Steering Management Dashboard

SERBIA – ICT RTD TECHNOLOGICAL AUDIT

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Serbia RTD Technological Audit

- Steering Management Dash Board-

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General statistics[1]

Population: 7.36 million

Capital: Belgrade

Territory area: 88,361 km2

Border countries: Hungary, Romania, Bulgaria, Macedonia, Albania, Montenegro, Bosnia and Herzegovina, Croatia

Religions: Serbian Orthodoxy 85.0%, Catholic 5.5%, Protestant 1.1%, Muslim 3.2%, unspecified 2.6%, other, unknown, or atheist 2.6% (2002 census)

GDP (absolute): 29.5 billion EUR (per capita: 3,994 EUR)

GDP - composition by sector:

18,3% Manufacturing

16,4% Real estate, renting and other business activities

12,8% Wholesale and retail trade; repairs

11,2% Agriculture, hunting, forestry and water works supply

8,1% Transport, storage and communications (33,1%   Others)

Percent of GDP spent on R&D: less than 0.4% (estimated 0.3%)

Percent of GDP spent on Education: 2.4%

Percent of GDP spent on Healthcare: 3.5%

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[1] Starting from 1999 the Statistical Office of the Republic of Serbia has not at disposal and may not provide available certain data relative to AP Kosovo and Metohia and therefore these data are not included in the coverage for the Republic of Serbia (total).

Participation in FP6-IST and FP7-ICT Theme

Table 1   Success and failure rates of proposals in FP6-IST and FP7-ICT Theme.

	EU Proposals		Serbian Proposals		Ratio (%) of successful proposals		SERBIA - Proposals share	
	Total	Succesful	Total	Succesful	EU	SERBIA	Successful	Failure
FP6-IST Priority	8383	1123	125	16	13,4	**12,8**	**1,4%**	1,5%
FP7-ICTTheme	5586	840	77	12	15,0	**15,6**	**1,4%**	1,4%

Source: EC-DG INFSO (FP7-ICT Theme Call 4 inclusive)

In FP6-IST Priority EU countries achieved success rate of 13,4% (8383 submitted proposals and 1123 approved) and Serbia 12,8% (125 submitted proposals and 16 approved) showing slightly lower passing (success) rate of Serbian proposals than EU average. Serbian entities submitted their proposals to six of seven thematic categories showing the big dispersion of the proposals, while the accepted proposals were in only three thematic categories.

⇒ In the FP7-ICT Theme, the EU countries achieved success rate of 15,0% (with 5586 submitted proposals and 840 approved),

⇒ Serbia accomplished higher passing rate of 15,6% (with 77 submitted and 12 approved proposals). In addition, this represents the growth of 2,8 percentage points compared to the Serbian success in FP6-IST Priority.

Figure 1   Success rates of applicants in the FP6-IST and FP7-ICT for EU and Serbia
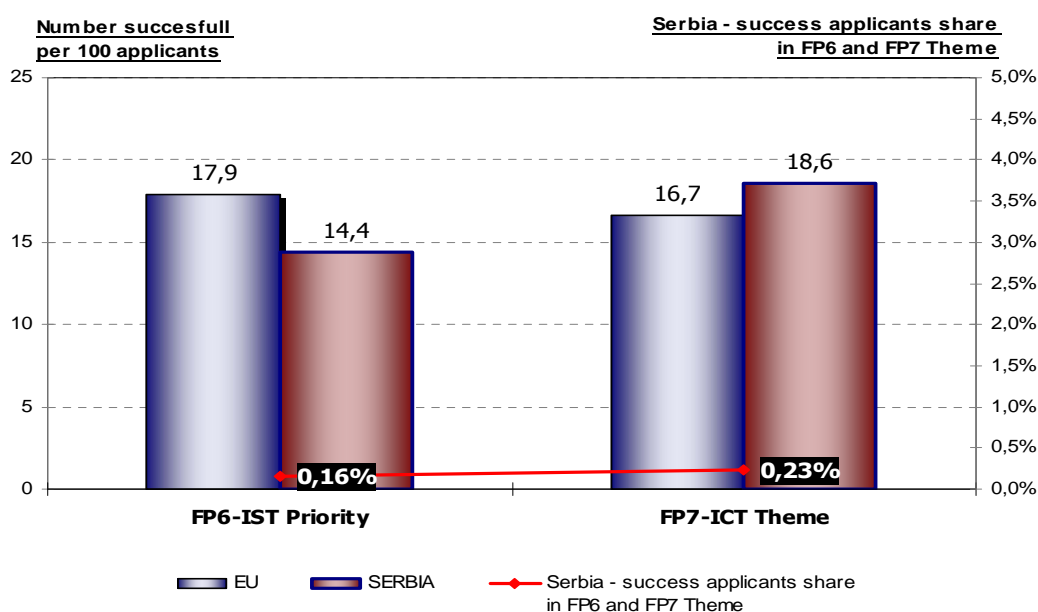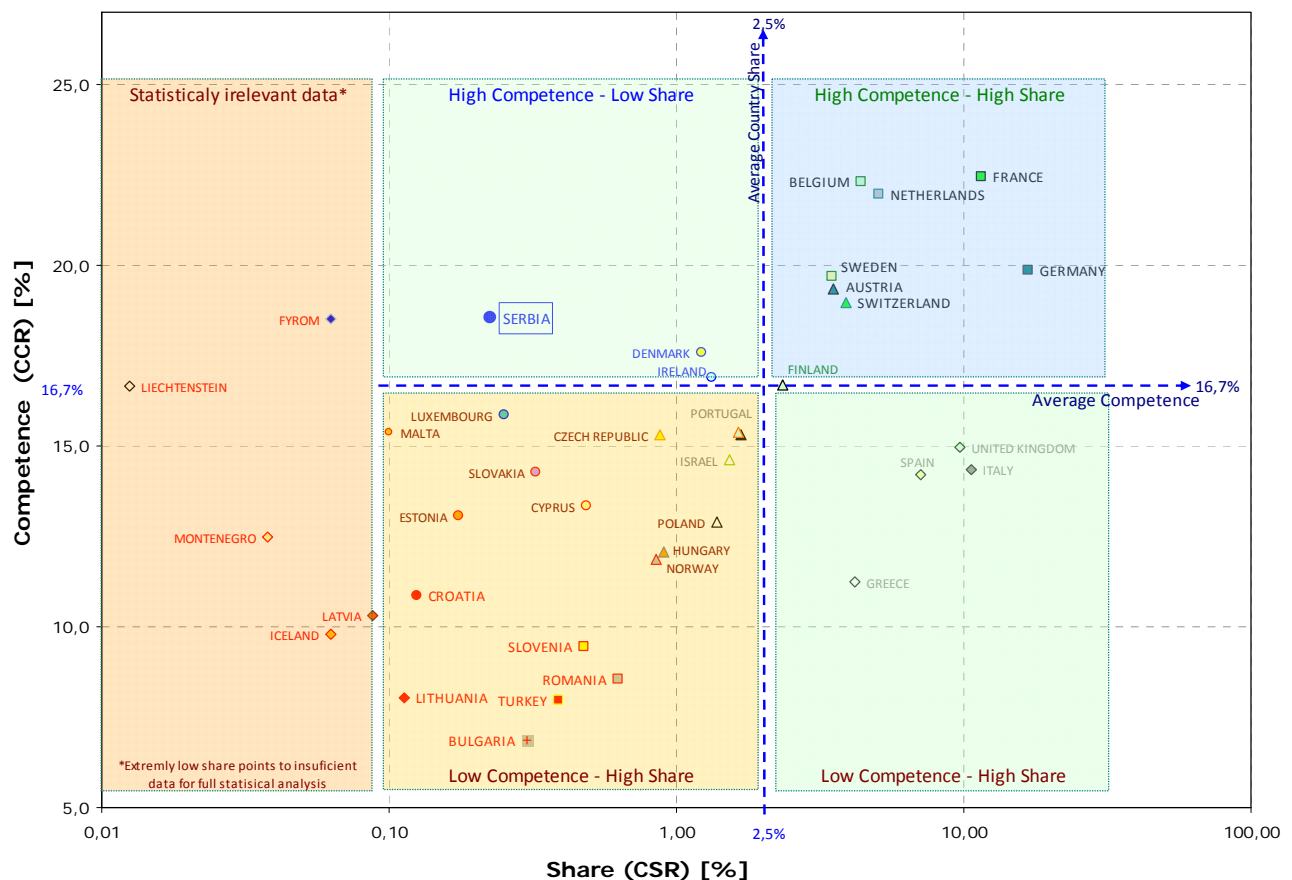

Source: EC-DG INFSO (FP7-ICT Theme Call 4 inclusive)

⇒ With 18 successful applicants in FP7-ICT Theme Serbia achieved 18,6 successful applicants per 100 (Serbian) applicants compared to 16,7 of EU countries. Serbian rate of successful applicants (18,6%) is among the highest in the Europe.

⇒ The share of Serbian participations in total EU successful participations (applications) raised to 0,23% from 0,16% in FP6-IST Priority.

⇒ Despite detected growth Serbia is still among the countries with the lowest number of participants.

Comparison of Serbia applicants to EU27 and AC

Figure 5 presents the Competence/Share Matrix of EU27 and AC applicants in FP7-ICT Theme. In this figure Serbia is positioned in the "high competence - low share" quadrant, with the highest competence in this quadrant. There is a visible contradiction between impressive successes of Serbian applicants **(among the 38 most influential countries, Serbia is on the 8th place)** and a small share in number of projects **(among the 38 most influential countries, Serbia is 28th)**. This indicates either lack of critical mass of researchers or their modest interest in FP7-ICT participation.

Figure 2   EU27 and AC applicants in FP7-ICT Theme – Individual Countries Positions

Source: EC-DG INFSO (FP7-ICT Theme Call 4 inclusive)

Explanation: The Country Share Ratio (CSR) and individually Country Competence Ratio (CCR) for each of 40 countries (EU27 and AC) are presented.

⇒ CSR [%] = number of Country's successful applicants / number of all successful applicants in FP7-ICT; CCR [%] = number of Country's successful applicants / total number of Country's applicants.

The average value of Share (2,5%) is emphasized. This line represents the borderline between the big and small share. Similarly, for the Competence, the average competence of all countries, 16,7% separates the more from the less successful countries.

Centres of Excellence (CoE)

For the requirements of this analysis the quantitative and qualitative criteria were defined and than applied to obtain the consolidated list of CoE and consolidated list of potential CoE. The first quantitative criterion is based on data analysis from Annex I Who is Who in ICT Research, *Section Research areas of main expertise according to FP7-ICT Challenge and Objectives.* For each research unit the data on its expertise according to FP7-ICT objectives is considered (from Annex I – Who is Who). For each research unit the sum of declared expertise is presented as a number in a column "Total". Explanation: CSM presents two parameters compound for each research unit: Centre Competence Ratio (column CCR in Table 2) and Centre Share Ratio (column CSR).

⇒ CCR [%] is ratio of number of expertise for particular research unit and a number of Challenges from which these expertise are coming, combined with ratio of number of researchers of that particular research unit and total number of researchers (of all consolidated research units).

⇒ CSR [%] is ratio of number of expertise for particular research unit and the total number expertise (of all consolidated research units).

As the second quantitative criterion the number of researchers (Ph.D, M.Sc. and B.Sc) and the number of employees in development sector were used, column "NoR".

Identified CoE are organizations and research units with necessary critical mass of knowledge, resources and infrastructure, thus capable for achieving research results. For identifying the CoE the threshold of at least 3 FP7-ICT expertises and minimum of 9 researchers (Ph.D, M.Sc. and B.Sc) was set. Selection of 17 entities is presented. Among them three research units, all of them institutes, have significantly bigger number of researchers than average and three research units have significantly bigger number of expertise than average. Only two organizations from consolidated list of CoEs came outside High Education Sector and Institutes: one from industry sector and one from SME.

Table 2 Consolidated list of identified centres of excellence

Short name	Research unit	NoE	NoR	Expertise by FP7-ICT Challenge and Objective								Total	CC1	CSR [%]	CCR [%]
				1	**2**	**3**	**4**	**5**	**6**	**7**	**FET**				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
IMP	INSTITUTE MIHAILO PUPIN	437	205	[1.2] [1.3]	[2.1] [2.2]	[3.4] [3.5] [3.6]	[4.2] [4.3]	-	[6.1] [6.2] [6.3] [6.4] [6.5]	[7.2] [7.3]	2	**18**	2,6	7,1	43,0
IPB	INSTITUTE OF PHYSICS BELGRADE	180	140	[1.1] [1.2] [1.6]	-	[3.1] [3.2] [3.5] [3.6] [3.7]	[4.1] [4.2]	-	[6.3] [6.4]	-	5	**17**	3,4	6,7	38,8
FON.1	FACULTY OF ORGANIZATIONAL SCIENCES (FOS), UoB, Chair for e-Business and System Management	9	9	[1.1] [1.2] [1.3] [1.4] [1.5] [1.6]	-	-	[4.1] [4.2] [4.3]	-	[6.1] [6.2] [6.3] [6.4] [6.5]	[7.1] [7.2] [7.3]	-	**17**	4,3	6,7	3,1
ETF.1	SCHOOL OF ELECTRICAL ENGINEERING, UoB, Department of Electronics	21	18	[1.1]	-	[3.2] [3.3] [3.5] [3.6] [3.9]	-	[5.2]	[6.1] [6.2] [6.3] [6.5]	-	2	**13**	2,6	5,1	3,8
ETF.2	SCHOOL OF ELECTRICAL ENGINEERING, UoB. Chair of Automatic Control	24	24	-	[2.1]	[3.4]	-	[5.1] [5.2] [5.3]	[6.1] [6.2] [6.3]	[7.1] [7.2]	2	**12**	2,0	4,7	3,9
CIM	CIM COLLEGE (CIM GROUP)	25	20	[1.2] [1.3] [1.6]	-	-	[4.3]	[5.2]	[6.1] [6.3] [6.4] [6.5]	[7.3]	2	**12**	2,0	4,7	3,3
ETF.3	SCHOOL OF ELECTRICAL ENGINEERING, Department of Telecommunications	28	28	[1.1] [1.2] [1.4] [1.6]	-	[3.4] [3.5] [3.6]	-	-	[6.2]	-	2	**10**	2,5	3,9	5,7

Short name	Research unit	NoE	NoR	Expertise by FP7-ICT Challenge and Objective								Total	CC1	CSR [%]	CCR [%]
				1	2	3	4	5	6	7	FET				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
FON.2	FACULTY OF ORGANIZATIONAL SCIENCES (FOS), UoB. GOOD OLD AI	100	20	[1.2] [1.3] [1.6]	[2.1] [2.2]	-	[4.1] [4.2] [4.3]	-	-	[7.2]	-	9	2,3	3,5	3,7
ETF.4	SCHOOL OF ELECTRICAL ENGINEERING, UoB. Chair Of Computer Engineering and Information Theory	24	24	[1.2] [1.5]		-	[4.2] [4.3]	[5.1] [5.2]	[6.1] [6.2]	[7.3]	-	9	1,8	3,5	3,5
FTN.1	FACULTY OF TECHNICAL SCIENCES, University of NOVI SAD Chair of Communications and Signal Processing	25	24	-	[2.1] [2.2]	-	[4.3]	-	-	[7.1] [7.2]	2	7	1,8	2,8	3,4
PMF	FACULTY OF MATEMATICS UNIVERSITY OF BELGRADE Department of Computing and Informatics	35	21	[1.1] [1.2] [1.3]	[2.2]	-	[4.1] [4.2] [4.3]	-	-	-	-	7	2,3	2,8	4,0
ELFAK.1	Faculty of Electronic Engineering, University of Niš, Laboratory for Electronic Design Automation (LEDA)	12	11	-	-	[3.2] [3.4]	[4.2]	-	[6.3] [6.5]	-	1	6	1,5	2,4	1,3
IMTEL	Institute for Microwave Techniques and Electronics (IMTEL)	49	22	[1.6]	[2.1]	[3.4] [3.5] [3.9]	-	-	-	-	-	5	1,7	2,0	3,0
ETF.5	SCHOOL OF ELECTRICAL ENGINEERING, UoB. Chair of General Electrical Engineering	13	13	[1.6]	-	[3.2] [3.9]	-	-	[6.2] [6.4]	-	-	5	1,7	2,0	1,8
ELFAK.2	Faculty of Electronic Engineering, University of Niš Chair Of Telecommunications	26	26	-	[2.1] [2.2]	[3.4]	-	-	[6.2]	-	-	4	1,3	1,6	2,8
IRITEL	IRITEL AD BEOGRAD	195	85	[1.1]	-	[3.4] [3.5]	-	-	-	-	-	3	1,5	1,2	10,4
DKTS	PUPIN TELECOM DKTS	165	40	-	-	[3.4]	-	-	[6.3] [6.5]	-	-	3	1,5	1,2	4,9
	TOTAL	1368	730	30	11	28	18	7	33	12	18	157			

**Legend:**

Source: EC-DG INFSO (FP7-ICT Theme Call 4 inclusive)

1 - Pervasive and Trustworthy Network and Service Infrastructures

2 - Cognitive Systems, Interaction, Robotics

3 - Components, systems, engineering

4 - Digital Libraries and Content

5 - Towards sustainable and personalized healthcare

6 - ICT for Mobility

7 - ICT for Independent Living, Inclusion and Governance

FET - Future and Emerging Technologies

NoE – Number of employees

NoR – Number of researchers,

Figure 3   Competence/Share Matrix of identified CoE in Serbia

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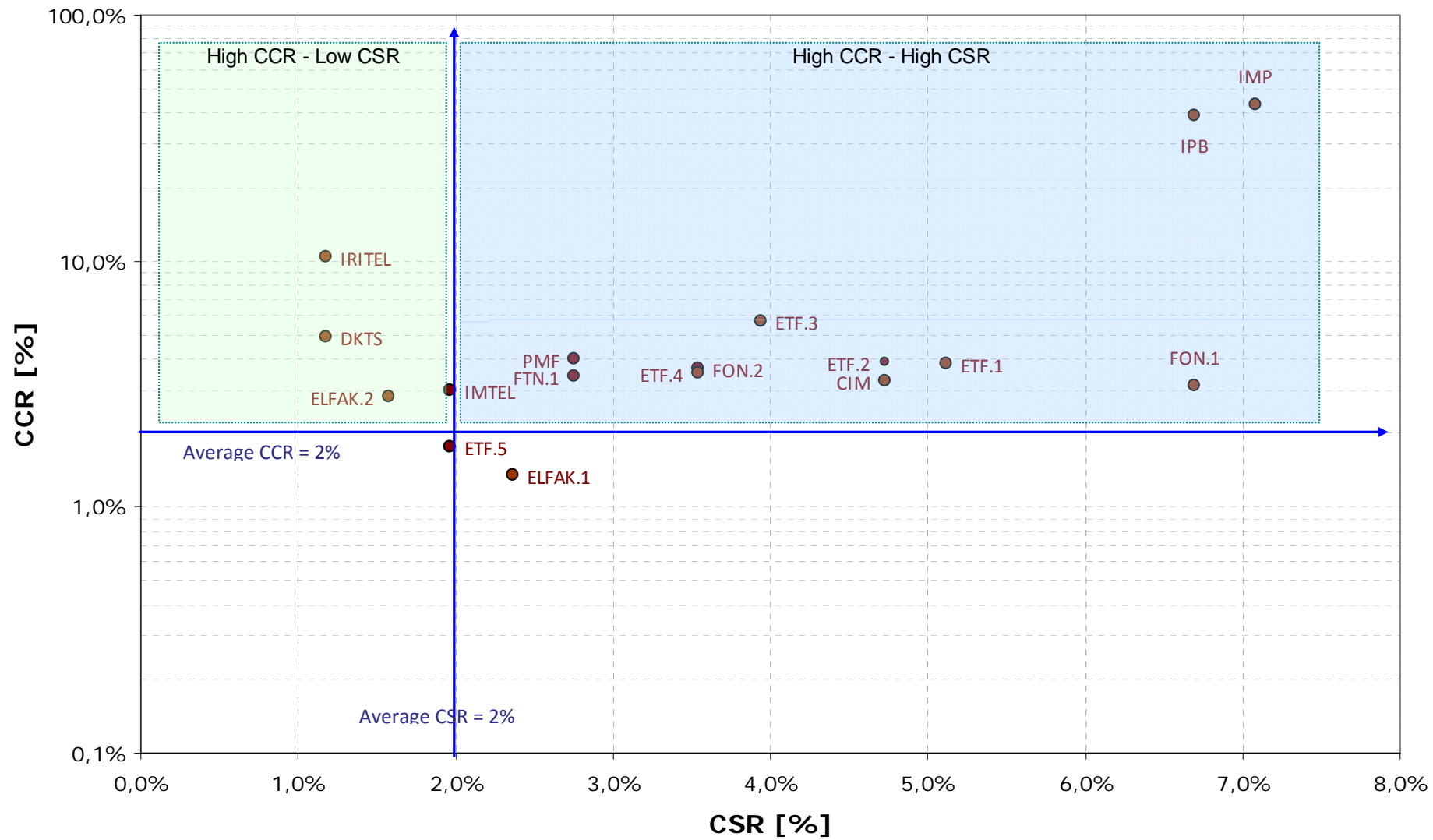
Identified potential CoE are organizations and research units with potentially sufficient critical mass of knowledge, resources and infrastructure and perspective to manage achieving research results in the near future.

Table 3   Consolidated list of identified potential centres of excellence

Research unit	NoE	NoR	Expertise by FP7-ICT Challenge and Objective								Total	CC1	CSR	CCR
			1	2	3	4	5	6	7	FET				
BioIRC, Bioengineering Research and Development Center, Kragujevac	15	10	-	2.1 2.2	3.6 3.9	4.3	5.1 5.2 5.3 5.4	6.1	7.1	3	**14**	2,0	5,5%	1,6%
Belit Ltd. - Belgrade Information Technologies	17	10	1.2 1.3	2.2	3.5	4.1 4.2 4.3	5.1 5.2	6.1 6.4 6.5	-	1	**13**	1,9	5,1%	1,6%
SPINNAKER NEW TECHNOLOGIES ltd.	212	136	1.2 1.3	-	-	4.1 4.3	5.1 5.2 5.3	-	7.2 7.3		**9**	2,3	3,5%	27,2%
E-SMART SYSTEMS DOO	48	19	1.2 1.3	-	3.4	-	5.1	6.1 6.3	7.3		**7**	1,4	2,8%	2,4%
EXECOM d.o.o	41	28	1.2 1.3	-	-	-	5.1 5.2	-	7.1 7.2 7.3		**7**	2,3	2,8%	5,8%
Innovation Center, School of ETF	14	11	1.6	-	3.5	-	5.1 5.2	6.3	7.3		**6**	1,2	2,4%	1,2%
SAGA d.o.o.	290	23	1.1 1.2 1.3	2.2	-	-	-	-	7.3		**5**	1,7	2,0%	3,4%
RCUB			1.1 1.2 1.4 1.5 1.6	-	-	-	-	-	-		**5**	5,0	2,0%	0,0%
S&T Serbia	86	16	1.2 1.3	-	-	4.1 4.3	-	-	-		**4**	2,0	1,6%	2,8%
Microsoft Software ltd.	19	5	-	2.2	-	4.1 4.2 4.3	-	-	-		**4**	2,0	1,6%	0,9%
INI	20	6	1.2	-	-	4.2 4.3	-	-	-		**3**	1,5	1,2%	0,8%
OSA Racunarski Inzenjering	29	8	1.1	-	-	4.1 4.3	-	-	-		**3**	1,5	1,2%	1,1%
PSC doo	42	15	-	-	-	4.3	-	-	7.3	1	**3**	1,0	1,2%	1,3%
Levi9 Global Sourcing Balkan	102	80	-	-	3.6	4.3	-	6.2	-		**3**	1,0	1,2%	7,1%
Coming Computer Engineer.	30	5	1.2	-	3.5	-	-	-	-		**2**	1,0	0,8%	0,4%
AB Soft	40	16	1.3	-	-	4.1	-	-	-		**2**	1,0	0,8%	1,4%
INFORMATIKA AD	200	10	-	-	3.4 3.6	-	-	-	-		**2**	2,0	0,8%	1,8%
IIB d.o.o.	25	17	1.3	-	-	-	-	-	-		**1**	1,0	0,4%	1,5%
ASW INZENJERING ltd.	42	22	1.3	-	-	-	-	-	-		**1**	1,0	0,4%	2,0%
PSTech d.o.o.	75	70	1.2	-	-	-	-	-	-		**1**	1,0	0,4%	6,2%
Digit	76	8	1.3	-	-	-	-	-	-		**1**	1,0	0,4%	0,7%
LOGO d.o.o.	74	4	1.4	-	-	-	-	-	-		**1**	1,0	0,4%	0,4%
INTENS d.o.o Novi Sad	42	4		-	-	-	-	-	-		**1**			0,0%
	1539	523	28	5	9	18	14	8	10	5	**98**	12,3	38,2%	

Legend:

1 - Pervasive and Trustworthy Network and Service Infrastructures   5 - Towards sustainable and personalized healthcare

2 - Cognitive Systems, Interaction, Robotics   6 - ICT for Mobility

3 - Components, systems, engineering   7 - ICT for Independent Living, Inclusion and Governance

4 - Digital Libraries and Content   FET - Future and Emerging Technologies

For indentifying the potential CoE the threshold of at least one FP7-ICT expertise and minimum of four senior researchers (Ph.D, M.Sc. and B.Sc) was set. Selection of 23 entities is presented. Among these organizations three research units, all of them very active on international IT market, have significantly bigger number of researchers than average and three research units have significantly bigger number of declared expertise than average. Only one organization was successful in FP7-ICT Theme

Figure 4   Competence/Share Matrix of identified potential CoE in Serbia
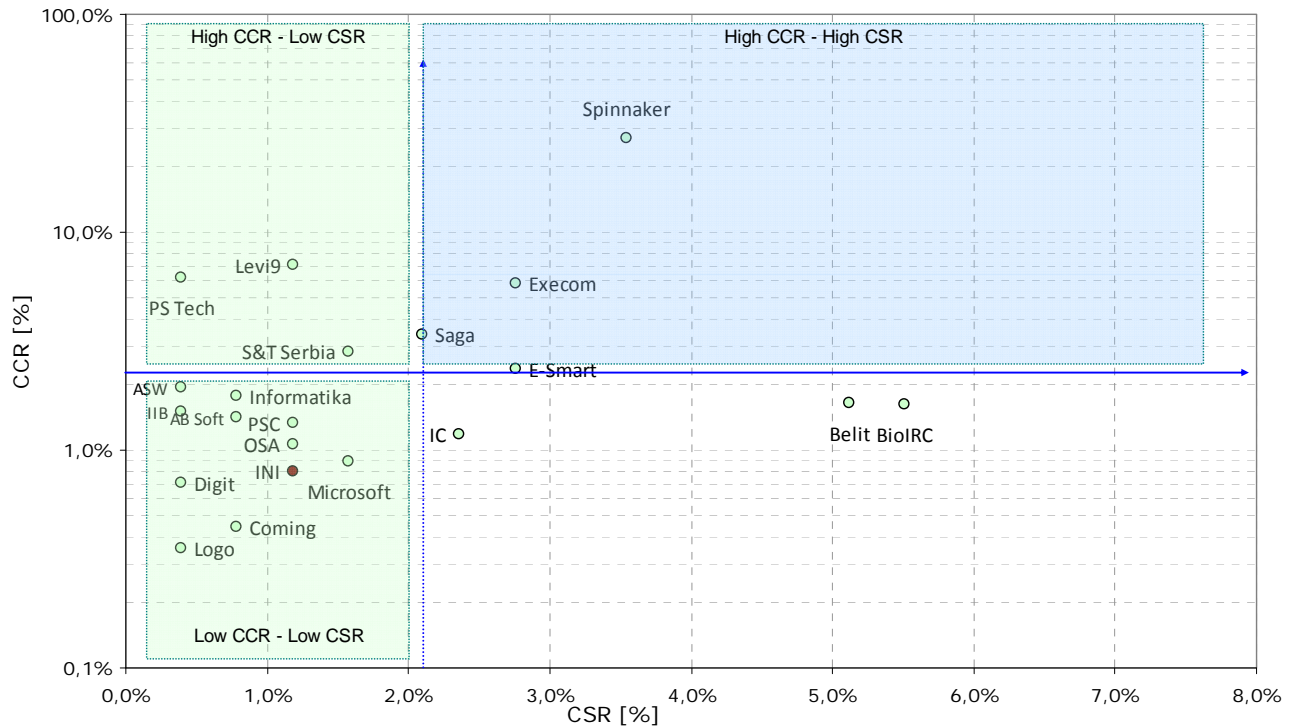
R&D capacity

The Competence and the Share ratio of identified Serbian FP7-ICT Theme Objectives are presented in the Table below. (Competence [%] = number of Serbian successful proposals / total number of FP7-ICT Theme successful proposals; Share [%]= number of Serbian proposals / total number of FP7-ICT Theme proposals).

The value of competence and the value of share of 2,5% are considered as the borderlines between the low and high competence and accordingly, between the low and high share (2,5% is estimated level for Serbia according to its potential as a country for FP7-ICT).

Based on proposed method, the Competence/Share Matrix of Serbian FP7-ICT Theme objectives are presented below. The area of particular interest for raising the participation in FP7-ICT Theme of Serbian entities is High Competence-Low Share quadrant.

Table 4   Identification of Serbian FP7-ICT objectives

High competence – low share:	High competence – high share:
1.1 The Network of the Future **7.2** Accessible and inclusive ICT **2.2** Cognitive Systems and Robotics **8.2** FET – Proactive	**1.3** Internet of Things and enterprise environments **4.1.** Digital libraries and technology enhanced learning **3.5** Networked embedded and control systems **5.3** Virtual physiological human **6.3** ICT for the environmental management and energy efficiency **9.1** International cooperation
Low competence – low share:	**Low competence – high share:**
5.1 Personal health systems for monitoring and point of care **3.1** Next generation nanoelectronics components and electronics integration **3.7** Photonic components and subsystems **4.3** Intelligent content and semantics 5.2 Risk assessment and patient safety **1.4** Trustworthy ICT **1.5** Networked Media & 3D Internet **7.1** ICT & ageing **1.2** Internet of Services, Software & virtualization	–

Source: EC-DG INFSO (FP7-ICT Theme Call 4 inclusive)

Macro-economic/tehnical ICT RTD related overview

Relevant financing authorities. Government is the main relevant authority financing ICT RTD through the Ministry of Science and Technological Development (MSTD) and the Ministry for National Investment Plan (NIP). Budget is the main financing source of ICT RTD in Serbia. From the budget are financed programs of general interest of the Republic. The science share in 2003 reached 0.3% GDP and stands at that level for now. According to the (MSTD), with an annual growth of 0.15 percentage points the budget allocations in 2014 shall reach 1.05% GDP.

The total budget for science in 2008 was about EUR 100 million (from which the 14.2 million for technological development and 5.5 million for electronics and telecommunications and industrial software and informatics. All investments are not comparable to the world renowned universities or institutes whose annual budgets are above one billion Euros. The financing of Serbian science is facing the problem of the small amount coming mainly from the one source and than split on number of projects (more than 1000 from which 471 projects in the area of technological development).

The economic situation of the entities from ICT RTD sector is hindered by a lack of financial resources. In addition, solutions competitive both in quality and financially, both business and governmental sector cannot afford for the same reasons – the lack of finances. However, institutions active in ICT RTD have achieved significant results and preserved a solid base of experts in spite of the "brain drain".

Although Serbia has necessary institutions in government, science and research, their influence on society and economy is insufficient. For now, there is no synchronized work. However, linkages among and between every single group are of the highest importance for ICT RTD development, important almost as their activities.

Despite the system of ICT RTD in Serbia is of inadequate efficiency, this sector is alive and active, mainly thanks to the ingenious isolated individuals. Number of activities seems to come from a single or small group of individuals, which invest their knowledge, expertise, authority and energy – with no or insufficient government support. However, several hundred ICT related science and research projects are held.

Innovation scorecard

The Serbian level of innovation activities is higher than it's neighbors: Bosnia and Herzegovina, Montenegro, Macedonia and Albania, slightly higher than Bulgaria and Romania but lower than Croatia and Hungary.

Some progress in innovation activities has been achieved but it is unsatisfactory. According to data from "The Global Competitiveness Report 2009", Serbia is placed 92nd in the segment "capacity for innovation". In the document "A new ranking of the world's most innovative countries" by The Economist Intelligence Unit according to number of patents, innovation possibilities…etc. Serbia is positioned on 55th place (higher than Romania). Present position of Serbia is illustrating achieved progress from former 67th place in 2002. However, the stagnation is estimated for the following 4 year, which shows government insufficient investment in this area.

The Law on Innovative Activity inadequately regulates: the strengthening of innovative capacity, infrastructure development, the transfer of results, the development of the connection between the scientific research and economic sectors etc. Only accredited and registered organizations had access to budgetary resources which reduces the circle of potential users of these resources.

SWOT Analysis for ICT RTD

A comprehensive overview of present ICT RTD sector in Serbia examines four major aspects: (1) Legal and Regulatory Environment; (2) Serbian ICT RTD Infrastructure; (3) Serbian ICT RTD Sector; (4) Serbian ICT RTD Sector in FP7-ICT Theme. Each section is examined through a SWOT analysis lens, i.e., by examining related strengths, weaknesses, opportunities and threats. The final SWOT table is presented below.

Table 5   SWOT Analysis Summary

Strengths	Weaknesses
A ICT RTD Legal and Regulatory Environment ▪ Present ICT RTD L&R Environment is in process of harmonization with EU **B ICT RTD Infrastructure** ▪ Advantage of existing research infrastructure of Academic Network of Serbia (AMRES) can be measured by number of connected entities and users as well as services and applications provided for these users ▪ The existence of the Academic and Educational Grid Initiative of Serbia (AEGIS) ▪ NIP investment in capital equipment for scientific research **C ICT RTD Sector** ▪ Despite the economic, social and institutional crisis and a difficult transition process, the Serbian ICT RTD sector has survived ▪ A solid number of preserved Serbian experts ▪ ICT related Education system ▪ Solid institutes market orientation ▪ Experts experienced in the ICT business sector **D ICT RTD Sector in FP7-ICT Theme** ▪ Above EU average Success Rates of Serbian participants ▪ Solid competence of Serbian entities ▪ Programs of institutes and faculties are in line with the FP7-ICT Theme	**A ICT RTD Legal and Regulatory Environment** ▪ Insufficient political support in practice ▪ Lack of one dedicated Government body in charge of ICT RTD ▪ Problematic implementation of ICT RTD strategic documents ▪ Weak communication of the ICT RTD sector with the policy creators ▪ Government attitude towards the "third sector" **B ICT RTD Infrastructure** ▪ Current infrastructure for ICT RTD activities in Serbia is undeveloped ▪ Lack of large-scale R&D equipment ▪ Low investments in infrastructure **C ICT RTD Sector** ▪ Inadequate efficiency of the Serbian ICT RTD system ▪ The brain drain (internal causes) ▪ Neither visible focus on ICT RTD priorities defined in Strategy, nor partnering ▪ Low level of national funds for ICT RTD ▪ Lack of official Centres of Excellence ▪ No transparent evidence of business participation ▪ Weak cooperation between industry and education ▪ Insufficient political will, financial resources and expertise **D ICT RTD Sector in FP7-ICT Theme** ▪ Serbia is a latecomer to the FP programs ▪ Insufficient experience in search for consortium partners ▪ Limited Serbian lobbing ability ▪ Insufficient interest of academic researchers to participate in FP7-ICT ▪ Lower follow up of upcoming calls ▪ Missing public national ICT RTD database ▪ Weak administration capacities for FP7-ICT requirements ▪ Insufficient support in project proposal preparation

Table 6   SWOT Analysis Summary - Continued

Opportunities	Threats
A ICT RTD Legal and Regulatory Environment ▪ Ambitious plans expressed in strategy papers in the ICT RTD field ▪ Creation and rapid adoption of Action Plan for the Strategy for Science and Technological Development ▪ New legal documents ▪ Strengthen cooperation and networking **B ICT RTD Infrastructure** ▪ 50-80M Euro of 300 M Euro Investment initiative ▪ Development of Broadband Access (AMRES/EMRES) ▪ Establishment of a regional centre for supercomputing ▪ Improvement of the SEE-GRID-SCI (SEE-GRID eInfrastructure for regional eScience) ▪ Huge potential of the EPS optical network ▪ More advanced and competitive public telecommunication sector **C ICT RTD Sector** ▪ Good price / quality ratio of Serbian services ▪ Solid expertise in particular FP7-ICT areas ▪ Reorganization of Serbian Education system ▪ Implementation of the "Focus and partnering" Strategy, which is expected to come soon ▪ Exploit the hidden potential of the ICT business sector ▪ Rising compatibility with international ICT RTD sector ▪ Meet the Government needs for ICT solutions and services ▪ Serbia as a natural gathering and coordinating regional center **D ICT RTD Sector in FP7-ICT Theme** ▪ Room for increasing participation ▪ Use capacity of leading Serbian entities ▪ Fully recognizing of benefits from participation in FP7-ICT ▪ Positive attitude towards FP7-ICT ▪ Experts' familiarity with FP7-ICT opportunities ▪ Transfer of evaluators' knowledge and experience ▪ Targeted regional FP7 calls ▪ Regional conferences, events and support actions ▪ Harmonize Serbian thematic areas with the FP7-ICT Theme ▪ Work on raising the critical mass of ICT researchers	**A ICT RTD Legal and Regulatory Environment** ▪ Political instability in the country/region ▪ Low level of investments in science and research ▪ Uncertain sources of funding ▪ Non-customized mirrored policy ▪ Mistrust in the promises of the policy makers **B ICT RTD Infrastructure** ▪ Obsolete existing infrastructure ▪ Lack of the connection between private faculties and the AMRES **C ICT RTD Sector** ▪ Serbia as a latecomer to the international market ▪ The brain drain (external causes) ▪ Weak cooperation on ICT projects ▪ Long time present differences between Serbian and European researchers ▪ Stereotype image of Serbian research **D ICT RTD Sector in FP7-ICT Theme** ▪ Difficulties in reaching the big EU15 consortia ▪ Low participation of Serbian entities ▪ Negative "cash flow" ▪ Generally low FP7-ICT financial support for Serbian ICT RTD ▪ Insufficient Government funding for FP7-ICT projects ▪ Complex proposal writing/preparation ▪ Excessive bureaucracy ▪ Lack of evaluation and scientific ranking of projects ▪ Missing the real impact of FP projects

Barriers and ways to overcome them

ICT RTD Sector in FP7-ICT Theme

Serbia is the new player in Framework Programs, that came after many years of sanctions and standing aside of European research area and world RTD science.

⇒ It is suggested to create actions on EU level to promote and encourage Serbian RTD science through brokerage events, knowledge exchange and networking.

Low participation of Serbian entities indicates the absence of the ICT RTD critical mass and insufficient interest of academic elite for participation in FP7-ICT. In general, the focus of Serbian researchers is not on FP7-ICT projects, putting the total number of Serbian participants among the lowest in Europe – only 14 Serbian successful applicants (representing 0,24% of total EU applicants). Low participation could in turn bring Serbia to negative balance in the following FP cycle. As a consequence, the share of Serbian contribution to the EU budget could exceed the amount that Serbian entities will be able to pool based on their results.

⇒ The actions considered of having the most influence on increasing participation of Serbian entities in FP7-ICT Theme are: EDUCATION and MOTIVATION programs. For entities that have participated in the FP6-IST and FP7-ICT Theme but did not have success (have willingness, but low capacity) **educational programs** (training) are proposed. For number of entities in Serbia that have not participated in previous FP cycles although have the required ICT RTD capacity for successful participation (have capacity but not willingness) **motivation programs** are proposed.

⇒ The preparation of proposals for FP7-ICT requires high expertise and other skills and it should be properly evaluated in the meaning of scientific ranking. The suggestion is to include the participation and successfulness in FP7 projects in the existing evaluation criteria of science and research work. For example the project could be evaluated similar to the published works in international journals.

Difficulties in reaching the big EU15 consortia: In the time between the starting of the FP initiative and the moment when Serbia joined the FP (after almost two decades), big and successful consortia had already been established in the EU15, even before the EU12 extension. Rigidity of these consortia for new partners joined by weak connections of Serbian ICT RTD entities with EU research institutions create one of the main barriers to Serbian bigger participation in the FP-ICT Theme.

⇒ Targeted regional calls for common Western Balkan ICT R&D priorities are suggested for improving the regional cooperation, experience exchange and speeding up solving the common problems and barriers. It is recommended to focus on demand/application-oriented issues.

⇒ Apart from targeted calls on regional priorities, the support actions for other (EU) priorities that are underdeveloped in the region are recommended.

The high demanding administration activities and weak Serbian administration capacities for FP7-ICT requirements have been observed as one of the main barriers. The proposal writing/preparation is a complex and time-consuming work. Opposite to Serbia, in the EU15 this complex process of preparation is successfully distributed to well trained and experienced consortia partners, which brings them significant advantage.

⇒ Consider capacity-building actions for improving skills of Serbian ICT researchers, particularly in FP7 application procedures, project planning and management (including financial management). In collaboration with National Contact Points and the EC establish the National organization dedicated to training courses on FP7-ICT topics.

⇒ It is suggested to enable FP7 participants to outsource their administration activities by establishing of the centers with capacity for administration, financial reporting and project management support.

⇒ Consider establishing regional administrative center for FP7-ICT to enable ICT RTD organizations in the region to outsource these activities.

Negative "cash flow" is frequent appearance in Serbia. For organizations with weak financial capacity and with the team of researchers dedicated to the FP7 project, period of 3 years with the lack of capital can become a serious problem.

⇒ Government should consider possibility of giving guaranties for organizations with approved FP7 projects if they need financial support from banks (loans or other financial options). This would help organizations that participate in FP7 to cover their expenses in the period from project approval to the real pay off by the EC.

Insufficient Government funding for FP7-ICT projects. Current additional funding for FP7 projects in Serbia provided by Government is 10% of total project value.

⇒ According to interviewees, it is proposed to increase this amount to 25% of the project value. Also, it is suggested to provide additional sources of financing at the national level for organizations with approved FP projects. This will encourage participants for FP7 and help building the necessary critical mass of researchers in the most of successful entities.

⇒ Additional measures regarding ICT projects financing could be: Abrogation on taking 40% of incomes of faculties and budget-funded research centres.

Average EU FP7 financial support for Serbian ICT RTD is small (results from the Delphi survey). It is estimated that FP7-ICT projects contribute to Serbian ICT RTD sector with about EUR 2 million per year.

⇒ It is suggested to consider actions for increasing the amounts for contracted monthly payments of Serbian ICT RTD researchers, which are currently significantly lower then EU average – as it will significantly increase their motivation to participate in FP7.

ICT RTD Sector in general

The general perception of European researchers is that, with exceptions of some recognized cases of excellence, the level of Serbian research is low, particularly compared with the EU15.

⇒ In order to change this stereotype about Serbia, either a lot of years of hard and successful work or a very good "successful cases" marketing is needed, focused on a target group of exquisite European research organizations.

Brain drain is a very complex barrier, which can be identified as an internal weakness of the organization, sector or country but also as an external threat coming from the outside.

⇒ The Government has announced a plan (through the Strategy for Science and Technological Development) for stopping the 'brain drain' as well as for stimulating the return of the experts already abroad. It is suggested to speed up the realization of this plan.

Missing public national ICT RTD database: Due to the lack of a national public database of ICT RTD participants and organizations, Serbian entities are faced with the challenge of identifying the project partners within Serbia as well as connecting to other researchers and industry (networking). Partner search processes both within the national and European level are hampered.

⇒ It is recommended to create a public national database of R&D actors and organizations and to improve processes for partner search both within the country and SEE region;

⇒ In addition, such a database could be used as a knowledge base as well as a source for "know-how" and ICT solutions. This kind of database could be useful for attracting big users of IT solutions and help applicants in their search for partners from the end-user sector.

Low participation of "third sector": The Government almost exclusively follows up and regulates the relationships inside ICT RTD area of state-owned entities and their financing.

One of observed general problems from the Delphi survey (Task 6) is low participation of Serbian "third sector" (business, private, SME and NGO) in FP7-ICT projects.

⇒ It is recommended to define policy/strategy for including the "third sector" (industry, business and SME sector) with its hidden ICT RTD potential, which is currently invisible for Government. It is suggested to the Ministry for Science and Technological Development to put the special emphases on the SME sector and its involvement in different international cooperation programmes and particularly FP7-ICT through the following actions: (1) Case studies for presenting the added value of participation in FP7 projects; (2) 10 most successful SME participants in FP7 granted from ICT RTD fund every year; (3) Tax stimulations for SME whose proposals for FP7 are evaluated above defined threshold.

Lack of focusing: "Focus and partnering" - the key words from the adopted Strategy, show that the Government, as the key player, recognized and understood the importance of ICT RTD development and made serious decision towards its realization. Considering ICT RTD segment, there is still neither a visible focus on ICT RTD priorities defined in the Strategy, nor partnering, and there is no action plan. The way of financing remains the same.

⇒ National ICT RTD priorities need to be defined. Fast implementation of the "Strategy for rising participation of domestic research priorities in ICT research" and a "Strategy and policy for making ICT clusters" is necessary.

⇒ Partnering of private enterprises and public research and education ICT institutions has to be improved. Stimulation measures to increase the number of projects related directly to industry/business are highly recommended.

Weak communication of ICT RTD sector with policy creators:

⇒ It is recommended, before adopting the final Action Plan for the Strategy, that the Government in cooperation with ICT RTD experts concretizes/redefines ICT RTD priorities according to the needs of the ones most interested. Government has just initiated defining the ICT RTD priorities in cooperation with experts.

ICT RTD Infrastructure

Low investments in infrastructure resulted in current infrastructure for ICT RTD activities in Serbia which is undeveloped due to the low and irregular investments, inadequate – due to the short amortization period of this type of equipment and discontinuity in upgrades or renewing and only partially meets the real needs of Serbian science and research.

⇒ Serbian R&D investment initiative (EUR 300 million), which is a part of the Science and Technological Development Strategy of the Republic of Serbia 2010 – 2015, is the main

infrastructure opportunity. For the development of information and communication technology infrastructure budget of about EUR 50 – 80 million is planned. However, the lack of transparency, public available procedures and criteria on spending this amount are the barriers that could throw in the shade all other barriers as well as the planned results.

⇒ Enable clear procedure and criteria on spending the amount of EUR 300 million in R&D infrastructure and make it transparent and public available.

Governmental funding for R&D projects is intended to limited number of organizations and institutions registered as SRO (Science & Research Organizations). There are insufficient investments in R&D infrastructure through collaboration of businesses and universities.

⇒ Large ICT companies have potential for R&D in ICT but have low interest for investing in infrastructure. They should be stimulated or supported through governmental funds or tax benefits to invest in R&D infrastructure.

⇒ In addition, EU is encouraged to continue its financial support by participating in further projects / actions for specific ICT RTD infrastructure (like regional projects SEEREN, SEEREN2, SEE-GRID, SEE-GRID-2, SEE-GRID-SCI, SEERA-EI; SEE-Light, AEGIS, Blue Danube and others).

Legal and Regulatory Environment

Unrealized or partially realized implementation of adopted strategic documents is one of the most visible weaknesses in the ICT RTD area.

⇒ The Action Plan for the Strategy for Development of Science and Research in Serbia (2010-2015) is the key document for realization and acceleration of progress in ICT RTD area but does not exist yet. Rapid adoption of reliable and concrete Action Plan is the first and necessary step. In order to obtain this goal, it is needed: to assure that the Strategy gets a wide and strong political and professional support; to engage the best experts for its implementation and for the Government to relocate the budget money from populist goals to development programs.

Mistrust in the promises of the RTD policy makers represents a serious threat to accomplishing the given goals in ICT RTD development.

⇒ The amount of skepticism shown by a number of experts can be understood as „a realistic observation" of the issue, based on their previous experience. To overcome the identified gap between attitude of ICT "branch" and the one of RTD "policy creators" towards realization of government plans, it is necessary to significantly intensify and widen the

dialogue between them. The convergence of their positions is the key for the success of future work and plans.

Low level of investments in science and research: Investments of around 0,3% GDP are among the lowest in Europe (the total budget for science in 2008 was about EUR 100 million). Considering vast differences in GDP of Serbia and the EU countries and the investments percentages, a situation might emerge where Serbia won't be able to follow EU ICT RTD programs.

⇒ It is suggested to increase the budget funding and necessarily include the funding from the business sector. Unless this is achieved, the budget funds won't be sufficient for science development. According to recession and falling GDP, regulation (on an annual basis) of GDP expenditure is necessary for achieving the plan to increase investments in Research and Science.

Non-customized mirrored policy: Instead of creating national and sustainable ICT RTD policy, there is a potential threat of non-customized imported policy from the EU.

⇒ Careful creating of national and sustainable ICT RTD policy is needed, that will support High Tech projects and the best national ICT RTD institutes, instead of closing them and leading the ICT RTD sector into technologically subordinated position.

The list of actions to maximize the Serbian potential in the FP7-ICT

The List of actions that need to be taken at national level

⇒ Government is highly suggested **to increase significantly investments in infrastructure required for FP7 –ICT Theme** or to cover part of the expenses for equipment purchased within FP7-ICT.

⇒ **The preparation of proposals for FP7-ICT requires high expertise** and other skills and it should be properly evaluated in the meaning of scientific ranking.

⇒ **Negative "cash flow" is frequent appearance in Serbia**. Government should consider possibility of giving guaranties for organizations with approved FP7 projects if they need financial support from banks (loans or other financial options).

⇒ **The high demanding administration activities** have been observed as one of the main barriers. It is suggested that Government enable FP7 participants to outsource these activities by encouraging the establishment of the centers with capacity for administration, financial reporting and project management support.

⇒ It is recommended **to create a public national database of R&D actors** and organizations and to improve processes for partner search both within the country and SEE region.

⇒ **Consider capacity-building actions for improving skills** of Serbian ICT researchers, particularly in FP7 application procedures, project planning and management (including financial management).

⇒ It is suggested **to harmonize thematic areas, initiatives and goals in ICT area** (National Strategy, regional initiatives) with FP7-ICT challenges and objectives.

⇒ It is recommended **to define policy/strategy for including the "third sector"** (industry, business and SME sector) with its hidden ICT RTD potential, which is currently invisible for Government.

⇒ Finally, the actions considered of having the most influence on increasing participation of Serbian entities in FP7-ICT Theme: EDUCATION and MOTIVATION programs are presented. For entities that have participated in the FP6-IST and FP7-ICT Theme but did not have success (have willingness, but low capacity) educational programs (training) are proposed. For number of entities in Serbia that have not participated in previous FP cycles although have the required ICT RTD capacity for successful participation (have capacity but not willingness) motivation programs are proposed.

List of actions that need to be taken at EU level

⇒ **Serbia is the new player in Framework Programs** after many years of sanctions and standing aside of European research area and world science (1992-2000). It is suggested to create actions on EU level to promote and encourage Serbian science through brokerage events, knowledge exchange an networking.

⇒ **Targeted regional calls for common West Balkan ICT R&D priorities** are suggested for improving the regional cooperation, experience exchange and speeding up solving the common problems and barriers.

⇒ Apart from targeted calls on regional priorities, **the support actions for other (EU) priorities that are underdeveloped in the region** are recommended.

⇒ **Average EU FP7 financial support for Serbian ICT RTD is small** (results from the Delphi survey). It is estimated that FP7 contribute to Serbian ICT RTD sector with about EUR 2 million per year. Consider actions for increasing the amounts for contracted monthly payments of Serbian ICT RTD researchers – as it will significantly increase their motivation to participate in FP7.

⇒ **EU is encouraged to continue its financial support** by participating in further projects / actions for specific ICT RTD infrastructure.

⇒ It is suggested **to create awareness of the FP participation benefits through regional conferences and events** dedicated to demonstrations of the success stories and best practices. Consider transfer of knowledge and experience from EU to Serbian participants.

⇒ **Consider financing travel expenses for the EU experts** so they can present particular FP7 issues on regional conferences.

⇒ **Consider criteria for achieving grants for universities** and faculties such as access to renowned digital libraries (as IEEE and similar), as the COBSON, although amazing, does not cover sufficient number of ICT magazines.

⇒ **Consider benefits for FP7-ICT successful participant** for licenses for specialized software or access to specific data bases.

⇒ **Consider establishing regional administrative center for FP7-ICT** to enable ICT RTD organizations in the region to outsource this activity.

⇒ **Support actions on FP7 procedures and proposal development** are still important for the region.

Project Quality Control/QA Signature Sheet

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Task Number: 8
Task Title: SERBIA – RTD TECHNOLOGICAL AUDIT – Steering Management Dashboard
Planned Delivery Date: 04.12.2009
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Tasks for this report	Status of validation
• To summarize and draw conclusions from the findings described above, addressing the study objectives	S

Key:

S   Meets standards according to the contract, no revisions required
D   Discussion needed
L   Low degree of revision required
M   Moderate degree of revision required
H   High degree of revision required
N/A   Not applicable

Evaluation & Quality Assurance Officer	Name:	Signature:	Date:
	Milovan Matijević	*[signature]*	07.07.2010

Note:

The report was completed according to the contract requirements, a delay caused by additional time requested by external evaluators

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