



NATIONAL RESEARCH
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Identifying priorities of Russia's international S&T co-operation: countries and thematic areas

Anna Pikalova, Maxim Kotsemir

Institute for Statistical Studies and Economics of Knowledge
National Research University Higher School of Economics

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Content

- **Dynamics of S&T specialisation of foreign countries: bibliometric analysis of country's publications (2003-2013) indexed in Web of Science**
- **Expert survey / interview**

Global challenges -> S&T priorities

Global challenges:

- ❖ Lack of natural resources: clean water, energy, food
- ❖ Climate change
- ❖ Demography & ageing of population
- ❖ Spread and growth of diseases
- ❖ National insecurity, growth of ethnic conflicts, terrorism and crime



Response: S&T priorities setting

- ❖ Rational use of natural resources
- ❖ Energy efficiency
- ❖ ICT
- ❖ Life sciences (medicine and biotechnology)
- ❖ Food security
- ❖ New materials and nanotechnology
- ❖ Transport and space systems

interdisciplinarity



STI policy of Russia

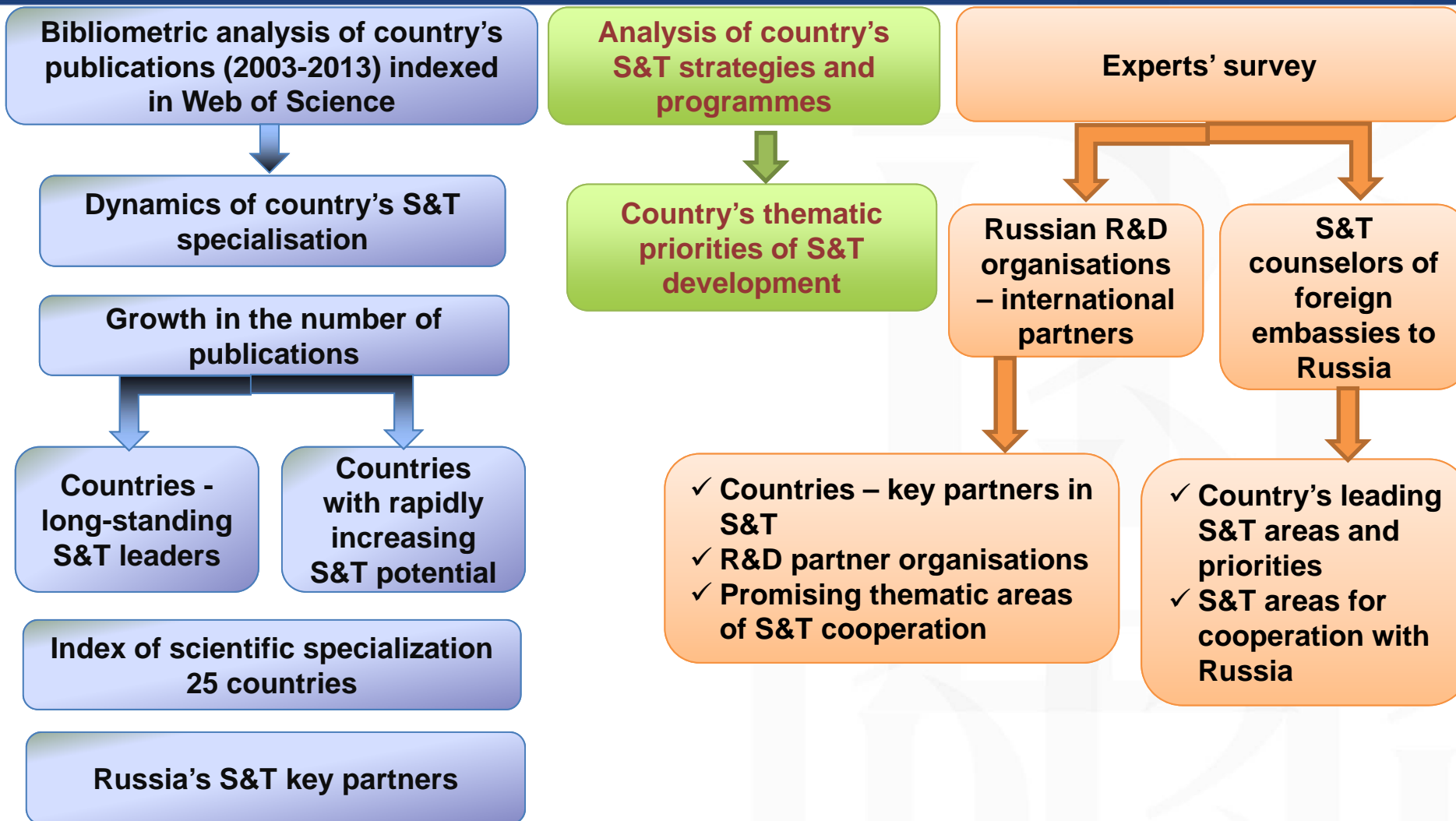
Strategy of innovation development of Russia - 2020

Strategy of science and innovation development until 2015

Priority fields of S&T development and list of critical technologies

State programme of S&T development

Forecast of S&T development of Russia until 2030





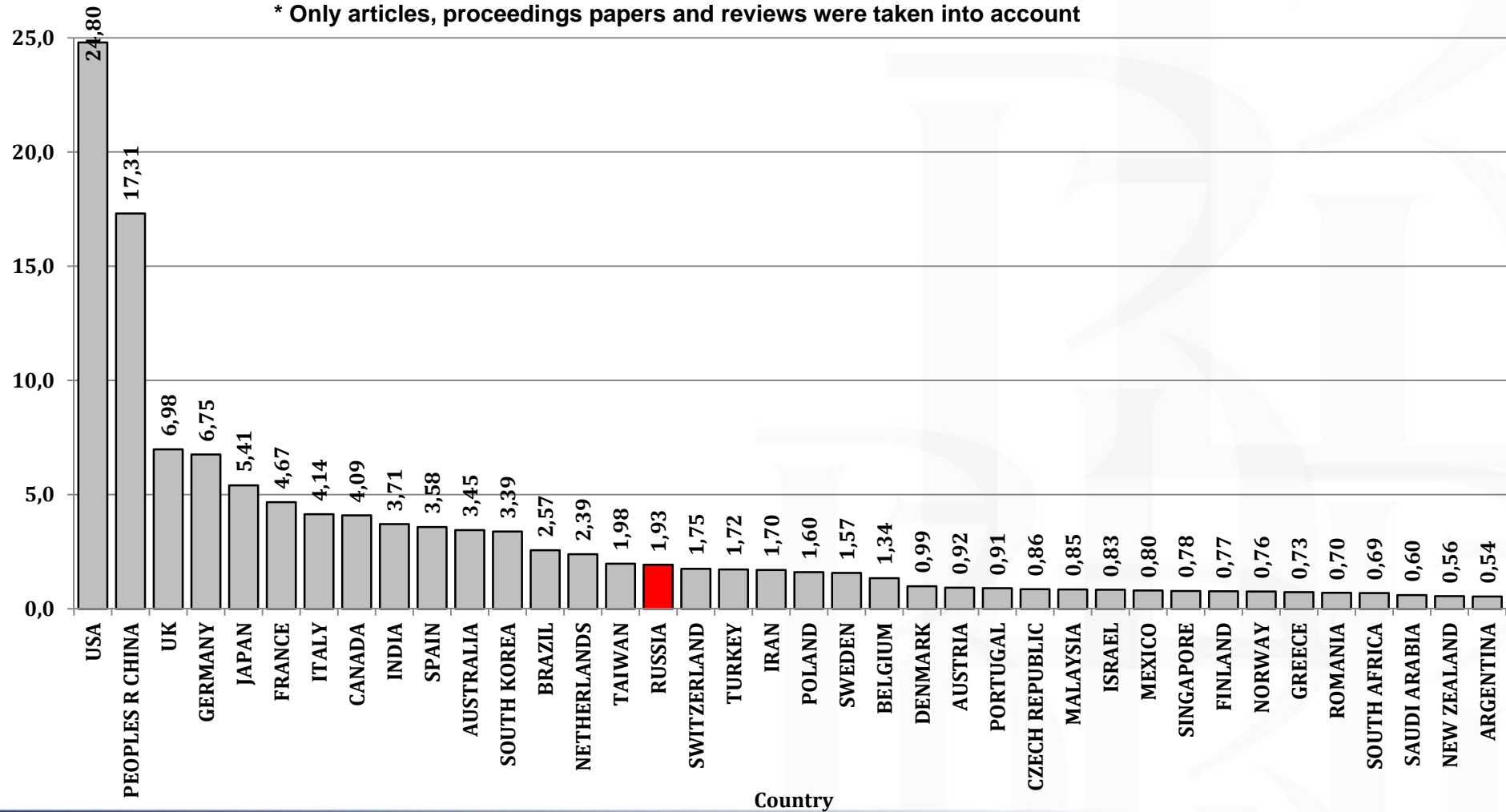
Countries under analysis

Countries / Regions	BRICS	Latin America	Asia-Pacific Region	European Union
1 Israel 2 Iran 3 Canada 4 USA 5 Turkey 6 Switzerland	7 Brazil 8 India 9 China 10 South Africa	11 Argentina 12 Mexico	13 Malaysia 14 Republic of Korea 15 Singapore 16 Taiwan 17 Japan	18 Austria 19 UK 20 Germany 21 Spain 22 Italy 23 Netherlands 24 Finland 25 France

Country shares in the total number of publications in scientific journals indexed in Web of Science: 2013, %

Publications total: 1 652 991 *

* Only articles, proceedings papers and reviews were taken into account





Growth in the number of publications: countries with rapidly increasing S&T potential (2003-2014, times)

Field of science/Country	Argentina	Mexico	Brazil	India	China	South Africa	Republic of Korea	Malaysia	Singapore	Taiwan	Iran	Turkey
Multidisciplinary	5.0	7.3	6.8		12.7	3.7		86.6		17.3		
Nano-technology		2.9			13.9		7.0	275.5	6.0	6.1		
Health sciences			4.7			3.7	5.3	10.6	4.9	3.3	12.6	
Earth and related environmental sciences								12.4			10.5	
Other agricultural sciences			5.8			3.4						
Chemical engineering		3.5	3.1	14.3		3.9					10.4	
Environmental biotechnology		2.6			8.4				2.8			
Veterinary science		2.5										
Clinical medicine			3.4				4.1					
Agricultural sciences			3.7		8.3							
Mathematics								19.3				4.7
Electrical engineering, electronic engineering, information engineering	3.5					3.6						3.5
Chemical sciences									3.0			
Agriculture, forestry, and fisheries			3.8									
Biological sciences									2.9			
Environmental engineering	2.6											
Physical sciences								11.3				
Materials engineering				4.4				24.2			12.0	3.5
Mechanical engineering				4.5				19.4				
Computer and information sciences	3.1											
Sociology					31.0	3.7						

Top-35 partners of Russia on scientific collaboration in Web of Science in 2014

№	Countries	Share in total number of Russian papers in int. collaboration, %		Number of papers in int. collaboration		Growth of papers in int. collab. with Russia 2003-2014,
		2003	2014	2003	2014	
1	USA	25.3	27.3	2 257	2 965	31.4
2	Germany	26.9	26.7	2 400	2 895	20.6
3	France	12.3	15.7	1 096	1 699	55.0
4	UK	9.1	14.5	815	1 571	92.8
5	Italy	8.1	11.1	723	1 202	66.3
6	Peoples R China	2.9	9.7	262	1 049	300.4
7	Spain	4.0	9.2	353	999	183.0
8	Poland	5.4	8.3	481	900	87.1
9	Japan	8.5	7.9	757	856	13.1
10	Switzerland	4.4	7.2	394	779	97.7
11	Ukraine	3.2	7.1	287	772	169.0
12	Netherlands	4.8	6.4	431	700	62.4
13	Sweden	4.9	5.8	433	633	46.2
14	Finland	3.1	5.6	276	604	118.8
15	Czech Republic	2.2	5.4	192	589	206.8
16	Canada	3.7	5.3	327	578	76.8
17	Brazil	1.7	5.0	154	542	251.9
18	Australia	1.5	4.9	133	535	302.3
19	India	1.2	4.8	110	522	374.5
20	South Korea	2.9	4.6	257	503	95.7
21	Austria	1.8	4.1	164	447	172.6
22	Belgium	3.2	4.1	284	443	56.0
23	Turkey	0.6	3.8	51	408	700.0
24	Byelarus	1.4	3.6	127	392	208.7
25	Taiwan	1.3	3.5	113	379	235.4
26	Norway	1.8	3.4	159	373	134.6
27	Hungary	1.2	3.4	108	370	242.6
28	Portugal	1.5	3.3	131	359	174.0
29	Israel	2.0	3.2	179	342	91.1
30	Denmark	1.8	3.1	157	332	111.5
31	Greece	1.3	3.0	118	330	179.7
32	Romania	0.6	2.9	55	316	474.5
33	Ireland	0.8	2.7	67	293	337.3
34	South Africa	0.3	2.4	25	262	948.0
35	Mexico	1.3	2.3	120	253	110.8



Top-30 thematic areas of Russian scientific collaboration in Web of Science in 2003-2014

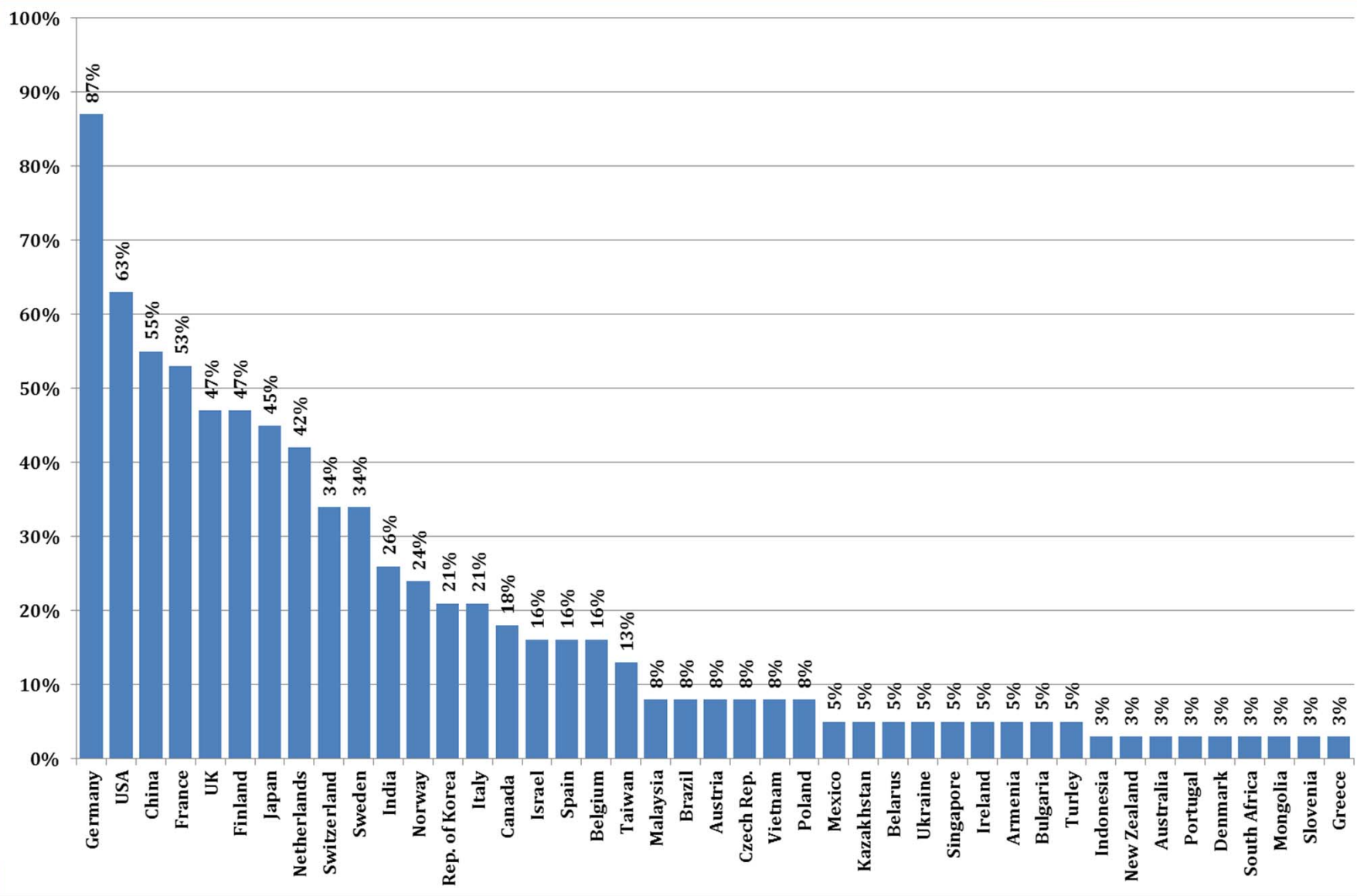
№	Web of Science Categories	Number of Russian papers in int. collab.			Share in total number of Russian papers in int. collab. for 2003-2014, %	Growth/decrease 2003 - 2014, % (more than 50% growth in green, more the 15% decrease in red)
		2003	2014	2003-2014		
	Total	8 914	10 854	112 485	100.0	21.8
1	Physics Condensed Matter	1 046	689	10 065	8.9	-34.1
2	Physics Multidisciplinary	859	787	9 910	8.8	-8.4
3	Astronomy Astrophysics	604	858	8 588	7.6	42.1
4	Physics Applied	709	758	8 317	7.4	6.9
5	Physics Particles Fields	558	739	7 929	7.0	32.4
6	Materials Science	574	799	7 485	6.7	39.2
7	Chemistry Physical	552	694	6 834	6.1	25.7
8	Optics	363	483	4 957	4.4	33.1
9	Physics Atomic Molecular Chemical	430	382	4 703	4.2	-11.2
10	Biochemistry Molecular Biology	421	365	4 611	4.1	-13.3
11	Physics Nuclear	420	319	4 418	3.9	-24.0
12	Geosciences Multidisciplinary	281	359	3 616	3.2	27.8
13	Chemistry Multidisciplinary	267	419	3 587	3.2	56.9
14	Mathematics	247	329	3 468	3.1	33.2
15	Nuclear Science Technology	341	199	3 244	2.9	-41.6
16	Physics Mathematical	286	272	3 028	2.7	-4.9
17	Physics Fluids Plasmas	244	212	2 815	2.5	-13.1
18	Instruments Instrumentation	266	244	2 808	2.5	-8.3
19	Mathematics Applied	180	290	2 736	2.4	61.1
20	Chemistry Inorganic Nuclear	212	233	2 703	2.4	9.9
21	Spectroscopy	250	201	2 654	2.4	-19.6
22	Geochemistry Geophysics	186	243	2 446	2.2	30.6
23	Chemistry Organic	196	182	2 353	2.1	-7.1
24	Engineering Electrical Electronic	229	179	2 344	2.1	-21.8
25	Nanoscience Nanotechnology	101	268	2 158	1.9	165.3
26	Meteorology Atmospheric Sciences	157	168	2 141	1.9	7.0
27	Mechanics	141	186	1 827	1.6	31.9
28	Metallurgy Metallurgical	127	202	1 823	1.6	59.1
29	Multidisciplinary Sciences	64	343	1 578	1.4	435.9
30	Environmental Sciences	124	174	1 566	1.4	40.3



Index of scientific specialization (points)

Field of science/Country	Austria	UK	Germany	Spain	Italy	Netherlands	Finland	France	Argentina	Mexico	Brazil	India	China	South Africa	Israel	Iran	Canada	USA	Turkey	Switzerland	R. of Korea	Malaysia	Singapore	Taiwan	Japan	
Industrial Biotechnology							1.21				1.14	1.11	1.44						1.11	1.16	1.95	1.34	2.98	1.41	1.69	
Physical sciences	1.09		1.43	1.04	1.23			1.41	1.07	1.41		1.24	1.17		1.22					1.24	1.40		1.38	1.30	1.50	
Materials engineering												1.45	2.24			1.18						1.85	1.47	1.58	1.43	1.35
Chemical sciences			1.03	1.21				1.02	1.10			1.95	1.58			1.71						1.37	1.37	1.18	1.05	1.33
Environmental biotechnology				1.14			1.10		1.32	1.31	1.06	1.67	1.05	1.30					1.02			1.62	1.60	1.13		1.30
Nano-technology			1.00									1.41	1.57			1.32					2.41	1.80	3.22	2.12	1.25	
Basic medicine	1.05	1.14	1.07		1.29	1.27	1.00		1.07		1.16				1.07		1.19	1.34							1.17	
Other agricultural sciences				2.15	1.18		1.17		2.32	1.63	1.92	1.48		1.25		1.34			1.85		1.47	2.32		1.10	1.15	
Biological sciences	1.17	1.13	1.09	1.22	1.02	1.14	1.22	1.10	2.04	1.47	1.44			1.60	1.15		1.20	1.21		1.18					1.09	
Mechanical engineering					1.01			1.10				1.04	1.48			1.80						1.26	1.16	1.01	1.12	1.09
Clinical medicine	1.43	1.24	1.21		1.37	1.59	1.17	1.01							1.33		1.16	1.26	1.81	1.27					1.07	
Electrical, electronic, information													1.50			1.27						1.55	1.77	2.16	2.13	1.04
Other engineering and technologies												1.09	1.87			1.28						1.32	1.44	1.22	1.50	1.01
Medical engineering	1.12				1.12	1.12											1.07	1.15		1.09	1.17	1.20	1.94	1.27		
Agricultural sciences				1.56	1.01		1.17		2.06	1.98	3.08	1.58		1.60		1.50	1.09		1.83				1.35			
Agriculture, forestry, and fisheries				1.62	1.03		1.57		2.16	2.33	3.59	1.55		1.59		1.51	1.28		1.27				1.17			
Environmental engineering												1.11	1.66	1.10		1.44	1.02				1.00	1.69		1.12		
Multidisciplinary	1.16	1.36	1.13		1.13	1.31	1.07	1.14	1.05			1.46	1.12	1.93	1.28		1.06	1.37		1.48		1.79				
Chemical engineering				1.26					1.68	1.50	1.11	1.65	1.44	1.18		2.55			1.76		1.43	2.20	1.43	1.12		
Computer and information sciences	1.02			1.04									1.60			1.08						1.16	1.70	1.68	1.67	
Animal and dairy science				1.33	1.37	1.17			1.61	2.25	3.41	2.60		1.98		1.69	1.28		1.28							
Civil engineering													1.96			1.67	1.04		1.33		1.34	1.25	1.41	1.32		
Health sciences		1.51				1.55	1.41					1.90			1.83		1.48	1.45		1.23						
Media and communications		1.18		1.32		1.11	1.60								1.87			1.21				2.12	1.61	1.28		
Sociology		1.68				1.27								1.80	1.55		1.32	1.51				1.23				

Key partners of Russia on scientific collaboration selected by experts (% of expert answers)

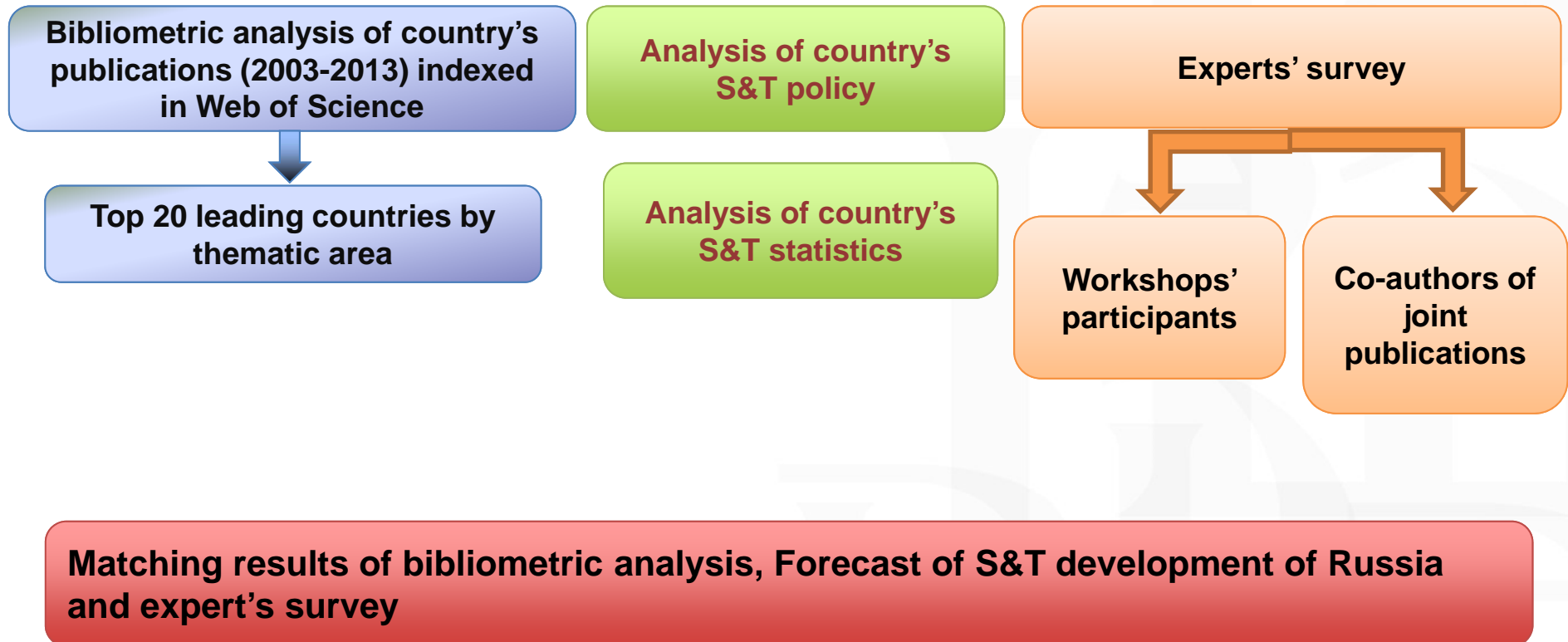




Key thematic areas and countries for Russia's cooperation (selected by experts)

- ❖ **ICT** - Germany, Israel, India
- ❖ **Medicine and Health** - United Kingdom, Germany, France, USA, Sweden, China, Japan, Singapore, Taiwan, Japan
- ❖ **Biotechnologies** - United Kingdom, Germany, France, Spain, the Netherlands, Japan, Brazil, China
- ❖ **New materials and nanotechnologies** - Germany, Finland, France, USA, Japan, China, South Africa
- ❖ **Rational use of natural resources** - Germany, USA, Saudi Arabia, South Africa, Republic of Korea
- ❖ **Transport and Space Systems** - Germany, USA, R. of Korea, China, Japan
- ❖ **Energy efficiency** - Germany, USA, Brazil, China, India, South Africa, Saudi Arabia

What next?





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for your attention!

