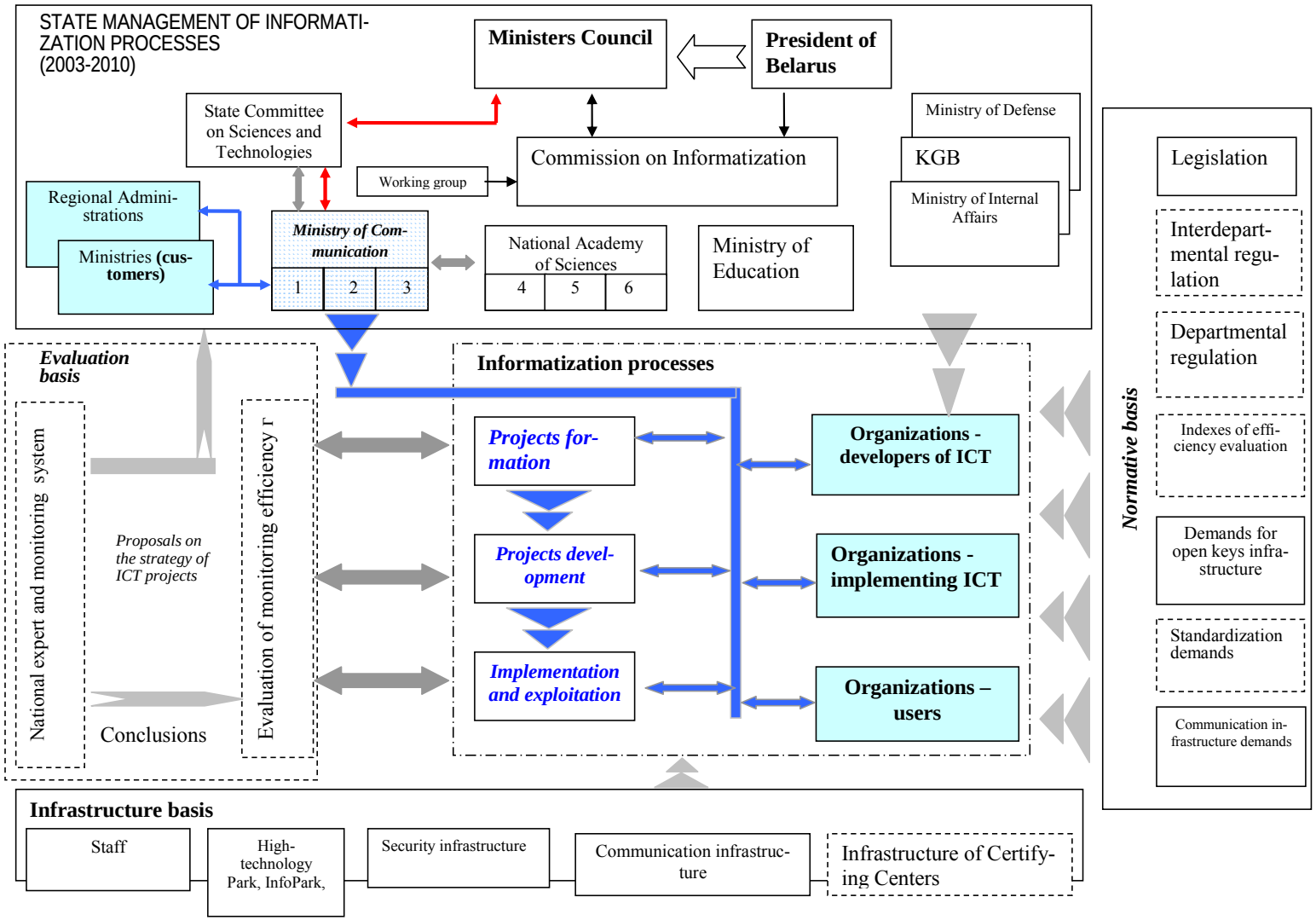
Referring to RTD sphere, the use and exploitation of results of any scientific activities - including ICT related - are regulated by the Decree of the Council of Ministries dated 21 July 1997 #914. The Decree defined the main evaluation criteria for research and development results. With this context, the State Committee on Science and Technologies issued a list of indices and criteria for scientific activity - including indices for novelty, importance for science and practice, objective knowledge, evidential significance and accuracy.

Overall, the process of design and implementation of major ICT programmes can be summarised as follows:

- The main topics of the ICT programme must be included in the governmental plan for 5-10 years;
- The plan must be approved by experts and politicians as being supportive of the state's framework and priorities for engineering, technological and social policy;
- The government is responsible for deciding financing for the most important parts of the plan;
- Science and technology centres and enterprises start work on projects under the programme;
- State management controls the programme proceedings and terms of programme fulfilment;
- Once results of research projects become available, an acceptance commission issues an evaluation report;
- If the evaluation is positive, marketing and implementation of the programme is allowed to continue.

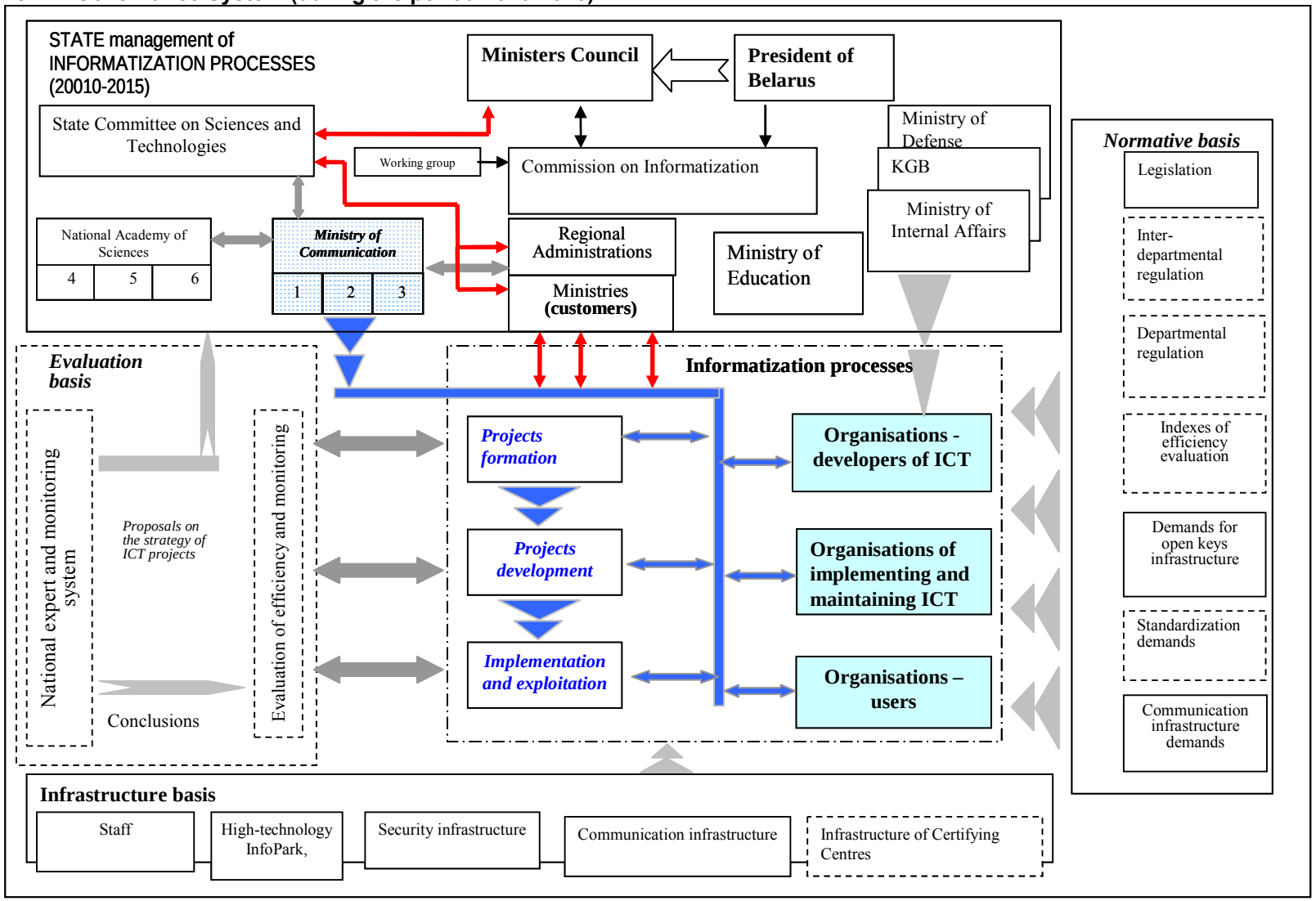
In the following pages, Exhibits 1 and 2 provide a graphical presentation of the ICT governance system in Belarus for the periods 2003-2010 and 2010-2015 respectively.

Exhibit 1: The ICT Governance System (during the period 2003-2010)



1 – Department of informatization and branch institute of the Ministry of Informatization and Communication 2 – Coordination Council of State Programme “e-Belarus”	3 – Council of top managers of State Programme “e-Belarus” 4 – Council on scientific-methodological support of informatization	5 – Department of Physics and Informatics of National Academy of Sciences of Belarus ; 6 – Institutions of the National Academy of Sciences of Belarus

Exhibit 2: The ICT Governance System (during the period 2010-2015)



1 – Department of informatization and branch institute of the Ministry of Informatization and Communication 2 – Coordination Council of State Programme "e-Belarus"	3 – Council of top managers of State Programme "e-Belarus" 4 – Council on scientific-methodological support of informatization	5 – Department of Physics and Informatics of National Academy of Sciences of Belarus ; 6 – Institutions of the National Academy of Sciences of Belarus

1.3 Appraisal of the National ICT Governance System

1.3.1 Policy Making and Implementation Practices

The ICT sector is a separate branch of the national economy. However, on the other hand, it offers a tool for developing all other branches of the economy, social sphere and government system. As a result, the state scheme for designing and implementing ICT policy is based on the current system of formation and realization of various kinds of programmes for social, economic, scientific and technical development.

Consequently, **different government organisations are responsible for different areas of ICT policy making**, depending on the specific ICT domain:

- National telecommunication infrastructure - Ministry of Communications and Informatization;
- Research and development programmes - State Committee on Science and Technologies and National Academy of Sciences;
- Mass media system (electronic media, Internet) – Ministry of Information;
- Intellectual property rights management - Centre of Intellectual Property of State Committee on Science and Technologies;
- State ICT enterprise development - Ministry of Industry and State Military-Industrial Committee;
- Software sector development (including export) - Technological Association “Infopark” and Administration of “Hi-tech Park”.

However, cooperation among them exists in various cases. For example, the formulation of the “Strategy of Information Society Development in Belarus during the period 2010-2015” (published in 2009 upon the initiative of the Ministers Council of Belarus) which is the national Strategy for the development of the information society in the Republic of Belarus for 2010-2015 involved in its development representatives of various actors such as: branch state bodies, the National Academy of Sciences, the public association NGO “Information Society” and the Technological Association “Infopark”. According to it, the main priorities for ICT governance includes the following:

- Decisive role of the government in coordination and development of ICT processes, scientific research organisation, and strengthening human resources;
- Liberal economy, permanent improvement of business climate and competition in ICT community;
- Priority to the development of national ICT industry to produce national ICT products and services.

Referring to ICT policy implementation. It takes place **through dedicated ICT programmes**. In total, there were 475 programmes in Belarus on 1 April 2008 including: 27 state programmes, approved by the Decree of the President of the country; 151 – approved by the Government; 177 branch and 120 regional programmes. Specific policy objectives are defined in the programme management plans for the State Programme of Basic Research, State Programme of Focused Basic Research, State Programme of Applied Scientific Research and the State Complex Programme of Scientific Researches. Other noteworthy state programmes include: the State Scientific and Technical Programme which is developed to address significant economic, ecological, social and defence problems; the Regional Scientific and Technical Programme which is developed to address important scientific and technical problems of social and economic development of the administrative and territorial units (regions); and the Branch Scientific and Technical Programme which is developed to address scientific and technical problems for social and economic development.

As an example, 26 projects were scheduled for implementation during the period 2006-2010 within the framework of the **State programme “e-Belarus”**. In 2008 within this programme, 20 projects have been successfully accomplished. Some examples of the completed projects of “e-Belarus” are listed below:

- The creation of a national database for citizen applications with “one window”;
- An automated system for collection of taxpayer income information from tax agents;
- An integrated system for the state register of taxpayers in Belarus;
- A national system of state property registration ;
- An information system and database “State of the Market”;
- A national information-analysis system for monitoring the financial status of organisations;
- An automated information system to identify and trace raw materials and agricultural products.

Referring in particular to R&D programmes. The list of projects for State complex target science and technology programmes is specified by the National Academy of Sciences of the Republic of Belarus and the State Committee on Science and Technologies. The examination of state funded research projects takes place based on government regulations (first accepted in 2002 and then updated following the decision of the Ministers Council dated 29 December 2005 #1563). Finally, in November 2005, the State Committee on Science and Technologies issued regulations for science and technology councils for state, regional and branch managed science and technology programmes.

Overall, during the last 15 years, considerable budgetary funds have been invested in ICT development with positive outcomes. However, **the desired impact** on social and economic development as well as efficiency improvements in state institutions **has not been fully reached**. This is largely due to the **lack of an effective control and management system** for ICT processes within the government.

For example, the Interdepartmental Commission for Informatization Issues (i.e. the state body responsible for interdepartmental coordination of projects and preparation of proposals on ICT state policy) actually deals only with the State Programme for Informatization "e-Belarus". However, significant state budget and innovation branch funds finance ICT development for other Ministries and committees (e.g. Ministry of Economics, Ministry of Finance, Ministry of Industry, Ministry of Agriculture and Food Production, Ministry of Health, Ministry of Social Defence, Ministry of Statistics, the State Property Committee, etc). The volume of resources allocated to these other programmes is several times higher than the financing provided to the programme "e-Belarus". However, proper coordination of the ICT activities carried out across these different programmes has not been achieved so far.

As a general rule, State programmes have independent and complex objectives, different methodical and information bases and weakly correspond with each other. Consequently, it is difficult to compare and evaluate their integrated contribution to national social and economic development. Furthermore, despite the fact that the different government organisations usually interact with each other on a formal basis when new government ICT regulations are being developed the desired coordination of efforts has not been adequately achieved.

Furthermore, there are **additional reasons** affecting the efficiency of the State Programmes of Informatization. Those have to do with out-of-date methods of formation and management of realization and introduction of programme results. More specific:

Formation: Programmes were formed mainly by a method of "stacking" by collecting suggestions from the concerned state departments. For example, the State Programme of Informatization for 2006-2010 "e-Belarus" was formed "bottom-up" by collecting suggestions from various bodies of state administration. As a result, wide consultation with the rest of the ICT actors (e.g. scientific, business community, etc) or other methods of programme formation did not take place. Furthermore, the programme does not have clearly defined qualitative or quantitative indicators characterizing the progress reached as a result of its implementation. Finally, even though all projects in the programme are considered as research and development, in many aspects, many of them do not meet the international requirements for research and development projects (being mostly innovation and ICT deployment projects rather than R&D). Last but not least, projects provide feasibility reports that are insufficient to monitor the effectiveness of their implementation and validity of their costs.

Management: The existing management system for government ICT processes is based on a departmental approach to the formation of information systems and use of the state information resources. The majority of information produced by branches is intended for interdepartmental use, but it is inaccessible, and unable to meet the challenges of nationwide and regional level management. There are no clearly defined heads of ministries and departments responsible for the information management situation and information resource quality. As a result of the departmental approach, the following fundamental problems of the state administration informatization have not yet been solved completely:

- Creation of a uniform state network for information interaction between state administration bodies of various level;
- Formation of basic information resources – registers of population, legal bodies, infrastructure etc;
- Creation of a nationwide infrastructure of "open keys" to allow the introduction of a digital electronic signature and circulation of legally significant documents.

Currently, the majority of departments develop their own corporate networks that comply to the administrative-territorial division of the Republic of Belarus. Great budgetary funds are spent on building and

operating such networks and employing the required qualified personnel. The creation of a uniform nationwide network would enable each branch to have a minimal necessary telecommunication infrastructure, guaranteed quality of service, and save costs. The universal tendency is to transfer the development and operation of corporate information systems to specialized organisations. It is necessary to upgrade service and operation from branch level towards nationwide information systems, which will help significantly raise quality with modern systems whilst lowering operating costs.

State administration informatization: The introduction and upgrade of ICT in government institutions is not accompanied by systematic analysis and improvement of government administrative processes. However, worldwide experience of introducing ICT into organisations shows that, without the optimization of administrative (business) processes, ICT does not generate its full positive impact and just creates expenses instead. Consequently, it is gradually recognised in Belarus that a more systemic approach is required to enable the full benefit to be realised from the introduction of information technologies.

However, the situation is changing rapidly. The President and government turned their direct attention towards the considerable improvement of efficiency of ICT projects and objective evaluation of their impact on social and economic development of the country which is clearly stressed and emphasised within the "National Strategy for Sustainable Social and Economic Development of the Republic of Belarus till 2020" and the Strategy of Information Society Development in Belarus until 2015.

1.3.2 Policy Benchmarking and Evaluation – Utilisation of International Experience

- Referring to former/current policy benchmarking and evaluation practices.
There are various concerns regarding the policy benchmarking and evaluation practices currently followed. For example, ICT programmes are implemented at branch (regional) level and their development is typically based on branch (regional) reporting and evaluation. The Ministry of Communications and Informatization provides ICT branch development reports to the International Union of Telecommunication and the Regional Commonwealth on Communication. However, these reports do not always address sufficiently the needs of the state statistics indicators to support the benchmarking and evaluation of ICT development.

In addition, the reviews of the current situation of specific ICT sectors and policies are carried out on a departmental level (at the level of the boards of the Ministry of Communications and Informatization, State Committee on Science and Technologies, Ministry of Education, etc). At the same time, only few results of these reviews are open to independent expert evaluation (mostly the Ministry of Communications and Informatization and the Department on Informatization engage external experts to deal with specific technological questions).

Regarding the international cooperation and the exchange of experiences in the field of formation, realization and management of state ICT policy, at the moment it is in a nascent condition and limited to rare study trips of individual ministry heads. As a result, state employees involved in ICT policy development and implementation have limited possibilities to take advantage of the global experience in this area (with the exception of representatives of scientific organisations that are quite actively involved in cooperation with scientific centres of Europe in the framework of international projects and international conferences).

Finally, till recently, foreign experts were rarely involved in the development and examination of the legislative base, programmes and projects in the ICT sphere (However, expertise exchange and external expert involvement was actively applied during the elaboration of the Strategy of Information Society Development in Belarus until 2015).

The following table provides an overall appraisal of the current policy making and evaluation practices followed in Belarus.

Exhibit 3: Overall appraisal of current policy benchmarking and evaluation practices

Policy making/evaluation practice	Benchmark	Ranking (1 to 5)
Openness of the process of designing ICT policy (measures)	Policy development is undertaken through a partnership based approach involving consultation of key stakeholders at all stages	2
Quality of inputs to policy making (application of evidence based techniques, use of evaluation results)	Policy design is systematically evidence-based and account is taken of evaluation results	3
Regularity and transparency of policy monitoring and review processes	All major policy documents and instruments are the subject of a regular review involving stakeholder consultation	3
The impact on ICT of developments and regulations in other policy fields is appraised	A well-structured process exists for impact assessment of new regulations on ICT &/or ICT is taken into account as an issue in other policy documents	2
Existence of coordination mechanisms (high-level councils, inter-ministerial committees, etc)	Well organised coherent system of policy coordination at government and agency levels	3
Existence of an "evaluation culture" in the field of ICT policy	ICT policy measures are systematically evaluated at key milestones in their implementation	2
External versus internal evaluations of ICT policy measures	Evaluations respect good practice criteria (involve systematically external experts, evidence based, quality appraisal of evaluation reports, etc)	1
Transparency and publication of results of evaluations	All evaluations are published &/or discussed in a public forum	2

Scoring: Compared to the benchmark current practice in the country is judged to be: 1. Completely unsatisfactory, 2. Unsatisfactory (room for improvement), 3. Satisfactory, 4. Above average compared to other EU countries, 5. Best practice in the EU
Note: An evaluation culture (or culture of evaluation) is one in which evaluation, and the lessons drawn from it, form an important element of ICT programme management and policy formulation.

Finally, the following table also provides an overall appraisal of the tools undertaken for the utilisation of international experience in policy benchmarking and evaluation.

Exhibit 4: Overall appraisal of the tools undertaken so far for the utilisation of international experience in policy benchmarking and evaluation

Tool for policy learning	Benchmark	Ranking (1-5)
Formal mechanisms for policy learning (studies, ICT observatories, study visits, joint events with other countries, etc.)	Exists on a permanent basis (e.g. observatory) or at least one occurrence on an annual basis	2
Application of foreign experience in designing measures (e.g. involvement of foreign experts in design phase)	Systematically (all new policy measures take into account foreign experience)	2
Exchange or hiring of ICT policy staff/ experts to/from other countries (e.g. twinning programmes with new member states or candidate countries)	Long-standing and regular policy of exchange of staff	1
Involvement of senior policy makers /executives in trans-national networks	Key government or agency staff are members in such networks and play an active role (e.g. management committee, organisation of events, etc.)	2
Carrying out quantitative or qualitative benchmarking exercises to assess comparative ICT performance (scoreboards, etc.)	Benchmarking is a systematic process & results are incorporated into policy	3
Implementing policy cooperation with other countries: bilateral or multilateral programmes on ICT, etc.	Many long-term agreements operating (specifically in field of ICT, technology transfer, etc. as distinct from scientific research agreements)	2

Scoring: Compared to the benchmark current practice in the country is judged to be: 1. Completely unsatisfactory, 2. Unsatisfactory (room for improvement), 3. Satisfactory, 4. Above average compared to other EU countries, 5. Best practice in the EU

However, a considerable change in the Belarusian policy benchmarking and evaluation practice is currently under way. This is briefly presented below.

- Referring to future policy benchmarking and evaluation practice.
One of the key tasks defined in "Strategy of Information Society Development in Belarus during the period 2010-2015" is the issue of creating a unified system of indices for ICT development in the country (called "ESPRIO") as well as high quality monitoring, analysis and evaluation of the efficiency of production and use of ICT products.

Within this context, the Centre of Information Processes Monitoring Institute (a branch the Institute of Applied Software Systems established in 2008) together with the National Statistic Committee is currently developing ESPRIO which will be the new national system of indicators that will be consistent with the rest of the international systems (e.g. International Union of Telecommunication, the United Nations, etc). Respectively, Belarusian researchers involved in ICT policy development use public surveys and analytical materials published by the EU, individual countries, and international organisations (e.g. OECD, ITU, World Bank, etc.)

More specific, ESPRIO will include the following groups of indices:

- Factors of information society development:
  - Status of ICT
  - Human resources development
  - Economic status
  - Development of the national ICT industry
  - Security of ICT product usage

- Indices of ICT usage
  - ICT in state management
  - ICT in economy
  - ICT in education
  - ICT in healthcare and social works
  - Use of ICT by people
  - Others

In the ESPRIO system, key indices will be highlighted that define the qualitative level of state information resource formation and the efficiency of e-Government implementation. These key indices will include:

- The relevance of submitted information for users
- The level of accessibility of information for users
- The level of e-readiness of state information systems to provide e-services

At the same time, evaluation of e-readiness to provide e-services will cover the following five criteria:

a. ICT infrastructure;
b. Access of governmental offices to ICT structure;
c. Access of the population and business to ICT structure;
d. Human resources: (educational level, practice of ICT use, motivation to use Internet and e-services);
e. Normative and legislation basis.

1.3.3 Overall appraisal of ICT governance

The existing ICT governance system does not support effective management of ICT development in Belarus. In reality, the governance system does not facilitate interdepartmental coordination, independent and qualitative examination of programmes and projects, effective utilization of the global experience and international cooperation.

However, considerable changes are currently underway. Overall, more and more attention is paid to studying global experience in the formation and realization of ICT and innovation policy. Furthermore, it is more and more recognised as key requirement for the development of information society the need for increased cooperation and coordination among the governmental bodies as well as with all concerned sides – business, civil society, regional and international organisations. Finally, the completion of the unified system of indices (ESPRIO) for the monitoring and evaluation of the ICT development in the country as well as the rest of the related new strategies and actions are expected to upgrade considerably the policy benchmarking and evaluation practices followed and hopefully facilitate a more effective ICT policy making and implementation process in the country.

2 Trends in the National ICT Sector and in National ICT Policy Objectives

2.1 Overview of the main trends in the National ICT Sector

2.1.1 Recent Trends in Macroeconomic and Market Developments

The Belarusian model of social and economic development has an evolutionary structure based on active participation of the state. The strategic objective for the current stage of the country's development is to improve the well-being of the population and reach a similar living standard to that in developed countries of Europe.

Belarus has shown steady economic growth over many years. The National Statistics Committee of Belarus reported that during the first nine months of 2010 the country's GDP increased at an annual rate of 6.6% compared to 2009. GDP stood at Br116.6 trillion (approx €30 billion).

The country's main economic activities include machine-building, mechanical engineering, chemical and petrochemical industry, fuel and energy sector, agricultural and wood industry. Almost half of all enterprises operating in Belarus are privately owned. They produce more than 60 percent of all industrial output in the country. The volume of retail goods turnover in the private sector considerably exceeds that in the public sector. In 2008, Belarus' goods turnover exceeded $72bn and grew by over 36% compared to 2007.

Growth rate of industrial production (111,7%), agriculture (103.8%), construction (114.5%) and transport services (108.6%), communication (112.9%), trade and foodservice industry (111,4%), banking (109,7%), etc. had the most significant influence on the GDP growth rate in the second quarter of 2010 compared to the same period last year.

The economy of Belarus is strongly export-oriented. More than half of all production in Belarus is exported. In 2009 Belarus' export reached almost $49bn. Based on the ratio of foreign commerce to GDP, Belarus is ranked in the top ten for European countries. However, also during 2009, Belarus imported more goods than it exported. Consequently, the foreign trade balance was negative and stood at over $7.2bn. In the first half of 2010 the amount of foreign investment in the economy of Belarus increased by 4,4% compared to the same period last year and totalled $ 4.4 billion.

The government's "State Programme of Innovation Development in the Republic of Belarus for 2007-2010" aims to significantly improve the competitiveness of Belarusian goods and services through the creation of 187 new enterprises, organisation of 321 new manufacturers at existing enterprises, and complex modernization of 436 operating manufacturers via the introduction of new high technology.

The share of fixed capital investment in the gross domestic product in the 1st quarter 2010 amounted to 26.1%. According to the National Statistics Committee, the main investors in the economy of Belarus in January-June 2010 were economic entities of Russia (71.5% of all foreign investments), Austria (9.3%), Netherlands (5.9%), Cyprus (3.8%), the United Kingdom (3.5%). The largest amounts of foreign investment were directed at such industries as transport (50.7% of total), industry (23.2%), trade and public catering (15.6%).

Direct foreign investment (DFI) amounted to 60.2% of all foreign investment compared with the first half of 2009 their volume increased by 7.2% to $ 2.6 billion, 92% of DFI came from the residents of Russia. The proportion of residents of the United Kingdom and Cyprus comprised the 1% each, Latvia – 0.8%, China and Germany – 0.7%, USA – 0.6%.

In 2007, the relative contribution of telecommunication services to GDP was 2.2%. This was driven by the rapid growth of the cellular telecommunication network market. In that year, the amount of users' numbers increased by over 1 million; the number of telephones by 91,100 pieces; the quantity of telecommunication services offered to individuals increased by 16.4%; and the quantity of telecommunication services offered to the population through all channels increased by 17%. Furthermore, growth of exported telecommunication services reached 114.9% compared to 2006[1].

[1] Source: the Economic-Investment Review: 2008, Belarus, http://www.mfa.gov.by/upload/eio2008.pdf

Exhibit 6: Comparable indicators of economic performance

Indicator	National performance		EU average	
	2007	2009	2007	2007
GDP per capita in PPP (EU average=100)	32.4[CIA10]	12.5[CIA10]	100*	100*
Real GDP growth rate (% change previous year)	11.0[STB]	0.2[CIA10]	3.0[E08]	-4.1[CIA10]
Inflation rate (average annual)	13.3[STB]	10.1[STB]	2.2[E08]	0.7[CIA10]
Unemployment rate (as % of active population)	1.6[CIA10]	1.0[CIA10]	7.9[E08]	8.9[CIA10]
ICT Expenditure (% of GDP)	Not Available	Not Available	6.4[EIS08]	6.4[EIS08]
Broadband Penetration Rate (% population with broadband access)	2.8[WB09]	6.3[BTR10]	14.8[EIS08]	24.8[EIS08]

Sources:

- *(CIA10) World Fact Book 2002 – Central Intelligence Agency; (CIA08) World Fact Book 2002 – Central Intelligence Agency*
- *(E02) Eurostat 2002; (E08) Eurostat 2008*
- *(STB) Statistics Ministry Belarus*
- *(EIS02) European Innovation Scoreboard 2002; (EIS08) European Innovation Scoreboard 2008*
- *(WB09) World Bank – ICT at a Glance – 2009*
- *(*) EU 25 average*
- ***(BTR10) Belarus Telecommunications Report 2010 –*** *http://www.marketresearch.com/product/display.asp?productid=2618636&g=1&kw=&view=abs&curr=CHF*

Belarus was listed amongst the ten most reformed countries in the World Bank's "Doing Business Report for 2009". According to the World Bank's "Doing Business Report for 2011" in terms of conditions for doing business, Belarus occupies 68th place. According to "Doing Business Report for 2010" Belarus took 58th place, having improved its ranking by 24 points compared to the report of the previous year. This improvement is partly due to a number of actions to liberalise economic activities that have been successfully implemented:

- Procedure for opening a private business has been simplified;
- Taxation system has been simplified;
- Various administrative and technical procedures have been improved;
- Price and anti-monopoly regulation has been improved;
- More favourable conditions for investment activity have been provided.

Additionally, a number of activities to improve the investment climate in Belarus are being implemented: the procedure for permission to realise licensed kinds of activity has been simplified; the number of various administrative procedures has been reduced; and customs registration process for commercial organisations has been simplified, etc[2]. In addition, on 25 May 2010, President Lukashenko signed a Decree №273 on establishment of the National Agency for Investment and Privatization (subordinated to the Government of the Republic of Belarus).

The government's measures to reduce "red-tape" also partially help to explain the phenomenal growth in new small and medium sized enterprises (SMEs) in recent years. By the end of 2008, there were 66,000 SMEs registered, which represented a 21,500 or 48% year-on-year increase.

2.1.2 Recent Trends in ICT Performance

Belarus' ICT performance is quite favourable when compared to other countries. It tends to be ranked in the upper quarter to upper third of country lists in international surveys. For example, in the United Nations e-Government Survey 2008, Belarus was ranked 56 out of 182 countries based on the e-Government Readiness Index, and 98 out of 182 based on the e-Participation Index[3]. Similarly, against the International Telecommunications Union's ICT Development Index, Belarus was ranked 54 out of 154 countries in 2007, which was a slight improvement from 57th position in 2002[4].

Besides comparing Belarus' current ICT performance with other countries, it is worthwhile examining on a qualitative – as well as quantitative – basis the evolution of Belarus' information society in recent years.

[2] Source: the Review of Economic Development: Belarus 2008, www.mfa.gov.by/upload/economic_review.pdf
[3] Source: United Nations e-Government Survey 2008
[4] Source: Measuring the Information Society. The ICT Development Index, 2009 ITU, http://www.itu.int/ITU-D/ict/publications/idi/2009/index.html

Belarus' information society is based upon extensive information and communication infrastructure, which is comprised of the following components:

1. Main fibre-optic network,
2. Fixed public switched telephone network,
3. National data transmission network,
4. Internet resources and trading systems,
5. Wireless access,
6. Mobile telecommunication networks,
7. TV and radio broadcasting and cable networks.

The recent developments of each of these components are then examined:

1) The **main fibre-optical network** was created and is maintained by the national operator – Republican Unitary Telecommunication Enterprise (RUE) "Beltelecom". It is based on technology employing the synchronous digital hierarchy concept, which is introduced not only on the primary trunk network, but also on city telephone systems of all regional centres and large cities. By utilising wavelength-division multiplexing, the technology is able to make optimal use of the cable's fibre-optic bandwidth.

2) Today, there are more than 3.5 million automatic telephone station (ATS) numbers located on the country's **fixed public switched telephone network**. There are 38.5 phones per 100 persons. All rural settlements will have fixed or mobile wireless telecommunication access by the end of 2010. Overall, 72.7% of the population has access to digital connections. By 2010, the capacity of electronic telephone stations is expected to exceed 80% of the general capacity of ATS.

3) At present, around 170 organisations in Belarus have special permission (license) from the Ministry of Communications and Informatization to provide data transmission services. According to a 2007 survey, the installed capacity of the **national data transmission network** is approximately 455,000 ports. About 2.8m people, or 30% of the population, use the national network in order to access the Internet.

   Current work to modernise the main data transmission network by RUE "Beltelecom" will help to increase the bandwidth up to 10 Gbit/sec. This will provide subscribers with high speed Internet access – at least 20Mbit/sec - which will allow such services as interactive TV (IPTV), telecommunication using VoIP, and video on demand (VoD).

   During recent years, there has been stable growth in the number of broadband access subscribers. In 2007, there were 190,000 broadband access subscribers. At present, average data speed is 3.1 Gbit/sec. By 2010 the bandwidth capability of international transits will extend to levels of STM16 and STM64 (10 Gbit/sec), which will allow expansion of external gateways into the worldwide Internet network. Meanwhile, interactive television (IPTV) was introduced in 2008, which allows subscribers to receive certain films and programmes.

   The adoption of broadband connections and virtual corporate networks using xDSL technology is becoming increasingly popular. Currently, corporate networks are being introduced in the Ministry of Taxation, Ministry of Finance, State Control Committee, Central Agency of Air Services, Joint-Stock Company "Belinvestbank", Joint-Stock Company "Belagroprombank", Republican Unitary Enterprise "Production Enterprise Belarusneft" and Foreign Enterprise "Lukoil". Multiplexers for broadband access have been installed in all regions and many regional centres and enable access for users using xDSL technology. International connection to the Internet is via three independent communication channels through the international operators Teleglobe (Canada), Sprint (USA) and Peterstar (Russia).

4) Belarus has relatively poor **Internet resources**. Today, there are about 20,000 sites registered in the .by-zone and 30,059 Belarusian resources are registered in the catalogue of the Belarusian search system (www.tut.by). Leading telecommunication operators have identified the following problems as slowing the development of the Internet in Belarus:

   - Imperfect tariff policy: different tariffs for services rendered to various categories of users. Unreasonable inflated tariffs for operators that do not have legal or licensed rights to organize independent communication channels. Equal conditions of access to the Internet for all operators are needed, including the national operator RUE "Beltelecom".
   - Operators do not have the opportunity to rent broadband communication channels in order to enter regions, despite having submitted applications for these services.

- Currently, the use of frequency resource to maintain wireless access is basically blocked.
- Delays in the development of regulatory and legislative frameworks

Today, there are over 2800 online shops and 7 online retail-information – and trading systems – using two domestic systems of electronic payment - are registered and operate in Belarus. Between 15 and 52 new online shops are registered each month under the Belarusian Internet domain. The monthly goods turnover for individual online shops is typically between 500 and more millions Belarusian roubles (approx 125k to 250k euros). Despite the dynamic development, volumes of Internet trade occupy no more than 1 percent of the total amount of retail goods turnover. According to the Ministry of Trade of the Republic of Belarus, electronic exchange trade on the basis of the Belarusian Universal Commodity Exchange (BUTB) is developing very rapidly. The government is improving legislation concerning advertising and trade in general, and electronic trade and advertising in particular. The changes are directed towards secure protection of consumer rights as well as development of civilized forms of trade according to national economic interests and international norms.

5) The national operator RUE “Beltelecom” has established **zones for wireless access** in Minsk city and the whole country. Today there are 640 WI-FI access points in Belarus, 392 of them are public. It is planned to use WiMAX technology to set up broadband connections for the "last mile", expand the number of wireless access points, and organise high-speed communication between company offices.

6) Over 9.6 million people, or 98% of the population, subscribe to the country’s **GSM mobile telecommunication network**. Strong market competition encourages mobile communication operators to expand their services, cut costs and introduce state-of-the-art technologies. The Joint Limited Liability Company "MTS" and Joint Venture Limited Liability Company "MCS" – leaders in the Belarusian mobile telecommunication market – are planning to introduce 3G technology in the near future. Meanwhile, mobile operator Limited Liability Company Joint Venture "BelSel" offers data transmission services using CDMA technology via mobile devices with speeds 10 times greater offered with existing GSM networks.

7) In the area of **television and radio broadcasting,** RUE “Belarusian Radio and Television Transmitting Centre” is responsible for broadcasting state channels and 22 commercial channels. There is also a range of medium, short and VHF channels, such as “Kultura”, “Stolitsa”, Radius-FM radio, regional broadcasting, “Radio station Belarus”, “Voice of Russia” and 19 commercial programmes.

The Ministry of Communications and Informatization has developed a “Plan for Establishment of Ground-Air Digital Broadcasting in the Regional Centres” in accordance with “The National Programme for the Introduction of Digital Television and Radio Broadcasting in Belarus till 2015”. The plan involves the establishment of ground-air digital TV-broadcasting based upon the DVB-T standard in all regional centres during 2007-2009.

Intensive development of cable television networks in Belarus began in the mid-90s. By the start of 2008, there were 1,567,000 cable television subscribers and 125 operators. Lastly, three Belarusian TV-programmes - "Belarus-TV", “Stolishnoe TV” and “The First Musical Channel” - are broadcast over satellite communication systems.

2.2 National Policy Objectives and Trends

2.2.1 Objectives and Targets of National ICT Policy

The principal goals of national ICT policy during recent years have been captured in the "National ICT Programme of the Republic of Belarus from 2003-2010 (e-Belarus)", approved by the Council of Ministers of Belarus № 1819 on 27 December 2002 with amendments issued by The Ministry of Communication and Informatization № 3,30,35. The objectives are to create a unified ICT environment that will provide conditions to improve the economy; enhance state and regional management; and provide citizens with the right to freely search and distribute information on the economic and social status of society.

The action plan for implementing e-Belarus has a multi-dimensional character and was based on the fundamental provisions of the State Law of the Republic of Belarus on 6 September 1995 No.3850-XII "On Informatisation":

- Create a nationwide automated information system;
- Develop telecoms infrastructure and establish access points to open information systems;
- Develop and improve ICT and set up export-oriented IT-industry;
- Improve the legislative base and the system of state regulation in the sphere of informatization;
- Improve activities and functions of state bodies via application of ICT;
- Facilitate ICT processes in real economy sectors, including creation of a system of electronic trade and logistics;
- Enhance the system of education and retraining of ICT specialists and qualified users;
- Encourage cultural and mass media development by means of ICT dissemination;
- Improve system of information security taking into account the National Security Concept.

In order to achieve these principal goals, specific objectives have been defined with quantitative targets and deadlines. These objectives are listed in the table overleaf:

Exhibit 7: National ICT policy objectives

Objective	Quantitative target (if set)	To be achieved by (year)
Increase the number of fixed broadband access ports	4 000 000 ports	by 2015
Increase the number of mobile telephony subscribers	12 400 000 subscribers	by 2015
Increase the number of mobile Internet access subscribers	7 000 000 subscribers	by 2015
The relative number of legal entities using electronic digital signature	40%	by 2015
The proportion of public services provided by means of ICT	60%	by 2015
The relative number of educational establishments with broadband Internet access	100%	by 2015
The relative proportion of medical documentation provided in electronic form	90%	by 2015
The relative number of orders for state procurement of goods, works and services available on the Internet trading platforms	90%	by 2015
The proportion of goods and services sold on the domestic market by means of electronic commerce	no less than 30%	by 2015
The proportion of research and development in ICT of the total number research and development activities carried out at the expense of all sources of funding	no less than 30%	by 2015
A significant increase of the Republic of Belarus (to the level of advanced European countries) in the international rating in terms of the International Telecommunication Union indicators (The ICT Development Indexes) and the UN (The "e-Government" Development Index)		by 2015
Reduce tariffs for Internet access	by 50%	by 2010
Adopt the "Law of the Republic of Belarus on electronic documents and electronic digital signature"		by 2010

The main organisations responsible for implementing e-Belarus are the National Academy of Sciences of Belarus, the Belarusian State University, the Belarusian State University of Informatics and Radio electronics, the Institute of Applied Software systems, the National Cadastre Agency, the Centre of Information Security, the State enterprise "Geoinformation systems", the and Enterprise "Beltelecom".

The principal goals of e-Belarus are also supportive of the government's strategic aim of sustainable development in Belarus. This aim is defined in the National Strategy for Sustainable Development of the Republic of Belarus as being "dynamic increase of the well-being standard, cultural enrichment, maintain morals of people on the basis of intellectual and innovative development of the economic, social and spiritual spheres, preservation of environment for present and future generations".

In this respect, ICT is viewed as one of the most effective instruments to accelerate the implementation of innovation development and socio-economic measures, which are defined in the Decision of the Council of Ministers "On the approval of the Main Directions of Socio-Economic Development of the Republic of Belarus during 2006-2015", No.1475, 4 November 2006[5]*:*

- Create an up-to-date information and communication infrastructure that satisfies the growing information needs of people, business and the state;
- Develop an education system to form and produce human capital for an information society;
- Design ICT and innovation policy that encourages information society development on the basis of key documents;
- Expand and promote the role and importance of ICT applications in government, economy and social spheres;
- Support the national ICT industry to produce information technologies, resources and services;
- Develop the system of information security and information trust to guarantee protection of national interests of the Republic of Belarus in the global information space
- Facilitate the legal and safe use of ICT in all spheres of life.

2.2.2 Recent National Policy Trends

During the past 5-10 years, Belarus has been extremely active in designing and implementing a broad range of ICT related policy measures to establish and develop its information society. The key policy measures implemented during this period are listed in the table below.

Exhibit 8: ICT Policy Measures

IPM N°	Title	Organisation responsible
BY_1	National ICT Programme of the Republic of Belarus from 2003-2010 "e-Belarus" (e-Belarus)	Ministry of Communications and Informatization
BY_2	State Programme of Innovation Development of Republic of Belarus for 2007 - 2010	State Committee on Science and Technologies
BY_3	Continuous Acquisition and Lifecycle Support - CALS (Product Lifecycle Management - PLM)	Ministry of Industry
BY_4	Electronics and Optics Programme	Ministry of Education
BY_5	Scientific fundamentals of information technologies and systems (INFOTECH)	Ministry of Education
BY_6	Development and implementation of science intensive computer technologies "TRIADA"	United Institute of Informatics Problems of the National Academy of Sciences of Belarus (UIIP NASB)
BY_7	Telecommunications Development Programme for the Republic of Belarus for 2006 – 2010	Ministry of Communications and Informatization
BY_8	State Programme for the Introduction of Digital Television and Radio Broadcasting in the Republic of Belarus until 2015	Ministry of Communications and Informatization
BY_9	State Programme for the Development of Satellite Television Broadcasting in the Republic of Belarus until 2010	Ministry of Communications and Informatization
BY_10	ICT for the education system of the Republic of Belarus for 2007-2010	Ministry of Education
BY_11	Hi-Tech Park	Hi-Tech Park Administration
BY_12	Strategy of Information Society Development in Belarus until 2015	Ministry of Communications and Informatization

[5] www.government.by/ru/rus_gdoc_prog20062010.html

The aforementioned measures are examined below in terms of their objectives, duration and funding , while full details can be found in Annex 2.1.

The **National ICT Programme of the Republic of Belarus from 2003-2010 "e-Belarus"** – which is the responsibility of the Ministry of Communications and Informatization - has aimed to create a unified ICT environment that will provide conditions to improve the economy; enhance state and regional management; and provide citizens with the right to freely search and distribute information on the economic and social status of society. The main organisations responsible for programme execution have been the National Academy of Sciences of Belarus, Belarusian State University, Belarusian State University of Informatics and Radio electronics, Institute of Applied Software systems, National Cadastre Agency, Centre of Information Security, State enterprise "Geoinformation systems", and Enterprise "Beltelecom".

The strategic goal of the **State Programme of Innovation Development of Republic of Belarus for 2007 – 2010** – which is administered by the State Committee on Science and Technologies – has been to develop the Belarusian economy to be knowledge-based, competitive in the world market, science-intensive, resource-saving and eco-friendly, as well as oriented towards sustainable socio-economic development and improving the quality of life of the Belarusian nation. Specifically, over the programme's four years, it has aimed to:

- Create 100 new enterprises and production facilities essential for innovation development of the country (22 involving foreign technologies)
- Create 386 new products (based on new technology development) in active enterprises critical for economic development (68 involving foreign technologies)
- Modernization of 609 active products based on implementation of 888 advanced (new and high) technologies (96 involving foreign technologies)

The state scientific-engineering programme **Continuous Acquisition and Lifecycle Support (CALS)**, or product lifecycle management, is being run from 2005 – 2010 by the Ministry of Industry with a budget of approximately 2.7m euros. It is designed to develop and implement information technology in industry to support the whole lifecycle of product development and production. It includes the use of contemporary CAD systems, technological works preparation, reengineering of works sequence, works management, general automation of the management of the enterprise as a whole, technical procedures of product acceptance and other aspects of product design, manufacturing, maintenance and utilization. The recipients of the technology are the Ministry of Industry of Belarus and the largest industrial centres in Belarus: Minsk Tractor Works, Minsk Truck Works, BELAZ (large lorries) and others.

The **Electronics and Optics Programme** runs from 2006 – 2010 with a budget of approximately 25m euros. The programme aims to develop the physical and technological basis of new materials production, new micro-opto-nano, radioelectronic devices and control systems development for the next generation of information and telecommunication systems. The programme is divided into two parts:

- Part #1: State Scientific-Technical Programme (SSTP) "Microelectronics", SSTP "Radioelectronics", SSTP "Radiocommunications", SSTP "Optotech", SSTP "Standards and Measurement Techniques";
- Part #2: State Complex Programme of Scientific Research (SCPSR) "Electronics" and SCPSR "Photonics".

The **INFOTECH Programme** is being run by the Ministry of Education from 2006 – 2010. It aims to support the creation of new intelligent information technologies and systems, the development of models, mathematical methods and hard-software facilities to increase the product competitive abilities and improve social sphere of the country. The programme involves fundamental research, applied research and maintenance projects. The beneficiaries of the programme are the National Academy of Sciences of Belarus and Ministry of Education of Belarus. The leading organisations responsible for execution of the programme are the United Institute of Informatics Problem and Belarusian State University.

A cluster supercomputer family SKIF was first created in United Institute of Informatics Problems of the National Academy of Sciences of Belarus (UIIP NASB) in cooperation with Russian scientific centres during the period 1999-2004. Following a successful evaluation of the initial stage of supercomputer development in Belarus, a new programme - **Development and implementation of science intensive computer technologies "TRIADA"** - was approved and started in 2005. Three project directions are specified in the programme**:**

- Investigation, verification and adaptation of advanced foreign computer technologies on the basis of Russian and Belarusian high-performance multi-processors computer systems;
- Development and implementation of new science intensive technologies on the basis of high-performance multi-processor computer systems;
- Development of the system software and hardware on the basis of high-performance multi-processors computers produced in Russia and Belarus complying science intensive computer technologies.

The Ministry of Communications and Informatization is responsible for the **Telecommunications Development Programme for the Republic of Belarus for 2006 – 2010** that runs from 2006 - 2010. The objectives of this programme include:

- conversion of the sector of electrical communication into the sector of information communication line technologies with the elements of electrical communication, radio broadcasting and computer technology;

- liberalization of the telecommunication services market and the exception of the cross subsidizing of different forms of telecommunication services considering the Republic of Belarus' entry into the International Trade Organisation;

- creation of the national net structure of informatization as the whole set of the communication networks, user equipment and information resources, which can be used for the access to information, personal contacts, work, education and leisure at any time and any place at the accessible tariffs.

The **State Programme for the Introduction of Digital Television and Radio Broadcasting in the Republic of Belarus until 2015** is administered by the Ministry of Communications and Informatization. It began in 2005 and has a budget of approximately 41m euros. The main objectives of the programme are:

- provision of multi-programme television services;
- improvement in the quality indices of television programme broadcasting service provision;
- creation of prerequisites for the development of science-intensive industries; launching the production of new types of receiving and transmitting radio and television equipment;
- timely access of new import-substituting domestic developments to the internal market; and
- an increase in the competitiveness of domestic production on the international market.

By the start of 2008, there were 1,567,000 cable television subscribers and 125 operators.

The same ministry is also responsible for the **State Programme for the Development of Satellite Television Broadcasting in the Republic of Belarus until 2010**. The programme began in 2006 and has a budget of approximately 1m euros. The main objectives of this programme include:

- development of electronic media,
- expansion of the information space of the Republic of Belarus,
- production of new types of receiving equipment of satellite television broadcasting,
- increase in the competitiveness of domestic products on international markets.

Today, three Belarusian TV-programmes - "Belarus-TV", "Stolishnoe TV" and "The First Musical Channel" - are broadcast over satellite communication systems.

The Ministry of Education has a budget of nearly 28m euros to implement the programme **ICT for the education system of the Republic of Belarus for 2007-2010**. The main goal of the programme is to improve educational quality through the creation of a modern and supportive information technology environment in schools and encourage the widespread use of information and communication technologies in educational practice.

The **Belarus Hi-Tech Park** based in Minsk was established by Presidential Decree on 22 September 2005. It aims to stimulate high technology production development in the country. Today, most Hi-Tech Park residents are involved in information technology development. Special and exclusive economic conditions are granted to residents of the park. The official body "Hi-Tech Park Administration" is responsible for managing the special economic status of the IT Enterprises. One of the important roles of the park is the maintenance of the IT education system. Currently, there are 88 enterprises - with various ownership

structures - in the Hi-Tech Park and their export of software development services exceeded $110m during 2009. Due to its success, there are plans to expand the park's activities and create a business incubator for IT companies.

The main targets of information society formation in Belarus are influenced by world experience whilst taking into account specific political, social and economic features of the country. Looking ahead over the medium-to-long term, the next set of high-level goals for national ICT policy will be those defined in the draft "**Strategy of Information Society Development in Belarus until 2015**", namely:

- Definition of the role of the state in the coordination and development of ICT processes, organisation of scientific researches, and formation of human capital;
- Liberalisation of the economy, continued improvement of the business-climate and development of market competition in the ICT sphere;
- Development of the national information industry;
- Improvement of the system of government through so-called "e-Government";
- Improvement of industry through the adoption and development of innovative ICTs;
- Improvement of people's daily lives by creating new opportunities to work, study, communicate and entertain.

In the action plan to implement the "Strategy of Information Society Development in Belarus until 2015", 20 specific actions have been defined, responsibility for their implementation allocated to different government bodies, and deadlines set for their implementation. These actions are listed in the following table.

Exhibit 9: Action plan for the "Strategy of Information Society Development in Belarus until 2015"

№	Action	Responsible body	Implementation date
1.	The republican state management bodies develop annual action plans for implementation of the Strategy for Information Society Development identifying performance benchmarks, and technical and economic (economic) substantiations of expenses for these purposes.	Republican state management bodies	Annually by 01.12
2.	Introduction of amendments and additions (that arise from provisions of the Strategy) to legal acts of the republican state management bodies, subordinated to the Government of the Republic of Belarus.	Republican state management bodies	According to the separate plan
3.	Submission, consideration, coordination and approval of proposals concerning priorities of the Programme for the Innovative Development of the Republic of Belarus for 2010-2015.	Republican state management bodies	November 2009
4.	Preparation of proposals for improvement of the state management system of informatization processes and information society development in the Republic of Belarus.	Ministry of Communications, National Academy of Sciences of Belarus	October 2009
5.	Preparation of proposals and development of the Concept of the State Information Policy.	Ministry of Communications, Republican state management bodies	2010
6.	Development of the state system for the establishment and application of information resources and set up free and charged access to them for organisations and citizens to satisfy the need of citizens, society and state for information products and services.	The Ministry of Communications, Republican state management bodies	According to the separate plan
7.	Development of the National Information System in the sphere of science and education that facilitates collection, processing, storage, search and delivery of scientific and technological information (within the development of the State System of Scientific and Technological Information).	National Academy of Science of Belarus	According to the separate plan
8.	Implement processes aimed at development and introduction of intra- and interdepartmental regulations of information interaction, the infrastructure for electronic digital signature and electronic document management technologies.	Ministry of Communications	According to the separate plan
9.	Programme and technical equipment of state bodies in accordance with the requirements of integrated application of information and communication technologies in order to improve efficiency and quality of the government administration.	Republican state management bodies	According to the separate plan

№	Action	Responsible body	Implementation date
10.	Produce a repository for software and technical solutions (developed within informatization programmes and projects) to be used by the state management bodies.	Ministry of Communications	2009
11.	Establish an effective and efficient system that ensures civil rights protection in information society and information safety of an individual, society and the state.	Intelligence and Analysis Centre	According to the separate plan
12.	Promote and encourage international cooperation, implement international commitments in the sphere of information society development, actively participate in the implementation of the second stage documents of the World Summit on Information Society (WSIS) and comply with the action plan adopted during WSIS events in Geneva. Define mechanisms of interaction with the leading international institutions and organisations.	Ministry of Foreign Affairs, Republican state bodies	According to the separate plan
13.	Coordinate activities within the Regional Commonwealth of Communication (RCC) and Coordination Council of the CIS countries on informatization at the RCC-level, set up interaction and cooperation between the state management bodies, business and civil society institutions for the integration with the global information society. Set up (within the RCC and also via RCC and other regions) permanent information exchange reflecting progress in implementation of WSIS resolutions, ICT development programmes and projects, informing about events in RCC member-states dedicated to information society issues.	Ministry of Communications, Ministry of Foreign Affairs	According to the separate plan
14.	Inform citizens about the changes and innovations in life, household, communication, health, education, etc. in information society, arrange conferences, round tables, involving mass-media, creation and promotion of specialized Internet sites, monitoring and analysis of the Internet-media market, publication of booklets, brochures, books, including electronic media based ones.	Ministry of Information, Republican state management bodies	According to the separate plan
15.	Establish a system of monitoring and statistical measurement of indicators for information society development in the Republic of Belarus and defining the level of information services rendered to citizens, society and the state.	Ministry of Communications	According to the separate plan
16.	Organize and maintain public relations in the information sphere on basis of structured legislation of the Republic of Belarus and define the place for information legislation in the legal system.	National Centre for Legislation and Legal Researches	According to the separate plan
17.	Define actions for scientific and methodological support of the Strategy for Information Society Development in Belarus.	National Academy of Science of Belarus	November 2009
18.	Prepare proposals for elaboration of the State Programme for Creation and Development of the Multipurpose Information and Computing GRID-Infrastructure, its integration with global information and communication systems and implement measures and actions aimed at participation of the Republic of Belarus in projects of the European Scientific Community and official partnership in GEANT3 project.	National Academy of Science of Belarus	According to the separate plan
19.	Elaborate the action plan for further informatization development in the Republic of Belarus.	Ministry of Communications	November 2009
20.	Prepare the annual report reflecting progress in development of information society infrastructure and financing of action plan measures.	Ministry of Communications	Annually, December

The National program of accelerated development of the IT services was prepared in the framework of the "**Strategy of Information Society Development in Belarus until 2015"** and was approved by the Cabinet of Ministers an the end of 2010. The program includes 9 subprograms:

- National IT infrastructure
- E-government
- E-health
- E-employment and welfare
- E-education and human resources development
- National content formation
- E-custom
- ICT security and trust
- Development of export-import IT industry

3 What lessons can be drawn from Policy Implementation?

3.1 Lessons from the Evaluation of ICT Policy Measures

The main ICT programmes in Belarus are state programmes approved by the Council of Ministers of Belarus. ICT policy measures are designed and implemented to improve the status of ICT in the country and to involve new organisations in the development and utilisation of information technologies to improve management and production. In accordance with the Regulation of the Government of Belarus (the Law of Scientific Activity of the Republic of Belarus), the results of each measure (programme and project) must be evaluated. Upon completion of the first stage of a measure (or its part), the scientific council of a research institution evaluates the results of the measure and appoints an acceptance inspection group, including the representatives of the contractor and customer and a high qualified ICT specialist from the country.

An acceptance inspection group is responsible for analysing the output reports of ICT projects and evaluating the results of an ICT measure according to the following criteria: novelty, importance for science and practice, objective knowledge, evidential significance and accuracy. The results of an inspection are captured in an acceptance certificate consisting of quantitative and qualitative analyses of the main results of the ICT measure. The acceptance certificate, along with a report of the measure results, is then reviewed and approved by the Scientific Council. In cases some discrepancies exist, the State Committee on Science and Technology of Belarus serves as arbitrator. The ministries of the Government of Belarus take responsibility for the implementation of ICT measures in the enterprises of Belarus.

In some special cases, a Coordination Council is organized to control the programme execution which includes representatives of the Scientific and Administration Boards of Belarus. The Council evaluates each project after completion and issues recommendation on how to utilise and maximise the impact of the project's results. The Council is responsible for reviewing annual project implementation reports and controlling the allocation and use of project finances. Governmental organisations are then responsible for reviewing the reports of all the projects and issuing an annual summary report.

In practice, evaluations of ICT policy measures typically include some details on how projects can be improved. However, overall, recent policy measures to improve the ICT situation in Belarus have been positively evaluated. Due to successful results, some policy measures have been extended and expanded (e.g. Belarus Hi-Tech Park) and created lasting impacts on education, society and the economy (e.g. ICT for the education system of the Republic of Belarus for 2007-2010). On the other hand, critical evaluations of the e-Belarus programme, by commissions and specialists, led to the replacement of the programme's top management with a new management team, which has since been implementing it more successfully in Belarus.

Over just a few years, the ICT situation in Belarus has been significantly improved. Governmental support of ICT projects (e.g. state programme "e-Belarus") has had a major positive impact on this process. This support has included:

- assisting enterprises to implement advanced software for design and management;
- increasing greatly the number of talented students and young specialists involved in ICT projects;
- opening many off-shore legal entities working for world known ICT company with advanced software packs and organizing several national innovation associations (e.g. "Hi-Tech Park", "Infopark" and "Academtechnopark");
- supporting several international organisation in funding mutual projects and, as a result, integrating Belarusian ICT companies into the European and Global ICT society.

Governmental ICT programmes in Belarus are covering more and more spheres of research, administration and economy: government offices, educational institutions, public information supply, judicial system, cadastre systems, library networks, transport scheduling and management, financial and bank system, medicine and healthcare, national resources monitoring, custom service, and the national security sector, etc.

Nevertheless, many ICT issues still need to be addressed to Belarus:

- still low availability and access to the Internet for the population;
- low level of coordination between ICT organisations (public and private);
- difficulties with computers and network facilities in educational organisations (schools, especially in some outlying districts);
- deficiency of highly skilled ICT specialists in certain sectors.

3.2 Review of Good Practice

A number of 'good practice' examples in ICT policymaking and implementation from 2003 onwards are mentioned below. Exhibit 10 summarises the respective policy measures and the results that have been achieved.

Exhibit 10: Summary of good practice cases in Belarus

Year	Title of good practice case	Justification for selection
2003-2010	National ICT Programme of the Republic of Belarus from 2003-2010 "e-Belarus" (e-Belarus)	The aim of the programme is to create a unified ICT environment to provide the conditions for improving the economy, state and regional management, provision of citizens right for free search, transfer, and distribution of information of the status of economic and social development of the society. The results of over 100 projects of the programme have been positively evaluated by a group of ICT specialists.
2004-2007	Development and implementation of perspective Space facilities and technologies in the best interests of Belarusian-Russian Union State economy and engineering development COSMOS-SG	The COSMOS-SG programme represents the second successful programme of Belarusian-Russian cooperation in space technologies. The first stage – COSMOS BR - was positively approved by Belarusian-Russian state commission with recommendations for its continuation. Russia is one of the countries with great successes in space systems. The participation of Belarus in the programme enables it to be a "space country", which participates in the development of space technologies and uses them for the needs of the national economy. The main goals of the COSMOS-SG programme included: • creating a centre of space information reception (high speed remote sensing information flow with high resolution should be received); • connecting the new centre via fibre optic network with the stations of Ministry of Forestry, Hydro-meteo offices and other recipients; • creating a distributed archive of space data; • developing technology to process space pictures in order to monitor gas and oil pipelines as well as agriculture areas; • developing the elements of an international navigation system with high accuracy for cadastre and transport control on the basis of soft-hardware facilities and satellite navigation GLONASS/GPS. The results of the COSMOS-SG have been evaluated positively by an International Acceptance Commission which includes specialists on space technologies from Russian and Belarus. A new follow on programme - COSMOS-NT - based upon the results of COSMOS-SG has recently started in 2008.
2005-2008	Development and implementation of science intensive computer technologies	A cluster supercomputer family SKIF was first created in UIIP NASB in cooperation with Russian scientific centres during the period 1999-2004. The main components of the computer system include Intel Pentium III, Intel Xeon AMD Opteron ™, and system network InfiniBand. High speed access to the telecommunication network of the National Academy of Sciences of Belarus

Year	Title of good practice case	Justification for selection
	"TRIADA"	(BAS-NET) from scientific networks in Russia is organized through the pan European scientific network GEANT. Following a successful evaluation of the initial stage of supercomputer development in Belarus, a new programme TRIADA was approved and started in 2005. TRIADA is focused on dominant problems of supercomputer technologies use - mainly in the industry. Three project directions are specified in the Program: • Investigation, verification and adaptation of advanced foreign computer technologies on the basis of Russian and Belarusian high-performance multi-processors computer systems. • Development and implementation of new science intensive technologies on the basis of high-performance multi-processor computer systems. • Development of the system software and hardware on the basis of high-performance multi-processors computers produced in Russia and Belarus complying science intensive computer technologies. So far, the results of TRIADA have been evaluated positively by an international acceptance commission including high rank scientists and engineers from Russia and Belarus. The Acceptance Certificate was issued and signed on 19 December 2008.
2005-2010	Continuous Acquisition and Lifecycle Support - CALS (Product Lifecycle Management - PLM)	State scientific-engineering programme CALS is designed to develop and implement information technology in industry to support the whole lifecycle of product development and production. It includes the use of contemporary CAD systems, technological works preparation, reengineering of works sequence, works management, general automation of the management of the enterprise as a whole, technical procedures of product acceptance and other aspects of product design, manufacturing, maintenance and utilization. So far, as a result of the CALS technology programme, over 16 integrated information and software systems have been developed and installed in industrial enterprises including Minsk Tractor Works, Minsk Truck Works and others. The results of each project, as well as the overall programme, have been positively evaluated by an acceptance inspection group. Indeed, the acceptance inspection group has recommended it to be implemented as well in the State Factory for Heavy Trucks "BELAZ", the Company "Vitiaz" (TV sets, electronics etc) and some others. The successful creation and installation of such enterprise management systems also demonstrates strong cooperation between Belarusian public research institutions and industrial technical centres.
2005–2015	State Programme for the Introduction of Digital Television and Radio Broadcasting in the Republic of Belarus until 2015	The main objectives of the programme include: • the provision of multi-programme television services; • the improvement in the quality indices of television programme broadcasting service provision; • the creation of prerequisites for the development of science-intensive industries; • launching the production of new types of receiving and transmitting radio and television equipment; • timely access of new import-substituting domestic developments to the internal market; • the increase in the competitiveness of domestic production on the international market.

Year	Title of good practice case	Justification for selection
		According to expert evaluation, digital television is 6 times more efficient than analogue. On 1 July 2005, digital television broadcasting started in Minsk on a regular basis. By 1 January 2009, digital television broadcasting coverage reached 46.77% of the population in the Republic of Belarus. Digital television transmitters have been installed in 10 towns of the Republic of Belarus with 6 TV channels (MPEG-4/AVC) and 1 radio channel (MPEG-2) overall transmission. The planned period for transition from analogue broadcasting to digital is expected to be complete by 2015.
2006-2010	Scientific fundamentals of information technologies and systems – INFOTECH	The INFOTECH programme aims to support the creation of new intelligent information technologies and systems, the development of models, mathematical methods and hard-software facilities to increase the product competitive abilities and improve social sphere of the country. The leading organisations responsible for execution of the programme are the United Institute of Informatics Problem and Belarusian State University. Each task of the programme has been evaluated after completion by a Commission including scientists from the National Academy of Sciences of Belarus and the Ministry of Education. An Acceptance Certificate was issued containing: • the confirmation of the tasks completion, • the indexes of novelty, importance for science and practice, objective knowledge, evidential significance and accuracy. • recommendation for implementation • the information of thesis defence on the material of the tasks and the list of scientific articles and participation in the conferences The evaluation of the Programme as a whole will take place in 2010 once all tasks have been completed.
2006–2010	Telecommunications Development Programme for the Republic of Belarus	The objectives of the programme include: • the creation of conditions, which facilitate the guarantee of maximum satisfaction of demand in the telecommunications and postal services to individuals and legal entities, individual entrepreneurs, republican institutions of public administration, national security and defence; • the conversion of the sector of electrical communication into the sector of information communication line technologies with the elements of electrical communication, radio broadcasting and computer technology; • the liberalization of the telecommunication services market and the exception of the cross subsidizing of different forms of telecommunication services considering the Republic of Belarus' entry into the World Trade Organisation; • the creation of the national net structure of informatization as the whole set of the communication networks, user equipment and information resources, which can be used for the access to information, personal contacts, work, education and leisure at any time and any place at the accessible tariffs. The export of telecommunication related services increased by 114.9% between 2006 and 2007 compared with the programme's forecast of 113.5%. Meanwhile, the import of such services increased by 99.1% over the same period compared with the programme forecast of 105%. Overall, the foreign trade balance surplus for telecommunication related services was 29.5m Euro in 2007 compared to a forecast of 28.6m Euro.

Year	Title of good practice case	Justification for selection
2006-2010	State Programme for the Development of Satellite Television Broadcasting in the Republic of Belarus until 2010	The main objectives of this programme include: • the development of electronic media, • the expansion of information space of the Republic of Belarus, • the production of new types of receiving equipment of satellite television broadcasting, • increasing the competitiveness of domestic products on international markets. Since 2007, three Belarusian television programmes have been broadcast via satellite systems: Belarus-TV, STV, and First Music Channel. Broadcasts are hosted by satellite "Express-AM22" (53 degrees e.l.) of the Russian operator "Space Communications". Belarusian television and radio programmes are available in the territories of the western part of Russia, all countries in Europe and the CIS. The Ministry of Foreign Affairs of the Republic of Belarus continues efforts to inform the diplomatic and consular missions of the Republic of Belarus of the satellite TV broadcasting programmes produced in Belarus. Prospective creation of the English versions of domestic TV channels and simultaneous translation into the main languages (English, French, German, Spanish and others) will further expand the multimillion foreign audiences of Belarusian satellite TV. JSC "Gorizont" and RUPE "Vityaz" now produce satellite TV devices for receiving and processing signals of satellite digital television broadcasting and transfer of decoded image signal and audio tracks to the analogue TV receiver input. Besides the Strategy of Information Society Development in Belarus until 2015"specified equipment, JSC "Gorizont" also produces head air-satellite stations for cable television systems.
2008-2011	Development of base elements and technologies for creation and implementation of onboard and land based facilities of multi-functional Space system "COSMOS-NT"	The COSMOS-NT programme is the third stage of Belarusian-Russian cooperation in space technologies. The first and second stages – COSMOS-BR and COSMOS-SG - were positively approved by Belarusian-Russian state commission with recommendation for their continuation. The main tasks of the programme include: • the development of advanced technologies of remote sensing of Earth information processing; • the creation of new pilot samples of land based devices for reception, processing and distribution of Space information; • the creation of pilot sample of microsatellite platform and pilot sample of microsatellite; • the development of design documentation; • the creation and debugging technologies and experimental facilities of processing and situation display of information received from space equipment and land based facilities taking into account coordinate and time binding. Currently, only the first steps of the COSMOS-NT programme have been evaluated.
2009-2010	New communication channel providing direct connection of Belarusian	Within the scope of scientific and technical cooperation between the National Academy of Sciences of Belarus (NASB) and the Ministry of Communications and Information of Belarus a new communication channel has been launched on August, 19th, 2010, providing direct connection of Belarusian research and education networks to Pan-European scientific network GEANT with the

Year	Title of good practice case	Justification for selection
	research and education networks to Pan-European scientific network GEANT with the speed of 1 Gbps	speed of 1 Gbps. GEANT unites 34 national science and education networks of Europe, with participation of about 4000 university networks and more than 40 000 000 potential end users, creating thus the greatest in the world and the most expanded network scientific and educational ecosystem. An important feature of GÉANT is development of communications with similar research networks in other regions of the world - America, Africa, Pacific, Asian and Mediterranean regions. The computer network BASNET is an associated member of the largest project of the 7th Framework EU program on creation of innovative international multi-domain hybrid network infrastructure GÉANT-III. The organisation of the connection to GEANT at 1 Gbps will give Belarusian scientists qualitatively new possibilities for realisation of joint projects with European colleagues in such areas, as radio astronomy, climatology, physics of elementary particles, telemedicine, gene engineering, etc. which demand high-speed exchange of large data files. Technical works on creation of the communication channel BASNET - GEANT 1 Gbps and organisation of gateways interaction BASNET-Beltelecom-PIONIER have been executed by experts of UIIP NASB, Beltelecom and Polish research network PIONIE.

4 ICT Co-operation with the EU

4.1 Co-operation involving RTD community

Over 50% of international projects involving Belarusian organisations are performed by Belarusian higher education institutions. There is a continuous increase in the scientific-industrial cooperation of Belarusian universities with foreign partners. During the past 5 years, the number of such cooperation agreements has virtually doubled. In total, Belarusian universities have partnerships with universities from 57 countries.

However, only 5% of Belarusian universities are involved in ICT research with EU partners. Arguably, the three strongest organisations in the field of ICT research are the Belarusian State University of Informatics and Radioelectronics (BSUIR), Belarusian State University (BSU), and National Academy of Sciences of Belarus (NASB).

Belarusian State University of Informatics and Radioelectronics (BSUIR) trains experts in a wide spectrum of ICT specialities: design and construction of radio-electronic equipment, software development, telecommunication, information protection, and micro- and nano-electronics. The university has specialised laboratories in all these research areas. BSUIR has bilateral agreements with 44 universities from 23 countries. Students and academic staff take part in international programmes such as INTAS, Europractice, Tempus, Copernicus, Erasmus and Mundus. Also, students win scholarships from the German Academic Exchange Service (DAAD) and the institution wins research grants from the French Society for Research Support, German Research Foundation (DFG), and the International Science and Technology Centre (ISTC).

Belarusian State University (BSU) is a prominent educational and research establishment with over 8500 staff including 2500 lecturers. The university trains more than 25,000 students including 1500 foreign nationals. Student programmers and IT specialists are trained in the Faculties of Applied Mathematics and Computer Science, Radio Physics and Electronics, and Mathematics and Mechanics.

BSU also has a special division - National Research Centre for Applied Problems of Mathematics and Informatics - involved in fundamental and applied ICT research. The centre's work includes:

- the development of software in the field of multivariate statistical analysis, robust against distortions of data;
- the development of software in the field of statistical quality control of production; teaching, consulting and development of methodic instructions for up-to-date statistical methods of information processing;
- carrying out scientific researches, concerning statistical computer data analysis in the science, technology, medicine, and other applications;
- the development of software in the field of econometric modelling and forecasting;
- consulting on using of econometric analysis and forecasting methods for solving practical tasks; and
- carrying out tasks, concerning modelling and forecasting of dynamic of the main macroeconomic indices.

Another BSU division dealing with ICT is the Centre of Information Technologies, which is responsible for the development of education, R&D and the management system in the university.

BSU has the largest number of international co-operations amongst all the Belarusian higher education institutions. It has partnership relations with more than 180 foreign educational and scientific organisations. Traditionally, it has close connections with European countries and CIS member states. Each year, on average, BSU is involved in over 80 on-going international projects with the support of the different foreign programmes and funds such as TEMPUS, ERASMUS MUNDUS, INTAS, PHARE, ISTC, NATO, and CERN.

National Academy of Sciences of Belarus (NASB) carries out its activities through 90 different scientific institutions distributed across seven departments. The biggest of them is Department of Physics, Mathematics and Informatics. In this department, there are 3 scientific institutions dealing with ICT research: United Institute of Informatics Problems, Institute of Mathematics and Institute of Physics.

The *United Institute of Informatics Problems of the National Academy of Sciences of Belarus (UIIP-NASB)* is involved in fundamental and applied research in information technology, computer science, applied

mathematics, computer aided design and some other related fields. It cooperates with industrial research centres and enterprises in solving applied problems in the field of computer aided design, computer aided engineering, new products testing, software and hardware development.

UIIP-NASB has the following comprehensive range of departments: modelling of intelligent processes; modelling of image synthesis and recognition processes; information technologies and systems; laboratories of mathematical cybernetics; operation research; logical design; modelling technological processes; technical systems synthesis; self-organizing systems modelling; computer networks; computer aided design; image processing and recognition; speech recognition and synthesis; cartographic systems and technology; system identification; system engineering; high performance systems; information protection; bio-information systems; computer graphics automation of video information input, information analysis systems; divisions of automation systems; joint space information technologies; and joint programmes of supercomputer systems.

The *Institute of Mathematics of the National Academy of Sciences of Belarus (IM-NASB)* is involved in fundamental research in algebra, geometry and theory of numbers, differential equations, optimization methods and systems of control, functional analysis, computational mathematics, discrete models and algorithms, probabilistic and statistic analysis and theory of random processes. Development of mathematical models and methods for solving actual applied problems arising in cryptology, physics, mechanics, microelectronics, engineering, economics, ecology, medicine, oil-refining industry, metallurgy, building, force majeure safety, logistics and theory of transport network and others.

IM-NASB has the following departments: mathematical theory of systems; differential equations; nonlinear and stochastic analysis; control process theory; mathematical physics; algebra; computational mathematics and mathematical modelling; combinatoric models and algorithms; parallel computational processes; laboratory of finite group theory and applications; and production-and-technical division.

The *Institute of Physics of the National Academy of Sciences of Belarus (IP-NASB)* is involved in laser physics, development and fabrication of new laser sources and systems for various applications; nonlinear and quantum optics, laser spectroscopy; nonlinear dynamics of complex systems; physics of quantum-dimensional structures; transfer of optical radiation and optics of scattering media, optical methods of investigation and diagnostics of natural objects and biological media; physics of elementary particles and nuclear reactions.

IP-NASB has the following departments: laboratories of wave optics; heterogeneous organic media; quantum optics; laser diagnostics; laser systems and devices; nonlinear optics; physics of polymers; optical problems of informatics; optical diagnostics; optical holography; physics and engineering of semiconductors; physical optics; optics of scattering media; physics of fundamental interactions; nuclear physics; and division of laser-optical technologies.

A major step forward to support academic research cooperation between Belarus and Europe occurred in October 2004, when Belarus was successfully connected to the pan-European GÉANT network. GÉANT is the largest scientific-educational network in Europe, which unites the scientific networks of 43 countries and 3500 research and educational organisations – including over 30 million researchers from 34 European countries. GÉANT is co-financed by the European Commission and European national networks of science and education and managed by the not-for-profit organisation DANTE.

Looking back over the European Commission's fifth and sixth framework programmes, besides several accompanying measures/support actions, there has only been a small number of IST/ICT research projects involving Belarusian higher education institutions.

The FP5 IST project "Research and training action for System on Chip design" (REASON, IST-2000-30193) ran from 2002 – 2005 and involved BSUIR and BSU[6]. The aim of the project was to integrate academic and research institutions of Central and Eastern Europe working in the field of microelectronics into the mainstream R&D activities going on in EU countries. To achieve this aim, the project organised training courses and workshops together with academic and research institutions from EU countries. Together with subcontractors the project involved about 50 institutions. The total number of public training events was 291 involving 7600 participants.

[6] http://reason.imio.pw.edu.pl

The FP6 IST project "Nanophotonics to realise molecular-scale technologies" (PHOREMOST, 511616) was a network of excellence dedicated to nanophotonics and molecular photonics in order to address the near- and long term needs of photonic functional components[7]. The project ran from 2004 – 2008 and involved the Institute of Molecular and Atomic Physics of the National Academy of Sciences of Belarus.

Meanwhile, the FP6 IST project "Engineered Quantum Information in Nanostructured Diamond" (EQUIND, 034368) is funded under the Future Emerging Technologies domain and runs from 2007 – 2009[8]. The Belarusian partner is the Institute of Physics of the National Academy of Sciences (IP-NASB). As its title suggests, the project is examining the application of diamond to quantum information.

On the other hand, there have been many ICT focused collaborative research projects involving Belarusian partners that have been funded by the intergovernmental organisation International Science and Technology Center (ISTC)9. ISTC was established in Moscow by international agreement in November 1992 as a nonproliferation programme. ISTC coordinates the efforts of numerous governments, international organisations, and private sector industries, providing former weapons scientists from Russia and CIS countries with new opportunities for sustainable, peaceful employment. The Parties to ISTC are Canada, the United States, the European Union, Japan, Norway and South Korea (funding parties), as well as Russia, Armenia, Belarus, Georgia, Kazakhstan, the Kyrgyz Republic and Tajikistan (recipient parties).

A relatively recent example of a successful ISTC funded projects involving Belarusian and European partners was ISTC project B-276.2 "Mesoscopic Lights Emitters, Switches and Transformers". It involved the Institute of Molecular and Atomic Physics of the National Academy of Sciences of Belarus, BSUIR, Centro Ricerche FIAT (Italy), EVOTEC BioSystems AG (Germany) and the University of Dortmund (Germany). The objective of the project was to exploit mesoscopic optical phenomena for the development of novel efficient light emitters, switches, and transformers. During the project, mesoscopic effects were used for developing experimental grade samples of visible light emitting plates with enhanced efficiency. Afterwards, the samples were evaluated through optical and laser experiments and theoretical simulations.

Although now discontinued, the International Association for the promotion of co-operation with scientists from the New Independent States of the former Soviet Union (INTAS) was also a very valuable body for funding collaborative research projects involving Belarusian organisations. It was established in 1993 by the European Community and like-minded countries, in order to promote scientific research activities in the New Independent States (aka former Soviet states) and scientific co-operation between scientists in these countries and the international scientific community.

Between 1993 and 2006, INTAS funded numerous ICT related research projects involving Belarusian partners. One such example was "Quantum information technologies: quantum cryptography and simulation of quantum many-body systems" (INTAS 2004-77-7289), which ran from 2005 – 2007 and involved the Institute of Physics of the National Academy of Sciences of Belarus (IP-NASB) and the University of Stuttgart amongst other partners. Interestingly, these two partners have gone on to collaborate together in the FP6 EQUIND project.

The main barriers to ICT cooperation between European and Belarusian research groups are highlighted in the following table overleaf together with an evaluation of the policy measures – from the Government of Belarus and/or European Commission – designed to address them.

[7] www.phoremost.org
[8] www.equind.org
[9] www.istc.ru

Exhibit 11: Main barriers for ICT co-operation and policy responses

Description of barrier	Measures addressing the barrier (if any)	Relevance of policy response	Evidence of impact
1. Withdrawn, or reduced, international support for science and technology cooperation with Belarus. E.g. Belarus cannot participate in the US' CRDF programme and Swiss SCOPES programme, which include other former Soviet countries. Similarly, Germany and Poland have lowered their support for bilateral S&T programmes.	Difficult to describe specific measures. Steps to improve political relations with Europe.	3-4	3-4
2. Lack of ICT research cooperation between Belarus and Europe (e.g. only 5% of Belarusian HEI involved in ICT research with EU partners. Also, only a handful of FP5/6/7 ICT collaborative research projects involving Belarusian HEI)	a) Unaware of any government measures b) 3 EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011)	a) 1 b) 4	a) - b) Too early to say
3. Lack of awareness amongst Belarusian ICT research groups of the FP7 ICT programme and lack of understanding and skills on how to effectively participate (e.g. only a handful of FP5/6/7 ICT collaborative research projects involving Belarusian HEI).	a) Establishment of a National Information Point on FP6/7 – including IST/ICT programmes - at Belarusian Institute of System Analysis (BelISA) first; and then - creation of NCPs network in the country b) 3 EC funded FP6 Support Actions TRISTAN-EAST, IDEALIST34 and IDEALISTFP7 that collectively organised FP6/7 ICT awareness/training events and helpdesks (2004 – 2008) c) 3 EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011).	a) 5 b) 5 c) 5	a) 4 b) 4 c) Too early to say
4. Lack of ICT related technology-transfer between universities/public research organisations and (European) private industry.	Establishment of Republican Centre for Technology Transfer in 2003 under State Committee for Science and Technologies and National Academy of Sciences of Belarus	4-5	3-4
5. Lack of government ICT policy monitoring system based on standardised, internationally recognised ICT indicators/statistics. Lack of experience of ICT policy development, monitoring, evaluation and impact assessment based on standardised ICT indicators.	One of the actions identified in the action plan for the "Strategy of Information Society Development in Belarus until 2015", foresees establishment of a system for monitoring and statistical measurement of indicators for information society development. Work to be done by National Statistic Committee and the Centre of Information Processes Monitoring Institute.	5	Too early to say
6. Lack of international mobility of researchers, in particular, young ones.	There are some mechanisms supporting the mobility, but the existing schemes are working mostly to support RTD carried out by Belarusian partners in bi-lateral research projects with those countries who have an intergovernmental agreement on S&T cooperation with Belarus. But there is no targeted support for wider types of mobility.	3	3

Policy response ranking scored from 1 to 5: 1. No specific measures addressing the challenge (possibly a debate but no evidence of any real policy development); 2. Policy development under way to respond to challenge (policy debate or design launched); 3. Specific measures existing for some time but insufficient to respond fully to challenge; 4. Existing measure plus one or more newly launched measures (during last 18 months); 5. A comprehensive set of measures which potentially respond fully to the challenge.
Evidence of impact scored from 1 to 5: 1. Trend for indicators has worsened since measure(s) introduced 2. No observable change in trend since measure(s) introduced, 3. Too early to appraise (measures introduced in last 24 months), 4. Trend for indicators has improved since measure(s) introduced 5. Evaluation or study indicates measure(s) has clearly contributed to improving performance of country.

4.2 Co-operation involving private industry

According to official data, in 2008, there were around 650 Belarusian companies specifying software development as one of their business activities. However, some of these companies are interested in developed software use, but not actively engaged in its development. According to experts, about 450-500 companies and informal development teams are engaged in software development in Belarus. 63 of these companies are members of the science and technology association “Infopark”. Altogether about 15,000 IT experts work in Belarusian software development companies - approximately 6500 on projects for the domestic market and 8500 for international markets (including 2500 based in the foreign offices of Belarusian companies).

The main competitive advantages of Belarusian software developers include territorial and cultural proximity to their main customers in Europe and North America, as well as the high qualification of programmers and their relatively low cost in comparison with other Central European countries. Up to 3500 IT students graduate annually from Belarusian higher institutes and technical schools and about 1000 of them become programmers. Many Belarusians have a higher education qualification and can be retrained to become software developers or testers. Thus, the number of employees at a software company could be increased by 60% in a fairly short period of time.

However, there is rather low awareness around the world of the potential benefits of cooperation with Belarusian software companies. As a consequence, there are only a few international software development centres in Belarus. By comparison, there are at least 30-40 international software development centres in Russia, which account for about 20% of the country’s export of software development services.

In 2005, legislation came into effect to create exclusive and favourable conditions for software development companies. An important piece of legislation was the Decree of the President of Republic of Belarus of 22 September 2005, № 12, which founded a Hi-Tech Park and provided major tax benefits to software development companies based there. Today, around 60 companies are residents of the High Tech Park. Most of these companies cooperate with business partners in the EU in areas such as outsourcing, licensing, production, service provision, etc.

In the past few years, the total number of companies - at least partially involved in software development - has increased considerably. About 200 companies have been established during 2005 - 2008 and have no more than 25 employees. However, among the companies with more than 100 employees, only one new company has been created during this period of time. Some of the new companies which have emerged in recent years are created on the basis of new subsidiaries or spin-outs from enterprises that have existed for a considerable time already. One of the main reasons for the sudden spurt of existing companies creating new ventures has been so that their new ventures can become residents of the “High-Tech Park”, and so benefit from the grants and tax privileges bestowed on them.

However, overall, the size and number of the leading software development companies has not changed significantly in recent years. During 2005-2008, there was no new company created with over 400 employees, one company created with up to 400 employees, three companies with 25 to 100 employees, and 20 small companies with 5 to 25 employees. In 2003, 20% of all Belarusian software development companies had an annual turnover in excess of $0.5m. By 2008, the percentage had increased to 55%. Similarly, the percentage number of companies with turnovers in excess of $2m increased from 13.5 to 24% over the same time period.

Overwhelming majority of software development companies are orientated either exclusively to the domestic market or to foreign markets. National income from the export of software development services mainly comes from several Belarusian companies that were created 10-15 years ago.

Amongst the customers of Belarus’ software development companies are global leaders in telecommunication and computer technology sphere: Alcatel, IBM, British Telecom, Microsoft, SAP, Siemens, Sun Microsystems and Xerox. There are also other international corporations and institutions that order IT support and development services from Belarusian companies: Coca-Cola, Ford, Goodyear, Honda, Johnson & Johnson, London Stock Exchange, Procter & Gamble and World Health Organisation. In particular, Belarus is proud to provide software development services to the Russian giants: “Gazprom”, the manufacturer of the telecommunication equipment “IskraUralTel”, oil company “Rosneft”, metallurgical industrial complex “Severstal”, aircraft association “Tupolev”, telecommunication company “Vympelcom” and other companies well-known in Russia and worldwide.

The establishment of the Hi-Tech Park and changes to legislation have been welcomed by the heads of Belarus' software development companies. These developments have been also noticed by various organisations abroad. In 2008, many foreign investors expressed interest to co-operate with Belarus in various technology fields and to invest considerable sums in the country's economy. The most serious interest has come from the Russian Open Joint-Stock Society AFK "System" owned by the Russian billionaire Vladimir Yevtushenkov. In May 2008, this corporation declared its intent to invest between $300m to $1bn in various projects in Belarus such as microelectronics production and telecommunications system development.

Telekom Austria Company has already entered the Belarus market and France Telecom has shown interest in following suit.

During the 8th session of the intergovernmental Belarus-Chinese commission on cooperation in the field of science and the technologies in July 2008, Chinese scientists expressed interest to extend cooperation with Belarusian colleagues into the field of microelectronics.

Less than 4% of Belarus' software exports is connected with the sale of end-user software solutions and products. The main reason is due to small size of the domestic IT market, which has not encouraged the development of competitive products. Instead, software development upon the request of foreign clients has provided a more favourable and reliable model of business development for local entrepreneurs.

In 2006, Gartner, a market research agency, conducted a survey of 50 countries and placed them in one of three categories according to how attractive they were as IT outsourcing destinations: "the Leader and its main competitors" (Leader and Challengers), "the Fast-growing countries" (Emerging Countries) and "New suppliers" (Early Entrants). Belarus was placed amongst the "Fast-growing countries" group, which included 13 other countries (including 6 Eastern Europe representatives – Latvia, Estonia, Lithuania, Bulgaria, Slovakia and Ukraine). However, due to major changes in legislation and improvements in business conditions for software companies, the position of the country is expected to be improved further in future reports.

Belarus has to compete with many countries on the global market. India has been considered the main competitor for many years. However, recent surveys indicate that it has been replaced by Russia. On the other hand, it seems more appropriate to talk about cooperation rather than competition in the context of Russia. Belarus can present itself as a bridge between the European Union and Russia, who can provide clients with significantly lower software development costs compared to Eastern Europe, whilst offering access – and scale if needed - to Russian programming resources. Similar relations with India are simply not possible.

According to the Ministry of Communications, during the period January - June 2008, the net profit of the telecommunication enterprises grew 1.5 times and reached 462 billion Belarusian roubles (approximately 160 million euros). Taking into account the profitability of branch enterprises (about 40 %), it is estimated that their cumulative annual turnover is about 800 million euros.

The size of the export market for Belarus' software development services is several times greater than that for the domestic market. Total export income for Belarusian companies is about $360m. However, part of this income is received from the foreign development centres of Belarusian companies. If one excludes the contribution of these centres, then pure software development export amounts to about $300m. In other words, software and IT services export is almost three times larger than the domestic market.

An optimistic forecast for the size of export of software services in 2008 is that it was $390-420m. Meanwhile, total export income of Belarusian IT companies - including contribution of foreign centres – has been forecasted between $460-500m. The largest Belarusian companies - with over 400 employees - account for 60-70 % of all export. Meanwhile smaller companies - from 5 to 25 people, from 25 to 100, and from 100 to 400 – account for between 7-12 %.

In a recent survey, respondents declared that exported software services are normally related to the development of applied software for business. More than 40% of the respondents said they developed the following software solutions: "Applied software for enterprise resource management", "Applied software for business and production management" and "Software customer relations management". The least cited area for software development was for "System software". Meanwhile, less than 20% of the companies surveyed benefited from the sale of "Patents and intellectual property". The main goal for the majority of Belarusian

companies surveyed is to increase the size of their export markets whilst maintaining their local market presence.

The business environment for software development companies in Belarus has considerably improved in recent years. According to the World Bank and International Finance Corporation's survey "Doing Business 2009", Belarus has become one of the world's leaders for legal reforms aimed at simplifying business dealings and has joined four leading states-reformers in the legislation sphere.

To conclude, it is worthwhile citing the recent remarks of Valentine Makarov, President of the Russian Software Developers Association (Russoft): "There are some countries in Europe and in the world who like to brag that they export many millions of dollars of software development services each year. However, Belarus' forecast growth of 40-50% a year allows it to be considered the real challenger to quickly transition from one of eastern Europe's potential industry leaders into a world recognized leader for software development." In many ways, recent ICT industry developments in Belarus confirm this opinion.

There now follows a short description of Belarus' largest ICT companies with business activities and partners in Europe.

EPAM Systems is a leading software engineering outsourcing services provider in Central and Eastern Europe. EPAM maintains North American headquarters in Newtown, PA, and European headquarters in Budapest, Hungary, as well as support and delivery operations in UK, Sweden, and Germany. EPAM software development centres are located in Russia, Hungary, Belarus, and Ukraine.

ScienceSoft Inc is one of the most mature IT outsourcing service providers in Eastern Europe. During 20 years its custom software development centre has successfully completed more than 200 large projects (with some of them taking more than 100 man-years). Today 40% of Fortune 500 companies use software developed by ScienceSoft Inc.

Itransition is a software development company that creates cost-effective custom solutions based on technical expertise of about 600 software developers in staff. Itransition provides offshore software development, custom software design and outsourcing application development, as well as software solution customization and support. It has representative offices in USA (Texas), UK, and Netherlands.

EffectiveSoft is a custom software development firm located in Minsk, Belarus. It offers full cycle custom software programming services, from product idea, offshore software development to outsourcing support and enhancement.

BelHard Group is one of the leading IT holdings in Belarus, and BelHard Outsourcing is its software development division. Started in 1994, it has successfully completed more than 500 projects and has a substantial number of corporate customers.

IBA Group is the largest IT service provider in Eastern Europe performing onshore, near-shore and offshore projects with 2500 professionals. Headquartered in Prague, Czech Republic, IBA Group has offices in US, Germany, Bulgaria, Cyprus and Russia, and software development centres in Belarus and Czech Republic.

NTLab is a system-on-chip design and fabless microelectronic company. NTLab's is able to design digital, analogue, mixed-signal and RF microelectronic circuits. The company works in many fields of radioelectronics: GPS/GLONASS/Galileo satellite navigation, digital TV, and RF ID systems.

Generation P Consulting Ltd develops custom software solutions for the travel and hospitality businesses: travel technology companies, service providers, consolidators, tour operators, travel agencies and other industry players. It maintains a development centre in Minsk, Belarus, and a sales office in Munich, Germany serving clients throughout the EU, CIS and North America.

The main barriers to ICT cooperation between European and Belarusian private firms are highlighted in the following table together with an evaluation of the policy measures – from the Government of Belarus and/or European Commission – designed to address them.

Exhibit 12: Main barriers to ICT co-operation and policy responses

Description of barrier	Measures addressing the barrier (if any)	Relevance of policy response	Evidence of impact
1. Withdrawn, or reduced, international support for science and technology cooperation with Belarus, E.g. Belarus cannot participate in the US' CRDF programme and Swiss SCOPES programme, which include other former Soviet countries. Similarly, Germany and Poland have lowered their support for bilateral S&T programmes.	It is difficult to describe specific measures. However, there is an improvement in political relations between Belarus and the European Union (and steps towards a basic agreement on Belarus-EU cooperation).	3-4	3-4
2. Lack of awareness in Europe of the strengths of the Belarusian ICT sector. Lack of awareness of the potential technical and economic benefits of cooperation with Belarusian ICT companies (including IT outsourcing).	a) Establishment of the ICT association "Infopark" in 2001 under State Committee for Science and Technology b) Establishment of Belarus Hi-Tech Park in 2005 (by the Presidential Decree on High-Tech Park, 2005) c) Establishment of Republican Centre for Technology Transfer in 2003 under State Committee for Science and Technologies and National Academy of Sciences of Belarus d) Three EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011)	a) 4-5 b) 4-5 c) 4-5 d) 4	a) 4-5 b) 4-5 c) 3-4 d) Too early to say
3. Lack of awareness amongst Belarusian ICT companies of the FP7 ICT programme and lack of understanding and skills on how to effectively participate (e.g. only a handful of FP5/6/7 ICT collaborative research projects involving Belarusian HEI).	a) Establishment of a National Information Point on FP6/7 – including IST/ICT programmes - at Belarusian Institute of System Analysis (BelISA) first; and then - creation of NCPs network in the country b) Three EC funded FP6 Support Actions TRISTAN-EAST, IDEALIST34 and IDEALISTFP7 that collectively organised FP6/7 ICT awareness/training events and helpdesks (2004 – 2008) c) Three EC funded FP7 ICT Support Actions - SCUBE-ICT, ISTOK-SOYUZ and EXTEND – that collectively organise FP7 ICT awareness/training events, helpdesks and EU promotion tours (2009 – 2011).	a) 5 b) 5 c) 5	a) 4 b) 4 c) Too early to say
4. Lack of government ICT policy monitoring system based on standardised, internationally recognised ICT indicators/statistics. Lack of experience of ICT policy development, monitoring, evaluation and impact assessment based on standardised ICT indicators.	One of the actions identified in the action plan for the "Strategy of Information Society Development in Belarus until 2015", foresees establishment of a system for monitoring and statistical measurement of indicators for information society development. Work to be done by National Statistic Committee and the Centre of Information Processes Monitoring Institute.	5	Too early to say

Policy response ranking scored from 1 to 5: 1. No specific measures addressing the challenge (possibly a debate but no evidence of any real policy development); 2. Policy development under way to respond to challenge (policy debate or design launched); 3. Specific measures existing for some time but insufficient to respond fully to challenge; 4. Existing measure plus one or more newly launched measures (during last 18 months); 5. A comprehensive set of measures which potentially respond fully to the challenge.
Evidence of impact scored from 1 to 5: 1. Trend for indicators has worsened since measure(s) introduced 2. No observable change in trend since measure(s) introduced, 3. Too early to appraise (measures introduced in last 24 months), 4. Trend for indicators has improved since measure(s) introduced 5. Evaluation or study indicates measure(s) has clearly contributed to improving performance of country.

4.3 ICT policies and programmes facilitating co-operation with the EU

In 2003, the European Commission launched the **European Neighbourhood Policy (ENP)** which introduced the concept of Neighbourhood Programmes. The ENP lays the ground for closer cooperation with the neighbouring countries of the enlarged Union. Although the European Neighbourhood Policy covers Belarus, no Action Plan currently exists for the country.

Nevertheless, in the European Neighbourhood and Partnership Instrument (ENPI) Belarus Country Strategy Paper 2007-2013 and National Indicative Programme 2007-2010, the European Commission identified ICT as one of its assistance priory areas: "*Support may also be provided in the field of Information Society to facilitate the interconnection of the Belarusian education and research networks with their European counterparts*"[10].

Recently, in June 2009, the EU's Commissioner for External Relations and European Neighbourhood Policy - Benita Ferrero-Waldner - visited Belarus for the first time. During her visit, she held discussions with President Lukashenko on the need to conclude a basic agreement on Belarus-EU cooperation.[11]

Under the umbrella of European Neighbourhood Policy, the EU funds the cross-border cooperation (CBC) scheme with Belarus participating in three programmes – Poland/Belarus/Ukraine, Latvia/Lithuania/Belarus and the Baltic Sea Region. Although not an explicit scheme to support ICT cooperation, the priorities of the programmes allow such activities to be funded e.g. priority 1 - increasing competitiveness of the border area of the Poland/Belarus/Ukraine CBC.

In late 2003, the National Information Point on FP6/7 and INTAS was established in the Belarusian Institute of System Analysis (BelISA). BelISA is one of the main organizers of international S&T cooperation in the country: it organizes around 20 international events - seminars, conferences and national exhibitions - in Belarus and abroad each year. BelISA is a research institute of the State Committee for Science and Technology, which is responsible for the implementation of public policy and government control in the sphere of scientific and innovation activities, as well as protection of intellectual property rights.

Since 2004, BelISA has been the Belarusian representative in Ideal-IST[12], an EU funded worldwide ICT network, which is dedicated to supporting organisations to find partners and join EU funded ICT research projects. Also, 4 out of the 10 FP7 national contact points (NCPs) nominated in Belarus are located in BelISA, including the ICT NCP as well as National NCPs coordinator, INCO NCP and Mobility NCP.

In June 2009, BelISA organised an FP7 ICT workshop attended by over 120 people in Minsk entitled "Scientific and Technical Cooperation between Belarus and the EU in Information and Communication Technologies". The event was organised within the framework of the FP7 Support Action "Strategic Cooperation in Ukraine, Belarus and EU in Information and Communication Technologies" (SCUBE-ICT)[13]. Indeed, BelISA is also a partner in another FP7 Support Action EXTEND[14], which is supporting the participation of Belarusian organisations in the FP7 ICT programme. And, there is even a third FP7 Support Action - ISTOK-SOYUZ[15] – which is providing complementary support to Belarus.

The TEMPUS programme is another EU scheme that has provided since 1990 a potential route towards ICT cooperation[16]. Tempus supports the modernisation of higher education and creates an area of co-operation in countries surrounding the EU, including Belarus. Good examples of ICT cooperation via this mechanism include "Network to support the study development of information communication in Belarus (JEP-21054-2000)" and "Usage of new ICTs to train doctoral students in Belarus (JEP-TO74A04-2004)", which were both led by the University of Provence and involved Belarus State University, Gomel State University and Grodno State University.

On a bilateral level, science and technology cooperation with EU member states countries is well developed with Germany, Italy, France (via CNRS), Sweden, Poland, Czech Republic and Baltic States. However, Germany is by far the main R&D partner. Up to 60% international projects are implemented in cooperation with German scientists. Unsurprisingly, as a result, Belarus has a strong interest in the German approach to research, development and innovation.

[10] European Neighbourhood and Partnership Instrument - Belarus - Country Strategy Paper 2007-2013 and National Indicative Programme 2007-2010, page 18, http://ec.europa.eu/world/enp/pdf/country/enpi_csp_nip_belarus_en.pdf
[11] http://soderkoping.org.ua/page25248.html
[12] Ideal-IST website: www.ideal-ist.net
[13] SCUBE-ICT website: www.scube-ict.eu
[14] EXTEND website: www.extend-ict.eu
[15] ISTOK-SOYUZ website: www.istok-soyuz.eu
[16] Tempus Scheme, http://ec.europa.eu/education/external-relation-programmes/doc70_en.htm

From the side of the Belarusian government, there have been several initiatives in recent years that have significantly helped Belarusian ICT organisations with their international cooperation efforts. The most noteworthy of these are the Infopark, Belarus Hi-Tech Park and Republican Centre for Technology Transfer.

The scientific technology association "Infopark" was founded in 2001 and unites Belarusian software development companies[17]. The government established the association in order to improve the organisational, economic, and social conditions for ICT research, development and export. In particular, the association helps to provide a “common face” or “brand name” to foreign companies potentially interested in IT outsourcing. Currently the association has over 60 members, which amounts to more than 70% of all software developers in Belarus.

In 2005, the Belarus Hi-Tech Park[18] was created following the Decree of the President of Belarus to stimulate high technology production development in the country. Today, most Hi-Tech Park residents are involved in information technology development. Special and exclusive economic conditions are granted to residents of the park, which help to make it a very attractive location for European and international companies to outsource IT projects. The official body “Hi-Tech Park Administration” is responsible for managing the special economic status of the IT Enterprises. One of the important roles of the park is the maintenance of the IT education system. Currently, there are 88 enterprises - with various ownership structures - in the Hi-Tech Park and their export of software development services during the period of January-September 2010 reached $94.4m which is by 36% higher than over the same period in 2009. Due to its success, there are plans to expand the park’s activities and create a business incubator for IT companies.

In 2003, the Republican Centre for Technology Transfer (RCTT)[19] was founded by the State Committee for Science and Technologies of the Republic of Belarus, National Academy of Sciences of Belarus, United Nations Development Programme (UNDP) and the United Nations Industrial Development Organisation (UNIDO). Its main goal is to promote cooperation between developers and users of high technologies - including ICT - and potential investors. Specific to ICT related technology transfer, RCTT is currently a partner in two international cooperation projects: i) “Strengthening the National System for Technology Transfer in the Republic of Belarus on the Basis of ICT”, 50965, with $420k of funding from the Government of Belarus, UNDP and UNIDO and ii) “Information Technologies to Open Knowledge for Eastern Europe and Central Asia”, FP7 ISTOK-SOYUZ.

Finally, it is worth mentioning the intergovernmental organisation International Science and Technology Center (ISTC)[20]. ISTC was established in Moscow by international agreement in November 1992 as a nonproliferation programme. ISTC facilitates international science projects – including ICT related ones - and assists the global scientific and business community to source and engage with Russian and CIS institutes – including Belarus - that develop or possess an excellence of scientific know-how. The Parties to ISTC are Canada, the United States, the European Union, Japan, Norway and South Korea (funding parties), as well as Russia, Armenia, Belarus, Georgia, Kazakhstan, the Kyrgyz Republic and Tajikistan (recipient parties).
In summary, the key existing measures supporting ICT cooperation between the EU and Belarus are listed in the following table.

Exhibit 13: ICT Policy Measures facilitating co-operation with the EU

N°	Title	Organisation responsible
1	FP7 ICT Programme	DG Information Society, European Commission
2	Tempus	DG Education and Culture, European Commission
3	FP7 Marie Curie Actions	DG Research, European Commission
4	European Neighbourhood and Partnership Instrument (ENPI) Cross Border Cooperation (CBC) scheme: Poland/Belarus/Ukraine, Latvia/Lithuania/Belarus and Baltic Sea Region Programme	DG External Relations, European Commission
5	Infopark	State Committee for Science and Technology
6	Belarus Hi-Tech Park	State Committee for Science and Technology
7	Republican Centre for Technology Transfer	State Committee for Science and Technology and National Academy of Sciences of Belarus
8	ISTC Regular Projects and Partner Projects	International Science and Technology Centre

[17] Infopark website: www.infopark.by
[18] Belarus Hi-Tech Park website: www.park.by
[19] Republican Centre for Technology Transfer website: http://ictt.by
[20] International Science and Technology Center website: www.istc.ru

5 Recommendations to support future EU-Belarus ICT Co-operation

Based on an analysis of the gaps in policy response to EU-Belarus research cooperation barriers for universities and public research organisations (Exhibit 11) and private industry (Exhibit 12), the following concrete steps and instruments are recommended to improve cooperation within the ICT R&D sector. The suggestions target different ICT actors (i.e. RTD community, private industry and government) in each region (namely in Belarus and in EU) and are separated between strategic (medium-to-long term) and operational levels (short-to-medium term and/or making use of existing policy measures).

5.1 Recommendations for Belarusian ICT R&D actors

Exhibit 14: Recommendations for Belarusian ICT R&D community

RTD Community
Strategic Level
Recommendation #1 Recommend to DG Information Society and Media (DG INFSO) to fund future dedicated SICA projects as well as support actions aiming to support cooperation between the EU's and Belarus's ICT RTD Communities in FP7 ICT throughout the FP7 programme (up to 2013), as well as prepare the ground for FP8-ICT (beyond 2013). Responsible Organisation(s): ICT RTD Community actors (Belarusian Institute of System Analysis and Information Support in the Scientific and Technical Sphere (BELISA), United Institute of Informatics Problems of the National Academy of Sciences of Belarus (UIIP-NASB), Belarusian State University of Informatics and Radioelectronics (BSUIR), ICT Technology Business Incubator "Hi-Tech Park", etc). EECA-ICT cluster – to present the findings on country's ICT priorities until 2015, as well as results of SICA workshop on ICT projects Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 3*
Recommendation #2 Elaborate a concise draft and recommend to the Ministry of Communications and Informatization and the Ministry of Education to launch a competitive "ICT technology transfer" programme where consortia comprising of High Educational Institutes (HEI), public research organisations and industrial partners implement technology-transfer projects (from academic/public research organisations to industry). The programme should be largely "bottom-up" driven, where government defines broad ICT themes but consortia formulate their own specific proposal ideas and compete against each other. The programme should allow the participation of EU RTD actors well as private companies at their own costs. Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park) Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 4*
Recommendation #3 Ask the European Commission's Delegation to Belarus about the potential for funding a project focused on transferring EU know-how and expertise of ICT technology-transfer (e.g. via the Europe-aid Country-based support scheme in Belarus "Non-state actors and local authorities in development"). Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park) Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 4*

Recommendation #4
Belarusian scientific centres should strive to be the members of European and world associations and organizations (ECSA, EURO, ESF, ERA, ESA, etc)

Responsible Organisation(s): Belarusian universities and institutes of the National Academy of Sciences of Belarus

Timing: 2011-2013
ICT Cooperation Barrier Addressed (Exhibit 11): 2

Operational Level

Recommendation #1
Organise annual SICA (Special International Cooperation Action) EU-Belarus scientific workshops in Belarus focussed on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshops will be to pinpoint ICT research topics which could form the basis of EU-Belarus SICA calls in future FP ICT work programmes. Present and recommend findings to the Ministry of Communications and Informatization, the State Committee of Science and Technologies, the Ministry of Education and the DG Information Society and Media (DG INFSO).

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing: 2011-2012.

ICT Cooperation Barrier Addressed (Exhibit 11): 2

Recommendation #2
Recommend to the State Committee of Science and Technologies of Belarus to organise and/or financially support regular/annual FP7 ICT awareness raising/training workshops involving European ICT experts from RTD Community and Private Industry.

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing: 2011-2012

ICT Cooperation Barrier Addressed (Exhibit 11): 3

Recommendation #3
Recommend to the State Committee of Science and Technologies of Belarus to organise and/or financially support the strengthening of national (and possibly regional) FP7 National Contact Point (NCP) system/network. The existing EU experience in NCPs network building could be of great support in this process. The support should be based on the funding needs of the NCPs for training, travelling in EU and within the country, improving their service capacity as well as developing tools for monitoring and assessment of their work to increase Belarus participation in FP7.

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)
Timing: 2011-2012

Recommendation #4
Ask the Republican Centre for Technology Transfer (ICTT) to organise a workshop/plenary session about ICT technology-transfer to support the Belarusian ICT RTD Community (e.g. during the 2nd Belarusian Innovation Forum to be organised on 17-18 November 2010, Minsk).

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park)

Timing:2011-2012

ICT Cooperation Barrier Addressed (Exhibit 11): 4

Recommendation #5
Increase the mobility of Belarusian researchers. Set-up agreements with EU leading RTD organisations for joint RTD experiments, internships, etc. To develop a dedicated scheme to provide financial support to the researchers, including young ones, to be able to take part in different types of international mobility(conferences, face-to-face meetings, contacts, brokerage events, participation in international projects etc)

Responsible Organisation(s): ICT RTD Community actors (e.g. BELISA, UIIP-NASB, BSUIR, Hi-Tech Park); State Committee of Science and Technologies, Belarusian Foundation of Fundamental Research

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11): 4

Exhibit 15: Recommendations for Belarusian ICT Private Industry

Private Industry
Strategic Level
Recommendation #1 Recommend to DG INFSO to fund future dedicated EECA SICA research projects as well as support actions aiming to support cooperation between the EU's and Belarus's ICT Private Companies in FP7 ICT throughout the FP7 programme (up to 2013), as well as prepare the ground for FP8-ICT (beyond 2013). Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. "Hi-Tech Park", Infopark, Belarusian Scientific and Industrial Association, IT Enterprises Association) Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 12): 2 and 3*
Recommendation #2 Recommend to the Ministry of Communications and Informatization and Ministry of Education to launch a competitive "ICT technology transfer" programme where consortia comprising of High Educational Institutes (HEI), public research organisations and industrial partners implement technology-transfer projects (from academic/public research organisations to industry). The programme should be largely "bottom-up" driven, where government defines broad ICT themes but consortia formulate their own specific proposal ideas and compete against each other. Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. InfoPark, Belarus Hi-Tech Park and ICTT) Timing: 2011 *ICT Cooperation Barrier Addressed (Exhibit 12): 2*
Recommendation #3 To recommend strongest Belarusian private companies (EPAM, IBA, Itransition and others) to find possibilities and resources for engineering and scientific research in cooperation with leading national and European scientific centres and universities, as well as with their EU business partners, involved in FP7. Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. InfoPark, Belarus Hi-Tech Park and ICTT) Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11: 4, Exhibit 12: 2)*

Operational Level
Recommendation #1 Encourage Belarusian ICT Private Industry to make greater use of the ISTC's (International Science and Technology Centre) technology transfer and research partnerships programmes, as well as to use the ISTC for promotion of their new technologies and R&D competencies via the ISTC website (www.istc.ru). These are programmes that enable ISTC partners (e.g. various EU member states) to utilise the R&D and technology know-how of science and technology organisations from Belarus. Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. "Hi-Tech Park", Infopark, Belarusian Scientific and Industrial Association, IT Enterprises Association), ISTC Belarus Branch Office. Timing: 2011-2012 *ICT Cooperation Barrier Addressed (Exhibit 12): 2*
Recommendation #2 Encourage Belarusian ICT Private Industry to make greater use of the Republican Centre for Technology Transfer (ICTT) to promote their ICT capabilities. For example, ICTT could organise a workshop/plenary session dedicated to ICT technology-transfer during the 2nd Belarusian Innovation Forum (17-18 November 2010, Minsk). Responsible Organisation(s): Republican Centre for Technology Transfer (ICTT) Timing: 2011-2012 *ICT Cooperation Barrier Addressed (Exhibit 12): 2*
Recommendation #3 Recommend to the State Committee of Science and Technologies of Belarus to organise and/or financially support regular/annual FP ICT awareness raising/training workshops involving European ICT experts from RTD Community and Private Industry. Responsible Organisation(s): Organisations representing Belarusian ICT Private Industry (e.g. "Hi-Tech Park", Infopark, Belarusian Scientific and Industrial Association, IT Enterprises Association) Timing: 2011-2012 *ICT Cooperation Barrier Addressed (Exhibit 12): 2 and 3*

Exhibit 16: Recommendations for Belarusian Government

Government
Strategic Level
Recommendation #1 Recommend to DG Information Society and Media (DG INFSO) to fund future dedicated SICA projects as well as support actions aiming to support cooperation between the EU's and Belarus's ICT RTD Communities in FP7 ICT throughout the FP7 programme (up to 2013), as well as prepare the ground for FP8-ICT (beyond 2013). Responsible Organisation(s): The Ministry of Communications and Informatization, Ministry of Education, the State Committee for Science and Technologies Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 3*

Recommendation #2:
The State Committee for Science and Technologies of the Republic of Belarus should ask the European Commission's Delegation to Belarus about the potential for a joint project focused on transferring EU know-how and experience of ICT RTD policy development, ICT indicators, monitoring and evaluation (e.g. via the European Country-based support scheme in Belarus "Non-State Actors and Local Authorities in Development").
NB: The work should complement current activities being done by the Belarusian Government.

Responsible Organisation(s): State Committee for Science and Technology

Timing: 2011-2013

ICT Cooperation Barrier Addressed - Exhibit 11: 5 and Exhibit 12: 4

Recommendation #3
The Ministry of Communications and Informatization and Ministry of Education should launch a competitive "ICT technology transfer" programme where consortia comprising HEI, public research organisations and industrial partners implement technology-transfer projects (from academic/public research organisations to industry). The programme should be largely "bottom-up" driven, where government defines broad ICT themes but consortia formulate their own specific proposal ideas and compete against each other. The programme should allow the participation of EU RTD actors as well as private companies.

Responsible Organisation(s): Ministry of Communications and Informatization and Ministry of Education

Timing: 2011-2015

ICT Cooperation Barrier Addressed - Exhibit 11:4 and Exhibit 12:2

Recommendation #4
To stimulate the participation of IT organisations in EU R&D projects, to recommend to the State Committee of Science and Technologies of Belarus to initiate a procedure on a special tax reduction on income received for working in the frame of such projects.

Responsible Organisation(s): State Committee of Science and Technologies of Belarus

Timing: 2011
ICT Cooperation Barrier Addressed - Exhibit 11:4

Recommendation #5
Recommend to the Government of Belarus to support the system of National Contact Points in Belarus and to find the ways of funding their job, in some cases on full-time mode.

Responsible Organisation(s): State Committee of Science and Technologies of Belarus.

Timing: 2011

ICT Cooperation Barrier Addressed - Exhibit 12:3

Recommendation #6
To support the developing a national statistics system for monitoring social and economic transformation influenced by implementation of ICT programs, e.g. via the EuropeAid country based support scheme

Responsible Organisation(s): State Committee of Science and Technologies of Belarus.

ICT Cooperation Barrier Addressed - Exhibit 11:4

Operational Level

Recommendation #1
Organise bi-annual SICA (Special International Cooperation Action) EU-Belarus policy workshop focussed on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshop will be to agree on ICT research topics which could form the basis of EU-Belarus SICA calls in a future FP ICT work programmes.

Responsible Organisation(s): State Committee of Science and Technologies of Belarus, Ministry of Education of the Republic of Belarus and DG INFSO.

Timing: 2011-2013

ICT Cooperation Barrier Addressed - Exhibit 11: 2 and Exhibit 12:3

Recommendation #2

The State Committee of Science and Technologies of Belarus should fund the Belarusian RTD community to regularly organise (e.g. on annual basis), FP ICT awareness raising/training workshops involving European ICT experts from RTD Community and Private Industry (through a bi-annual competitive call).

Responsible Organisation(s): State Committee of Science and Technologies of Belarus

Timing: 2011-2015

ICT Cooperation Barrier Addressed - Exhibit 11: 2 and 3 and Exhibit 12: 3

Recommendation #3

The Ministry of Communications and Informatization and Ministry of Education and Belarusian Entrepreneurs Association, High-Tech Park, NGO "Information Society" should ask the European Commission's Delegation to Belarus about the potential for funding an ENPI Project focused on transferring EU know-how on how to run an ICT based business incubator.

Responsible Organisation(s): The Ministry of Communications and Informatization and Ministry of Education and Belarusian Entrepreneurs Association, High-Tech Park, NGO "Information Society".

Timing: 2011-2013

ICT Cooperation Barrier Addressed - Exhibit 11: 4 and Exhibit 12: 3

5.2 Recommendations for EU target audiences

Exhibit 17: Recommendations for EU ICT RTD community and Private Industry

RTD community and Private Industry
Strategic Level
Recommendation #1 Urge ETPs, EECA cluster, etc to recommend to DG INFSO to fund future dedicated EECA SICA projects as well as support actions aiming to boost cooperation between the EU's and Belarus's ICT research and industrial communities in FP7 ICT throughout the FP7 programme (up to 2013) as well as prepare the ground for FP8 ICT (beyond 2013). Responsible Organisation(s): EECA cluster, SCUBE-ICT consortium, ETP's international relations secretariat. Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 2 and 3*
Recommendation #2 The European Commission's Delegation to Belarus should discuss with the State Committee of Science and Technologies of Belarus, Ministry of Education of the Republic of Belarus about the potential for a joint project focused on transferring EU know-how and experience of ICT RTD policy development, ICT indicators, monitoring and evaluation (e.g. via the Europeaid Country-based support scheme in Belarus "Non-State Actors and Local Authorities in Development"). *NB: The work should complement current activities being done by the Belarusian Government.* Responsible Organisation(s): European Commission's Delegation to Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 5*
Operational Level
Recommendation #1 Urge the Belarusian research diaspora (i.e. Belarusian researchers working in EU) and ETPs to support the organisation of SICA (Special International Cooperation Action) scientific workshops in EU focussing on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshops will be to pinpoint ICT research topics which could form the basis of EU-Belarus SICA calls in future FP ICT work programmes. Present and recommend findings to DG INFSO as well as the Ministry of Communications and Informatization of Belarus, Ministry of Education and the State Committee of Science and Technologies of Belarus Responsible Organisation(s): Belarus research diaspora, ETP international relation secretariat, DG INFSO as well as the State Committee of Science and Technologies of Belarus, Ministry of Education and Ministry of Communications and Informatization of the Republic of Belarus. Timing: 2011-2012 *ICT Cooperation Barrier Addressed (Exhibit 11): 2*
Recommendation #2 Set-up agreements with Belarusian leading RTD organisations for joint RTD experiments, internships, etc through suitable funding (e.g. FP Capacities programme) or other funding instruments. Responsible Organisation(s): EU leading ICT RTD actors Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 4*

Exhibit 19: Recommendations for the European Commission

DG Information Society and Media (INFSO), DG Research and EU Delegations
Strategic Level
Recommendation #1 The European Commission's Delegation to Belarus should discuss with Ministry of Communications and Informatization and Ministry of Education of Belarus about the potential for funding a project focused on transferring EU know-how and experience of ICT R&D policy development, indicators, monitoring and evaluation. Responsible Organisation(s): European Commission's Delegation to Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 12): 5*
Recommendation #2 The DG INFSO should fund future dedicated EECA SICA projects as well as support actions aiming to boost cooperation between the EU's and Belarus' ICT research and industrial communities in FP7 ICT throughout the FP7 programme (up to 2013) as well as prepare the ground for FP8 ICT (beyond 2013). Responsible Organisation(s): DG INSFO, EECA cluster Timing: 2011-2015 *ICT Cooperation Barrier Addressed (Exhibit 11): 3 and 4*
Recommendation #3 The European Commission's Delegation to Belarus in cooperation with the Ministry of Communications and Informatization and Ministry of Education and Belarusian Entrepreneurs Association, High-Tech Park, NGO "Information Society" should check the potential for funding an ENPI Project focused on transferring EU know-how on how to support the development of technoparks and innovative clusters to support innovation and technology transfer, how to run an ICT based business incubator. Responsible Organisation(s): European Commission's Delegation to Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 11): 2*
Recommendation #4 The European Commission's Delegation to Belarus should support with the renovation and activisation of the basic cooperation agreement in science, technology and innovation between the EU and Belarus ratification process, as well as bi-regional policy dialog for framing mentioned above cooperation. Responsible Organisation(s): European Commission's Delegation to Belarus, State Committee of Science and Technologies, Ministry of Foreign Affairs of Belarus Timing: 2011-2013 *ICT Cooperation Barrier Addressed (Exhibit 12): 1*
Operational Level
Recommendation #1 DG INFSO in cooperation with the Ministry of Communications and Informatization and Ministry of Education should organise a bi-annual SICA EU-Belarus policy workshop focussed on ICT research topics of common interest to Belarus and EU. These topics are likely to be supercomputing, microelectronics, nanoelectronics and photonics, e-health and/or e-learning. The aim of the workshop will be to pinpoint ICT research topics which could form the basis of EU-Belarus SICA calls in future FP ICT work programmes.

Responsible Organisation(s): DG INFSO as well as State Committee of Sciences and Technologies Ministry of Communications and Informatization and Ministry of Education

Timing: 2011-2013

ICT Cooperation Barrier Addressed - Exhibit 11: 3 and Exhibit 12: 3

Recommendation #2

Encourage key Belarusian and European ICT research organisations to participate in the following three European Neighbourhood and Partnership Instrument (ENPI) programmes:

- Latvia-Lithuania-Belarus Cross Border Cooperation (CBC)
- Poland-Belarus-Ukraine Cross Border Cooperation (CBC)
- Baltic Sea Region

Although not explicit schemes to support ICT cooperation, the priorities of the programmes allow such activities to be funded e.g. Priority 1 of P-B-U CDC increasing competitiveness to the border area (which covers such activities as improving accessibility to education services (e.g. e-Learning), and joint actions to promote and support research and business institutions. The programme Poland-Belarus-Ukraine Cross Border Cooperation is open to regional and local authorities, non-governmental organisations and non-profit organizations, as well as organisations, providing services in the fields of culture, research and science.

Responsible Organisation(s): Joint Technical Secretariat (JTS) Cross Border Cooperation Programme and the Delegation of the European Union to Belarus.

Timing: 2011-2015

ICT Cooperation Barrier Addressed (Exhibit 11): 2

Recommendation #3

The European Commission's Delegation to Belarus should discuss with the Ministry of Communications and Informatization and the Ministry of Education about the potential for funding support action focused on transferring EU branding know-how and export promotion experience for the national IT outsourcing sector.

Responsible Organisation(s): European Commission's Delegation to Belarus

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 12): 2

Recommendation #4

The European Commission's Delegation to Belarus should discuss with the Ministry of Communications and Informatization and the Ministry of Education, Hi-Tech Park about the potential for funding support action focused on transferring EU know-how on how to run an ICT based business incubator.

Responsible Organisation(s): European Commission's Delegation to Belarus

Timing: 2011-2013

ICT Cooperation Barrier Addressed (Exhibit 11: 4, Exhibit 12: 2)

Annexes

Annex 1: Overview of ICT Policy Documents

Main policy documents concerning ICT policy adopted/published since 2002

Title of document (in English)	**Date** (of approval, publication, etc)	**Responsible Organisation** (Ministry, etc)	**Legal status** (Law, Government Decision, strategy (white) paper, action plan, etc)
On approving the State informatization programme of the Republic of Belarus for 2003-2005 and for the future till 2010 "e-Belarus"	27.12.2002	Cabinet Council	Resolution № 1819
On the development of the information society	01.07.2003	Coordinating Council for informatization of the CIS countries at regional commonwealth in the field of communications	Joint Statement of the Countries of the CIS (St. Petersburg Declaration)
On the postal communication	15.12.2003	Parliament	Law № 258-3
On approving the Regulation on the Ministry of Communications and Informatization of the Republic of Belarus	17.03.2004	Cabinet Council	Resolution № 302
On approving the list of the priority directions of basic and applied scientific research of the Republic of Belarus during for 2006-2010	17.05.2005	Cabinet Council	Resolution № 512
On approving the priority directions of scientific and technical activity in the Republic of Belarus for 2006-2010	06.07.2005	President of the Republic of Belarus	Decree № 315
On the electrical communication	19.07.2005	Parliament	Law № 45-3
On the improvement of the stimulation of the creative work of the young scientists	11.08.2005	President of the Republic of Belarus	Decree № 367
On the Hi-Tech Park	22.09.2005	President of the Republic of Belarus	Decree № 12
On some measures to develop the production of means and systems of telecommunication in the republic of Belarus	30.11.2005	Cabinet Council	Resolution № 1358
On approving the Regulation on the directing agency - the executor of the state (regional, branch) scientific and technical programme	30.11.2005	State Committee for Science and Technology	Resolution № 17
On the innovation fund of the Ministry of Communications and Informatization of the Republic of Belarus	06.12.2005	Ministry of Communications and Informatization	Resolution № 27
On approving the State programme of the introduction of digital television and radio broadcasting in the Republic of Belarus until 2015	08.12.2005	Cabinet Council	Resolution № 1406
On approving the list of state scientific and technical programmes for 2006-2010	04.01.2006	Cabinet Council	Resolution № 5
On approving the State Programme of the development of satellite television broadcasting in the Republic of Belarus until 2010	16.02.2006	Cabinet Council	Resolution № 232
On works coordination for the State informatization programme of the Republic of Belarus for 2003-2005 and for the future till 2010 "e-Belarus"	10.05.2006	Ministry of Communications and Informatization	Resolution № 10
On the state complex target scientific and technical Programmes	31.08.2006	Cabinet Council	Resolution № 1117

Title of document (in English)	**Date** (of approval, publication, etc)	**Responsible Organisation** (Ministry, etc)	**Legal status** (Law, Government Decision, strategy (white) paper, action plan, etc)
On the approving the Regulations on the order of competitive selection and realization of the innovation projects, financed from the republic budget, the scientific research, experimental design and experimental technological works and the works on organisation and mastering of the scientific and technical production, financed by the innovation funds	10.10.2006	Cabinet Council	Resolution № 1329
On approving telecommunications development Programme in the Republic of Belarus for 2006-2010	23.10.2006	Cabinet Council	Resolution № 1395
On the coordination councils for the state complex target scientific and technical Programmes for 2006-2010	24.11.2006	State Committee for Science and Technology and National Academy of Science	Resolution № 9/24
On approving the National Programme of international technical cooperation for 2006-2010	09.12.2006	Cabinet Council	Resolution № 1644
On approving the UNDP Country Programme for the Republic of Belarus (2006 - 2010 years)	09.12.2006	Cabinet Council	Resolution № 1645
On the approving the directions and state customers within the limits of the expenditures of republic budget, provided in 2007 for the scientific, scientific and technical and innovation activity	27.02.2007	Cabinet Council	Resolution № 246
On State Programme of Innovation Development of the Republic of Belarus for 2007-2010	26.03.2007	President of the Republic of Belarus	Decree № 136
On approving the implementation plan of the State Programme of Innovation Development of the Republic of Belarus for 2007-2010	25.04.2007	Cabinet Council	Resolution № 523
On certain issues of the Ministry of Communication and Informatization	14.05.2007	Cabinet Council	Resolution № 579
On approving the Regulation on Scientific and Technical Council of the Ministry of Communications and Informatization of the Republic of Belarus	20.07.2007	Ministry of Communications and Informatization	Resolution № 25
On the council for examination of scientific research, experimental design and experimental technological works	29.08.2007	Ministry of Justice	Resolution № 56
On information, informatization and information protection	10.11.2008	Parliament	Law № 455-3
On electronic document and digital signature	28.11.2009.	Cabinet Council	Law №113-3
On measures of improvement for the national Internet segment	01.02.2010	Cabinet Council	Decree №60
On some measures for development of data transmission network in the Republic of Belarus	30.09.2010	President of the Republic of Belarus	Decree №515
On approval of the National Program for accelerated development of information technology services for 2011-2015	Draft	Cabinet Council	Draft

Annex 2: Overview of ICT Policy Measures

Table A2.1: Policy Measure Fiche: overview

ICT PM Fiche Number	Title of measure	Information Details
BY_1	National ICT Programme of the Republic of Belarus from 2003-2010 "e-Belarus" (e-Belarus) (Государственная программа информатизации Республики Беларусь на 2003-2010 года "Электронная Беларусь")	Overview The creation of a unified ICT environment to provide the conditions for improving the economy, state and regional management, provision of citizens right for free search, transfer, and distribution of information of the status of economic and social development of the society. The recipients of the programmes are the Ministers of the Government of Belarus; State, Regional and City Administrations; Administration of the President of Belarus; Parliament of Belarus; and National and Regional libraries. The leading organisations responsible for programme execution are the National Academy of Sciences of Belarus, Belarusian State University, Belarusian State University of Informatics and Radio electronics, Institute of Applied Software systems, National Cadastre Agency, Centre of Information Security, State enterprise "Geoinformation systems", and Enterprise "Beltelecom". Background ICT is one of the priorities of state technology policy of Belarus. The programme "e-Belarus" is planned to integrate many automated information systems on the basis of unified approach and involvement of information technologies into new sphere of state and public activity. It should lead to increases in economic efficiency and management improvement on local, regional and state levels. The tasks of the programmes are directed to the solution of the problems of information systems cooperation by means of coordination of the activities of the participants of the process, support of IT centres in creation of the systems for the customers, involvement of Belarus in world IT market. The control and coordination of the programme are under responsibility of the Ministry of Communication and Informatization of Belarus. Duration 2003 - 2010 Budget - Not available Administering Agency Ministry of Communications and Informatization 10, F.Skoriny Ave., 220050, Minsk, Republic of Belarus Phone: (37517) 227-3861 Fax: (37517) 227-2157 E-Mail: mpt@belpak.by Web: http://www.mpt.gov.by Manager Responsible for the Measure Ministry of Communications and Informatization Phone: (37517) 227-3861 E-Mail: mpt@belpak.by References Programme "e-Belarus" is a State Programme approved by the Council of Ministers of Belarus № 1819 on 27 December 2002 and amendments issued by The Ministry of Communication and Informatization № 3,30,35
BY_2	State Programme of Innovation Development of Republic of Belarus for 2007 - 2010 (Государственная	Overview Strategic goal of the Programme is to develop the Belarusian economy to be knowledge-based, competitive in the world market, science-intensive, resource-saving and eco-friendly as well as oriented towards sustainable socio-economic development and improving the quality of life of the Belarusian nation.

ICT PM Fiche Number	Title of measure	Information Details
	Программа инновационного развития Республики Беларусь на 2007 - 2010 годы)	The major targets of the programme include: • building up the national innovation system • cultivating the economic, legal and socio-cultural environment conducive to innovation activities • upgrading manufacturing and social facilities on the basis of new and high technologies • achieving a brand new technological level in the economic sectors • increasing the share of high-technology exports, import-substitution, economy and energy security • developing intellectual potential and creative activities of people Specifically, over the Programme's four years, it aims to : 1. Create 100 new enterprises and production facilities essential for innovation development of the country (22 involving foreign technologies) 2. Create 386 new products (based on new technology development) in active enterprises critical for economic development (68 involving foreign technologies) 3. Modernization of 609 active products based on implementation of 888 advanced (new and high) technologies (96 involving foreign technologies) Background The State Programme is directed towards achieving one of the country's main priorities: transforming the national economy into an innovation and knowledge-based one. This will result in the implementation in the new products, technologies and services in all areas of the life of Belarusian society. To achieve this aim, a step-by-step approach is being taken to construct a national innovation system in the Republic of Belarus. Duration 2007 - 2010 Budget 6.5 billion euros (total – but much funding is allocated to construction) Administering Agency State Committee on Science and Technologies (Государственный комитет по науке и технологиям) Akademicheskaya Str. 1, 220072, Minsk, Republic of Belarus Phone +37517 2840760 Website http://www.gknt.org.by/ Email gknt@gknt.org.by http://www.government.by/public/shared/rus/innovations_p/en/08.html Manager Responsible for the Measure Chairman of the State Committee on Science and Technologies Voitov Igor Vitalievich (office 316, 08.00 – 14.00 1st Wednesday each month) Phone: +37517 2840760 Email: gknt@gknt.org.by References Decree of the President of the Republic of Belarus № 136 26.03.2007 Resolution of Cabinet Council of the Republic of Belarus № 523 25.04.2007 www.bankzakonov.com/d2008/time11/lav11891.htm (in Russian) www.levonevski.net/pravo/razdel5/num2/5d25216.html (in Russian) www.government.by/public/shared/rus/innovations_p/index.html (in Russian) www.government.by/public/shared/rus/innovations_p/index_en.html (in English)
BY_3	Continuous Acquisition and Lifecycle Support - CALS (Product Lifecycle Management - PLM) (Непрерывная	Overview State scientific-engineering programme CALS is designed to develop and implement information technology in industry to support the whole lifecycle of product development and production. It includes the use of contemporary CAD systems, technological works preparation, reengineering of works sequence,

ICT PM Fiche Number	Title of measure	Information Details
	информационная поддержка жизненного цикла продукта)	works management, general automation of the management of the enterprise as a whole, technical procedures of product acceptance and other aspects of product design, manufacturing, maintenance and utilization. The recipients of the technology are the Ministry of Industry of Belarus and the largest industrial centres in Belarus: Minsk Tractor Works, Minsk Truck Works, BELAZ (large lorries) and others. In the programme execution, the institutions of the National Academy of Sciences of Belarus work in close cooperation with the industrial engineering centres. Background Information technology plays an essential role in helping companies to manage and automate their product development and manufacturing processes, thereby helping to increase their efficiency, shorten new product development lead times and reduce costs. The most important stages of the cycle are the design stage and preparing for production. These parts include the graphic design, information supply and management optimization. Information technology has become a priority of the technology policy of the industrial centrer of Belarus. The programme is planned to integrate many automated information systems on the basis of a unified approach and the involvement of information technologies in new product manufacture. The control and coordination of the programme are under responsibility of the Ministry of Industry of Belarus. Duration 2005 - 2010 Budget 2.7m euros (total) Administering Agency Ministry of Industry 2, Partizansky Ave., block 4, Minsk, 220033, Republic of Belarus Phone: (+37517) 224-9595 Fax: (+37517) 224-8784 Email: minprom1@minprom.gov.by or minprom@minprom.gov.by Website: www.minprom.gov.by Manager Responsible for the Measure Ministry of Industry of the Republic of Belarus Phone: (37517) 224-9595 Email: minprom1@minprom.gov.by or minprom@minprom.gov.by References Programme CALS-technology is a State Scientific-Engineering Programme approved by the Council of Ministers of Belarus
BY_4	Electronics and Optics Programme “Электроника и оптика”	Overview The main goal of the programme is to develop the component basis for the future generation of information and telecommunication systems. The programme is divided into two parts: The First part contains: State Scientific-Technical Programme (SSTP) “MICROELECTRONICS”, SSTP “RADIOELECTRONICS”, SSTP “RADIOCOMMUNICATIONS”, SSTP “OPTOTECH”, SSTP “STANDARDS and MEASUREMENT TECHNIQUES”. The Second part contains: State Complex Programme of Scientific Research (SCPSR) “ELECTRONICS” and SCPSR “PHOTONICS”. Background The main goal of these programmes is to develop the physical and technological

ICT PM Fiche Number	Title of measure	Information Details
		basis of new materials production, new micro-opto-nano, radioelectronic devices and control systems development for the future generation of information and telecommunication systems. Duration 2006 - 2010 Budget 25m euros (total) Administering Agency United Institute of Informatics Problems, National Academy of Sciences of Belarus Manager Responsible for the Measure General Director Alexander TUZIKOV References -
BY_5	Scientific fundamentals of information technologies and systems – INFOTECH (Научные основы информационных технологий и систем - ИНФОТЕХ)	Overview The INFOTECH programme aims to support the creation of new intelligent information technologies and systems, the development of models, mathematical methods and hard-software facilities to increase the product competitive abilities and improve social sphere of the country. The programme belongs to oriental fundamental research (programme 01), applied research (programmes 22, 24, 26, 45, 47) and maintenance projects (programme 46). The beneficiaries of the programme are the National Academy of Sciences of Belarus and Ministry of Education of Belarus. The leading organisations responsible for execution of the programme are the United Institute of Informatics Problem and Belarusian State University. Background The work plan for the programme for the period 2006-2010 was approved by the Council of Fundamental and Applied research of the National Academy of Sciences of Belarus on 8 February 2006. The programme aims to advance the following priority scientific directions in Belarus approved by Presidential Decree on 6 June 2005: information and communication technologies (communication facilities and software); IT for resources economy and energy effective technologies of competitive products manufacturing; IT for diagnosis support in medicine ; IT for ecology and rational nature management; mathematical modelling the systems and processes, and creation of information infrastructure. The activities of the programme are aimed at resolving problems of innovation economic development and upgrading IT in production, agriculture, social sphere, service and state structures. Duration 2006 - 2010 Budget 1.4m euros (total) Administering Agency United Institute of Informatics Problems, National Academy of Sciences of Belarus Manager Responsible for the Measure General Director Alexander TUZIKOV References http://www.uiip.bas-net.by Annual scientific-research reports of the National Academy of Sciences of Belarus (2006, 2007, 2008) The reports of the Acceptance Group for the projects (in Russian)

ICT PM Fiche Number	Title of measure	Information Details
BY_6	Development and implementation of science intensive computer technologies "TRIADA"	Overview The programme is integrated and includes the priority directions that are focused on dominant problems of supercomputer technologies use - mainly in the industry. Three project directions are specified in the programme: 1. Investigation, verification and adaptation of advanced foreign computer technologies on the basis of Russian and Belarusian high-performance multi-processors computer systems. 2. Development and implementation of new science intensive technologies on the basis of high-performance multi-processor computer systems. 3. Development of the system software and hardware on the basis of high-performance multi-processors computers produced in Russia and Belarus complying science intensive computer technologies. Background The programme includes the projects: investigation of the adequacy, precision and scalability problems in CAE-application, aero-hydrodynamics and electromagnetic processes modeling of world known software package, development of technology and software for creation of parallel databases, information and information-analytic systems on the basis of high-performance multi-processors computer systems; development and investigation of parallel calculating algorithms for data processing in petroleum and gas fields exploration; investigations of new constructional methods of commutative algebra and new combinatory algorithms for effective solution of actual problems using calculating clusters with sub-miniature delay of message transfer and distributed shared memory; investigation of the problems of effective synchronization of parallel process in simulation discrete modelling of large technical and socio-economical systems, development of parallel intellectual simulation complexes for the situation centres of decision-making support; the principles of control real time systems creation based on multi-processors systems and methods of logical and calculating the real time algorithms; the creation of the family of genetic hard-software calculating complexes and basic methods with implementation in aerospace, automobile and shipbuilding industry, geological survey and meteorology. In the frame of the programme "TRIADA" the family of model high-performance personal computer complexes with parallel architecture (personal clusters) was created. Duration 2005-2008 Budget 6.4m euros (total) Administering Agency United Institute of Informatics Problems, National Academy of Sciences of Belarus Manager Responsible for the Measure General director Alexander V. Tuzikov References http://www.uiip.bas-net.by Analytical Report (Summary) on Russian-Belarusian State Programme "Triada", signed by the Acceptance Committee on April 2009

ICT PM Fiche Number	Title of measure	Information Details
BY_7	Telecommunications Development Programme for the Republic of Belarus for 2006 – 2010 (Программа развития связи в Республике Беларусь на 2006 — 2010 годы)	Overview The objectives of the programme are: • The creation of conditions, which facilitate the guarantee of maximum satisfaction of demand in the telecommunications and postal services to individuals and legal entities, individual entrepreneurs, republican institutions of public administration, national security and defence; • The conversion of the sector of electrical communication into the sector of information communication line technologies with the elements of electrical communication, radio broadcasting and computer technology; • The liberalization of the telecommunication services market and the exception of the cross subsidizing of different forms of telecommunication services considering the Republic of Belarus' entry into the International Trade Organisation; • The creation of the national net structure of informatization as the whole set of the communication networks, user equipment and information resources, which can be used for the access to information, personal contacts, work, education and leisure at any time and any place at the accessible tariffs. Background Information and telecommunication technologies play a crucial role in the contemporary world. Globalisation processes, international cooperation and division of labour, personal contacts and education are impossible without high quality communication and postal services. These services are usually better developed through state promotion and support. Duration 2006 - 2010 Budget 601m euros (total) Administering Agency Ministry of Communications and Informatization (Министерство Связи и Информатизации Республики Беларусь) Address Nezavisimosti Str, 10, 220050, Minsk, Republic of Belarus Phone +375 17 227 38 61 Website http://www.mpt.gov.by Email mpt@mpt.gov.by Manager Responsible for the Measure Minister of Communications and Informatization +375 17 287 87 06 (secretary of Minister), +375 17 287 88 89 (Minister himself – 1st Wednesday each month, 10-12 am), mpt@mpt.gov.by References Resolution of Cabinet Council of the Republic of Belarus № 1395 23.10.2006 www.pravo.by/webnpa/text.asp?RN=C20601395 (in Russian) www.president.gov.by/press13175.print.html (in Russian)
BY_8	State Programme for the Introduction of Digital Television and Radio Broadcasting in the Republic of Belarus until 2015 (Государственная	Overview The main objectives of the programme are: • provision of multi-programme television services; • improvement in the quality indices of television programme broadcasting service provision; • creation of prerequisites for the development of science-intensive industries; launching the production of new types of receiving and

ICT PM Fiche Number	Title of measure	Information Details
	программа внедрения цифрового телевизионного и радиовещания в Республике Беларусь до 2015 года)	transmitting radio and television equipment; • timely access of new import-substituting domestic developments to the internal market; and • an increase in the competitiveness of domestic production on the international market. Background Rapid development of telecommunications with the introduction of digital technologies for signal processing and transmission in order to raise the provision of telecommunication services to a brand new level. Digital methods of information transmission will allow combination of digital streams from different sources, effective interaction within various communication systems and computer networks and access to global and local information networks to a wide range of users. Thus they will contribute to further development of information structure and scientific and industrial potential of the country in the fields of radio electronics and telecommunications. Duration 2005 - 2015 Budget 41m euros (total) Administering Agency Ministry of Communications and Informatization (Министерство Связи и Информатизации Республики Беларусь) Address Nezavisimosti Str, 10, 220050, Minsk, Republic of Belarus Phone +375 17 227 38 61 Website http://www.mpt.gov.by Email mpt@mpt.gov.by Manager Responsible for the Measure Minister of Commucations and Informatization +375 17 287 87 06 (secretary of Minister), +375 17 287 88 89 (Minister himself – 1st Wednesday each month, 10-12 AM), mpt@mpt.gov.by References Resolution of Cabinet Council of the Republic of Belarus № 1406 08.12.2005 Resolution of Cabinet Council of the Republic of Belarus № 5 04.01.2006 http://president.gov.by/ru/press42993.html (in Russian) www.brtpc.by/services/television/digital/ (in Russian) www.levonevski.net/pravo/temy/tema24/glav/docm0047.html (In Russian)
BY_9	State Programme for the Development of Satellite Television Broadcasting in the Republic of Belarus until 2010 (Государственная программа развития спутникового телевизионного вещания в республике Беларусь до 2010 г.)	Overview The main objectives of this programme include: • the development of electronic media, • the expansion of information space of the Republic of Belarus, • the production of new types of receiving equipment of satellite television broadcasting, • increasing the competitiveness of domestic products on international markets. Background In today's world, television has become an essential tool for media, affecting the overall development of society, economic growth, social stability and development of civil society institutions. As an integral part of the culture of the country, television influences the preservation of language, traditions and the formation of the scale of material values of society, as well as social and political climate. Duration 2006 - 2010

ICT PM Fiche Number	Title of measure	Information Details
		Budget 968,462 euros Administering Agency Ministry of Communications and Informatization (Министерство Связи и Информатизации Республики Беларусь) Address Nezavisimosti Str, 10, 220050, Minsk, Republic of Belarus Phone +375 17 227 38 61 Website http://www.mpt.gov.by Email mpt@mpt.gov.by Manager Responsible for the Measure Minister of Commucations and Informatization +375 17 287 87 06 (secretary of Minister), +375 17 287 88 89 (Minister himself – 1st Wednesday each month, 10-12 AM), mpt@mpt.gov.by References Resolution of Ministers Council of the Republic of Belarus № 232 16.02.2006 www.president.gov.by/press42994.html (in Russian) www.levonevski.net/pravo/razdel5/num2/5d20163.html (in Russian)
BY_10	ICT for the education system of the Republic of Belarus for 2007-2010 (Программа “Комплексная информатизация системы образования Республики Беларусь на 2007-2010 годы”)	Overview The main goal of the programme is to improve educational quality through the creation of a modern and supportive information technology environment in schools and encourage the widespread use of information and communication technologies in educational practice. Background In the 21st century information and communication technologies have become a major factor in defining the development of society. The availability and ability to use information and communication technologies, by state administrations, private companies and individuals, is essential for a country aspiring to have a thriving knowledge-based economy. Duration 2007 - 2010 Budget 27.9m euros (total) Administering Agency Ministry of Education (Министерство образования Республики Беларусь) Address Sovetskaya st., 9, Minsk, 220010, Republic of Belarus Phone +375 17 227-47-36 Website http://www.minedu.unibel.by/ Email root@minedu.unibel.by Manager Responsible for the Measure Alexander Rad’kov, Minister of Education Phone +375 17 227-47-36 Email root@minedu.unibel.by References Resolution of Cabinet Council of the Republic of Belarus № 265, 01.03.2007 http://pravo.by/webnpa/text.asp?start=1&RN=C20700265

ICT PM Fiche Number	Title of measure	Information Details
BY_11	Belarus Hi-Tech Park	Overview The main objectives of the project are: • Establish favourable conditions for improving competitiveness of the economy of Belarus, based on new and high technologies; • Further improve the institutional, economic and social conditions for the development of modern technology and increase their exports in this sector • Attract domestic and foreign investments in IT-sector. The Hi-Tech Park hosts legal entities or individual entrepreneurs engaged in: • Analysis, design and software development of information systems and technologies (includes design, development, delivery and documentation of custom software or off-the-shelf software; design, development and implementation of enterprise information systems; consulting, training and technical support services for the software developed by Hi-Tech Park residents); • Software-based data processing; • Fundamental and applied R&D, experimental R&D in the field of natural and technical sciences (scientific, research, experimental and engineering works). As the next stage the Belarusian government considers adding medical & biotechnologies, nanotechnologies, integrated green technologies as well as other future-oriented activities to the high priority areas of the Hi-Tech Park activities. The Hi-Tech Park is keenly interested in R&D projects in various science-intensive areas. Today, there are 67 residents in the Hi-Tech Park. Background One of the success drivers of Belarus IT industry is rooted in its mature technical infrastructure which started to develop at the times of the Soviet Union when Belarus used to manufacture over 50 percent of the computers and computer components in the former USSR. Geographical and cultural proximity to the EU is also important. Among the key advantages of Belarus is the excellent education system inherited from the Soviet times when a strong focus was consistently made on natural sciences and applied research. A lot of programmers in Belarus have participated in scientific R&D projects for the military, energy and other industries of the former Soviet Union. Belarus is among the few countries in the world whose specialists have been involved in construction of space stations, global communication systems, and nuclear development projects. Duration 2005 - Budget - Not available Administering Agency The Administration of the Belarus Hi-Tech Park 1, str. Kuprevich Minsk Belarus 220141 tel. (+375-17) 268-69-11 fax (+375-17) 268-69-22 email: info@park.by Manager Responsible for the Measure Dr. Valery Tsepkalo, Director of the Belarus Hi-Tech Park tel. (+375-17) 268-69-11 References The Decree of the President of the Republic of Belarus “On the Hi-Tech Park”, 22.09.2005

ICT PM Fiche Number	Title of measure	Information Details
		http://park.by/about
BY_12	Strategy of Information Society Development in Belarus until 2015	Overview The main goal of the Strategy is to define priority areas of the state policy of the information society development in the Republic of Belarus for the period up to 2015. The goal is fully consistent with the action plan for building the information society, which were identified in documents of the World Summit on the Information Society and approved at the international level with the participation of the Republic of Belarus (Geneva 2003, Tunis 2005). The Strategy indicates basic tasks that need to be solved for effective information society development in the country: • Formulate the state information and innovation policy that promotes the development of information society on the basis of innovation; • Develop information and communications infrastructure to meet growing information needs of citizens, businesses and the state; • Develop the national information industry and attract investments in production of information technologies, resources and electronic services in Belarus; • Improve the education system, ensuring creation and maintenance of high-quality human capital; • Develop systems of information security, ensuring protection of national interests of the Republic of Belarus in the global information space, as well as legal and secure use of ICT in all spheres of life. Background Information Society is a recognized historical stage in the development of civilization, featuring a dominant role of knowledge and information in all spheres of society, the decisive impact of information and communication technologies (ICT) on the way of life of people, their education and work, as well as the interaction between the state and civil society. The development of information society in the Republic of Belarus is viewed as the top priority of innovation development of the country in the 2010-2015 and is regarded as the national objective that requires coordination and joint efforts by the state, private business and civil society. Duration 2010-2015 Budget Not yet defined as at present the Strategy does through the fourth stage of approval before adoption. Administering Agency Ministry of Communications and Informatization of the Republic of Belarus Address Nezavisimosti Ave, 10, 220050, Minsk, Republic of Belarus Phone +375 17 227 38 61 Website: http://www.mpt.gov.by Email: mpt@mpt.gov.by Manager Responsible for the Measure Minister of Communications and Informatization +375 17 287 87 06 (secretary of Minister), +375 17 287 88 89 (Minister himself – 1st Wednesday each month, 10-12 AM), mpt@mpt.gov.by References

Annex 3: Sources of further information

A3.1 Websites of key ICT organisations

Name of organisation (in English)	Website
Government and legislative bodies	
Legislative bodies	
National Assembly of the Republic of Belarus, House of Representatives	http://www.house.gov.by/
Commission on Education, Culture, Science and scientific and technical progress (of the National Assembly)	http://www.house.gov.by/
Commission on Human Rights, National Relations and Mass Media (of the National Assembly)	http://www.house.gov.by/
Commission on Industry, Fuel and Energy Complex, Transport, Communications and Entrepreneurship (of the National Assembly)	http://www.house.gov.by/
Government bodies	
Council of Ministers of the Republic of Belarus	www.government.by
Administrative Office of the President of the Republic of Belarus	http://www.president.gov.by
Interdepartmental Commission on Informatization Issues at the Council of Ministers	www.government.by
Ministry of Communications and Informatization, Department on Informatization, Coordination Council	www.mpt.gob.by , http://www.mpt.gov.by/new/modules/dep/
State Commission on Radio Frequencies	www.government.by
State Committee on Science and Technologies	http://www.gknt.org.by
Ministry of Education	www.minedu.unibel.by
National Statistical Committee	http://www.belstat.gov.by/
Ministry of Justice	http://www.minjust.by
State Committee on Standardization and Certification, Belarusian State Institute for Standardization and Certification	www.gosstandart.gov.by www.belgiss.org.by
Ministry of Economics	www.economy.gov.by
The information-analytical Centre at President of the Republic of Belarus	http://iac.gov.by
Ministry of Information	www.mininform.gov.by
The National Center of Intellectual Property	http://belgospatent.org.by
National Bank of the Republic of Belarus	http://nbrb.by/
Private sector organisations and entrepreneurship promotion	
Associations	
Belarusian association of the industrial enterprises	http://www.belapp.by
Republican Public Association “Belarusian scientific industrial association”,	http://www.bnpa.info
Union of legal bodies “Republican Confederation of Entrepreneurship”,	http://belarusbusiness.by
Belarusian Banks Association	http://www.abbanks.by/
Belarusian Union of Entrepreneurs	http://bae.iatp.by/
Minsk Capital Association of Entrepreneurs and Employers	http://allminsk.biz/
Association “Belarusian branch telecommunication union”	http://tos-by.com
Republican public association “Information society”	http://info.minsk.by
ICT enterprises association “Belinfocom”	http://www.belinfocom.by
IT Enterprises Association	http://www.akit.niks.by
Scientific and Technological Association “Infopark”	http://www.infopark.by
Telecommunication and content service	

Name of organisation (in English)	Website
Velcom, FE	http://www.velcom.by
Mobile TeleSystems, jLtd	http://mts.by
Life:)	http://life.com.by
Diallog (BelCel)	http://diallog.by
BelPost (Public Enterprise)	http://www.belpost.by/
Beltelecom (Public Enterprise)	http://beltelecom.by
Belinfonet, Ltd	http://adsl.by
Alternative Digital Network (Atlant-Telecom), FE	http://telecom.by
Business Network, JE	http://sml.by , http://bn.by
Solo	http://solo.by
Network Systems, CJSC	http://nsys.by/
IP TelCom, Ltd	http://www.iptel.by/
Aichyna Plus, ALC	http://www.aplus.by
ISP Anitex	http://anitex.by/
Open Contact, Ltd	http://ok.by
Cosmos TV, jLtd	http://cosmostv.by
Minsk Television Information Networks (Public Interprise)	http://mtis.by
Mobilcom	http://mobilcom.by
SPN Media	http://spn.by
Streamline	http://streamline.333.by
Publishing House “Glyanets”	http://www.gl.by
Nikita Mobile, jLtd	http://www.nikita.by
Belarusian Television and Radio Company (Public Enterprise)	http://www.tvr.by
ONT [Nationwide Television] (Second National TV Channel, CJSC)	http://www.ont.by
CTV (Capital Television, CJSC)	http://www.ctv.by
8 Channel, CJSC	http://8channel.tv
Hardware and software, system integrators	
Hardware and software, system integrators	
Altoros Development	http://www.altoros.com
Applied Systems	http://www.appsys.net
Avest	http://www.avest.by/
BELabat	http://www.belabat.com/en
Belhard Group, CJSC	www.belhard.com
Belitsoft	http://belitsoft.com/
BelRosSvyaz’	http://www.telemiks.by
Belsoft, CJSC	http://belsoft.by/go
Belsoft-Borlas Group	http://www.belsoft-borlas.com/
BLRSoft	http://www.abaxia.com/
Clabs, JLLC	http://www.clabs.eu
CTXM	www.ctxm.by
Dana Networks	http://www.dananetworks.net
EffectiveSoft	http://www.effectivesoft.com/
Epam systems	http://www.epam.by
Erpbel	http://www.erpbel.by/
Exadel	http://www.exadel.com
Exigen Services	http://www.exigenservices.com
Exon IT	http://www.exonit.by/

Name of organisation (in English)	Website
FE Godel Technologies Europe	http://www.godeltech.com/
Foranks	http://www.foranx.by/
Game-Stream, CJSC	http://game-stream.org
Generation P	http://www.generation-p.com/
Horizont, JSC	http://horizont.by/
IBA, CJSC	http://iba.by
IBA-Gomel-Park	http://www.gomel.iba.by/en
Intellectual Systems, CJSC	http://is.by/
IntexSoft (Intellectual Export Software)	http://www.intexsoft.by
Invention Machine	http://www.invention-machine.com/
Issoft Solution	http://issoft.by/
IT Park IBA	http://www.iba-it-group.com/
iTec Group	www.itecgroup.by
ITlect	http://itlect.com/
Itransition	http://www.itransition.com/
Lakshmi	http://www.autokroy.com
LeverX International	http://www.leverx.com/
Marco	http://www.marco.by/
Mikst	http://www.mikst.by/
Mobiletag	http://www.mobiletag.com
Nival Network	http://www.nival.com
Novacom Group	http://www.nvcm.net/
NTLab Systems	http://www.ntlab.com/
Numerical Methods	http://www.chisltech.com/
OnCleverSoft	http://www.oncleversoft.com/
Ozone Consulting	http://www.ozone-oo.com/
Pi-consult.by	http://www.pi-consult.by/
PM&S Software	http://www.pms-software.com/
Qulix Systems	http://www.qulix.com/
Real Soft	http://www.realsoft.com/
RelSoft	http://www.relsoft.by/
Republican Unitary Production Enterprise “Vityaz”	http://vityaz.by/
Sakrament	http://www.sakrament.com
Sam solutions	http://www.sam-solutions.by
Science and Technical Center “Atlas”	http://www.atlas.by
ScienceSoft	http://www.scnsoft.com/
Soft Perspectiva	http://soft.edu.by/
Softclub	http://softclub.by
Softeq Development	http://www.softeq.com/
Softline, Ltd	http://www.slbel.com
Steel Monkeys, FE	http://steelmonkeys.com/ru
Stylesoft	http://dev.by/companies/stylesoft
Svyaz’InformService	http://www.sis-group.com
Synesis	http://www.synesis.by/
System Technologies	http://www.st.by
Telesoftservise	http://www.telesoftservice.com/
TietoEnator Ltd.	http://www.tieto.com/

Name of organisation (in English)	Website
TKP-Soft	http://www.tkp.by/en/
Top Soft	http://www.galaktika.by/
Viaden Media	http://www.viaden.com/
Vimix	http://www.wimix.by/
VironIT	http://ru2.vironit.com/
VirusBlokAda Ltd.	http://anti-virus.by
VPI Development Center	http://www.vpisystems.by/
Knowledge institutes (R&D and education bodies)	
Research institutes	
National Academy of Sciences of the Republic of Belarus	http://nasb.gov.by
Belarusian Institute for System Analysis	http://www.belisa.org.by
United Institute for Informatics Problems of National Academy of Sciences	http://uiip.bas-net.by
Scientific Research Institute for Electronic Computers	http://www.niievm.by
Institute of Applied Software Systems	http://infores.mpt.gov.by
Identification Systems Centre	http://www.ids.by
"Giprosviaz" Institute, JSC	http://www.giprosvjaz.by
Central Research Institute for Management Technology	www.cniitu.by
System Analysis and Strategic Researches Center of the National Academy of Sciences	http://center.basnet.by
Instrument Engineering Innovation Center	http://www.ieic.biz
Research Institute for Technical Information Protection	http://www.niitzi.by
"SKIF" Super Computer Research Programme	http://skif.bas-net.by/
Institute of Solid State Physics and Semiconductors	http://ifttp.bas-net.by/
Institute of Physics	http://ifanbel.bas-net.by
Institute of Mathematics	http://im.bas-net.by/
Industrial ICT research centres	
Research and Production Corporation "Integral"	http://www.integral.by
State Scientific and Production Association "Planar"	http://www.planar.by/ru/
Belarusian Optical and Mechanical Association	http://www.belomo.by
Scientific and Production Association "Agat", Research Institute for Automation Means	http://www.agat.by
Republican Unitary Enterprise of Computer Technics and Informatics	http://belvti.com
Universities	
Belarusian State University	http://www.bsu.by
Institute for Informatization and Management Technology of the Belarusian State University	http://www.itiubsu.by/
Belarusian State University of Computer Science and Radio electronics	http://www.bsuir.by
Belarusian State Economic University	http://bseu.by/
Belarusian National Technical University	http://www.bntu.by/
Belarusian State Technological University	http://www.bstu.unibel.by
Polotsk State University	http://www.psu.by/
Belarusian-Russian University	http://www.bru.mogilev.by/
Gomel State Technical University	http://www.gstu.gomel.by
Minsk State Higher Radio engineering College	http://www.mgvrk.by
Brest State University	www.brsu.brest.by
State Higher Communication College	http://vks.belpak.by/

Name of organisation (in English)	Website
Baranovichi State University	http://www.barsu.by
Belarusian State Pedagogical University	http://bspu.unibel.by
Belarusian State Agrarian Technical University	http://www.batu.edu.by/
Brest State Technical University	http://www.bstu.by/
Vitebsk State Technological University	http://www.vstu.vitebsk.by/
Vitebsk State University	http://vsu.by/
Gomel State University	http://www.gsu.unibel.by/
Grodno State University	http://grsu.by/
Minsk State Polytechnic College	http://www.mgpk.unibel.by
ICT intermediaries	
Republican Centre for Technology Transfer	http://ictt.by
Belarusian Innovation Fund	http://www.bif.ac.by
Belarusian Republican Fundamental Researches Fund	http://fond.bas-net.by/
National Fund of Technical Legislative Acts of the Republic of Belarus	http://www.tnpa.by/
Department on Entrepreneurship Development and Support of the Ministry of Economics	http://svoedelo.by/
Belarusian Hi-Tech Park	http://www.park.by
Information Resources for Education System Center	http://iso.minsk.edu.by/
Mogilev Technological Park	http://www.technopark.by/
Annual International Exhibition “PTS - Prospective Technologies and Systems: Informatics, Telecommunications, Safety”	http://www.pts.by/
Technics and Communication, CJSC – Exhibition Company; Annual Exhibition on Telecommunication, Information and Banking Technologies “TIBO”	http://www.tc.by, http://www.tc.by/exhibitions/tibo/
Belarusian Search Index System	http://all.by
Business Support Center “XXI Century Center”	http://www.bc.by
Scientific and Technological Park “Metolit”	http://www.metolit.by
Small Entrepreneurship Incubator	http://mapzao.by/
Small Entrepreneurship Incubator “Beltrustinfo”	http://www.beltrustinfo.by
Brest Business Incubator	http://www.partnerplus.by/
“Apsel” Entrepreneurship Support Centre	http://www.ei.by/ooo-apsel
Belarusian Business Portal	http://bel.biz/
Electronic Business Center TUT.BY	http://www.tutby.com http://www.tut.by
Banking Technologies Center	http://www.cbt.by
Bank Processing Center	http://www.npc.by/
Bank Financial TeleNetwork	http://www.bfn.by/

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17. Nikolai Panteley, Minister of Communications of the Republic of Belarus (2008), *About the fixed communications and Internet development in Belarus - "Interfax" Agency interview.* Available at: http://it.tut.by/news/95369.html (in Russian)
18. *Survey of Belarusian software, services and products industry market development*, Made by the experts of the Russian Association of software developers RUSSOFT by request of the Belarusian scientific and technological association "Infopark" and Administration of Belarus Hi-Tech Park, 2009 (in Russian)

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