

Scientific collaboration of new 10 EU countries in the field of social sciences

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Abstract

The paper presents bibliometric analysis of scientific collaboration of new 10 countries EU in the field of social sciences. Material for this analysis was drawn from DB SSCI. The states as wholes are considered here as participants of collaboration. The results are mapped in a chart of counter to country links.

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1. Introduction

The object of the paper is the joint publications of authors from the 10 new EU member-states in the field of social sciences. The present study was based on the material of [SSCI DB for 2002](#). As is well known social sciences and humanities are a small part of the world's overall scientific production (in NSI system social sciences make 8% and humanities only 3% of the total number of publications). It should be kept in mind that publications in those fields are mostly devoted to local and regional problems, and accordingly are not included in ISI DB.

Research cooperation is witnessed by the authors' addresses: if a paper has two or more authors from different countries, it belongs to the material of the present study. In SSCI DB there are 1060 publications, whose authors' addresses were in would-be new member-states of EU.

2. Research activity and citation statistics

According to [NSI Standard version: 1998–2002](#) saw 3 599 665 papers in the fields of science and social science published with USA as world leader contributing 34.17% of publication. The scientists from 15 EU member-states authored 37.13% of all papers, the share of the ten EU candidate-countries is 2.99% (more than 107

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Table 1
DB NSI Standard version:1998–2002

	Countries	% of world total	Number of papers	% cited papers	Citation impact
<i>EU countries</i>					
1	UK	9.30	334,676	64.98	5.25
2	Germany	8.82	317,370	63.95	4.97
3	France	6.34	228,185	62.82	4.66
4	Italy	4.18	150,417	63.01	4.61
5	Spain	2.95	106,115	61.12	3.84
6	Netherlands	2.56	92,220	67.97	5.71
7	Sweden	2.05	73,644	67.79	5.17
8	Belgium	1.35	48,572	65.10	4.94
9	Denmark	1.04	37,609	69.17	5.58
10	Finland	0.98	35,259	65.92	4.92
11	Austria	0.95	34,156	62.63	4.57
12	Greece	0.66	23,668	54.80	2.78
13	Portugal	0.42	15,008	57.92	3.19
14	Ireland	0.36	12,975	59.67	4.19
15	Luxembourg	0.01	440	61.59	3.49
<i>EU candidate-countries</i>					
1	Poland	1.26	45,325	53.60	2.54
2	Czech rep	0.57	20,398	54.30	2.67
3	Hungary	0.52	18,874	57.53	3.22
4	Slovakia	0.25	9102	50.20	2.27
5	Slovenia	0.17	6276	52.17	2.51
6	Estonia	0.08	2700	59.33	3.38
7	Lithuania	0.06	2287	51.12	2.74
8	Latvia	0.05	1638	51.28	2.52
9	Cyprus	0.02	692	51.16	2.49
10	Malta	0.01	210	49.05	2.74

thousand papers), which is roughly equal to that of the 32 countries of Latin America (3.16% of all countries or more than 113 thousand papers).

The cited papers constitute 59.87% of all papers in NSI DB and 63.15% of all papers in EU countries. The corresponding figures of the 15 EU countries, except Greece, are higher – from 69.2 (Denmark) to 57.92 (Portugal). As for 10 EU candidate countries they vary little around the average figure in DB NSI (except Slovakia and Malta) and much lower than average figure for 15 EU countries. To some extent lesser citedness is due to language barriers, but the primary factor is quality of the work. Both quality and quantity of scientific production is reflected in the total number of citation of papers from this or that country.

The ‘Citation Impact’ is the ration of number of citation to the number of publications. The measure is effective as a tool of differentiation of both single countries and organizations. The average figure of Citation Impact in DB NSI is 4.25 and 4.54 for EU countries. The most significant differences among 15 EU countries are Netherlands, Denmark, UK and Sweden with higher Citation Impact and all 10 EU candidate-countries – with low Citation Impact less than 2.75; only two countries Estonia (the former USSR country) and Hungary exceed the figure at 3.

Research Activity and Citation statistics in science and social science for period 1998–2002 for those countries is shown in Table 1.

3. Research cooperation in the social sciences: results of study

In social sciences research activity is much lower than in science, e.g. in 2002 England had 13112 publications, Germany 4762, France 2363, Italy 1505. Total statistics of research activity and research cooperation of the 10 new member-states is given in Table 2.

The per cent of joint publications is very high, the only exception is two states of former Czechoslovakia.

The indexes ‘number of publication per 1000 inhabits’ are approximately the same for most new EU member-states : 0.02–0.05, except Latvia, Poland and Lithuania which have the corresponding figures more less. The analogous index of Germany is 0.06, France and Spain is 0.04, Italy – 0.03. It need to note (emphasize) this index of UK is the most significant (>0.25), The Netherlands and Sweden – 0.19 (Marshakova-Shaikovich, 2003).

Table 2
DB SSCI 2002: Total statistics of collaboration of 10 new UE countries

10 new countries EU	Total publications	Number of papers for 1000 inh.	Collaboration publications	% collaboration publications	Number of collaborating countries
Czech-rep	301	0.03	74	24.6	21
Poland	198	0.005	108	54.5	26
Hungary	196	0.02	122	62.2	25
Slovakia	132	0.02	14	10.6	6
Slovenia	84	0.04	39	46.4	21
Estonia	52	0.04	24	46.1	12
Cyprus	45	0.05	26	57.8	13
Lithuania	34	0.009	12	35.3	7
Malta	13	0.03	7	53.8	4
Latvia	5	0.002	3	60	3
Total	1060		429		

Table 3
Language of publication: BD SSCI CDE 2002

10 new countries EU	Croatian	Czech	English	French	German	Multi-language	Russian	Slovakian
Cyprus	–	–	44	–	–	–	1	–
Czech-rep	–	205	86	–	4	–	3	3
Estonia	–	–	51	–	1	–	–	–
Hungary	–	3	189	–	3	–	1	–
Latvia	–	–	5	–	–	–	–	–
Lithuania	–	–	25	–	8	–	1	–
Malta	–	–	13	–	–	–	–	–
Poland	–	–	189	1	–	–	8	–
Slovakia	–	11	49	–	–	1	–	71
Slovenia	1	–	82	–	1	–	–	–
Total	1	219	733	1	17	1	14	74

Table 4
The journals published more than 10 papers from 10 countries-candidate EU

	Title of journal	Number of publications
1	Politicka ekonomie	72
2	Finance a uver	65
3	Ekonomicky casopis	60
4	European psychiatry	60
5	Ceskoslovenska psychologie	42
6	Sociologicky casopis	32
7	Filosoficky casopis	25
8	Studia psychologica	22
9	Europe-asia studies	20
10	Acta psychiatrica scandinavica	15
11	Sociologia	15
12	International journal of psychophysiology	14
13	Journal of baltic studies	11
14	Sotsiologicheskie issledovaniya	10

As might be expected about 70% of all joint papers published in English, second comes Czech – 20%, third place goes to Slovakian (nearly 7%).

The statistics on the language of publication is given in Table 3.

Table 5
Collaboration of 10 new EU countries

Countries	CzR	PL	Hu	SK	SL	ES	CY	LI	MA	LA	Total
Total	74	107	122	14	39	24	26	12	7	3	429
Austria	2	3	3		1						9
Belgium	1	3	3		2	1					10
Denmark	3	1	1		1			2		1	9
Finland	1	1	6			2	1	1			12
France	4	5	4		1	1			1		16
Germany	10	15	13	3	2				1		44
Greece					1		4				5
Ireland											
Italy	3	1			3		1				8
Luxembourg											
Netherlands	3	9	9		2						23
Portugal					1						1
Spain	2	1	3		4			1			11
Sweden	2	2	2		3	4					13
UK											55
England	7	7	12	4	4	1	3	4	3	1	46
N-Ireland								2			2
Scotland		2	4								6
Wales							1				1
CzR		3		2							5
PL	3		6	1		1					11
Hu	3	6				1					10
SK					2						2
SL	2			2							4
ES		1	1								2
USA	21	30	34		3	6	4		2	1	101
Australia	2	2	2						1		7
Canada	1	1	4				5				11
Russia		5	5			3	2	1			16
Croatia	1	1		2	4						8
Israel		2	3								5
Japan		2	1		1	1					5
Norway	1				1	2					4
Switzerland		1	1		1						3
Iceland	1				1						2
R-China		1			1						2
R-Georgia			1			1					2
Ethiopia			1								1
Romania			1								1
S-Korea		1									1
S-Afrika		1									1
Bulgaria	1										1
Brazil			1								1
Iran			1								1
Jordan							1				1
Lebanon							1				1
Morocco							1				1
Syria							1				1
Tunisia							1				1

The 10 new member-states published 1060 papers in 380 scientific journals represented in DB SSCI. Titles of 14 journals which included 10 and more papers is given in Table 4.

The 10 new EU candidate-countries in 2002 collaborated mostly with 15 EU countries and USA. Scientific collaboration between these countries are 73% of all joint publications. The statistics of joint publications of the countries under study are given in Table 5.

On the basis of Table 5 a map of collaboration of the ten countries may be drawn.

The calculation of statistical significance of collaboration relatedness of two countries was made according to the formula:

Table 6
The values of collaboration relatedness S of pairs of countries

	Country i	Country j	Collaboration relatedness S
1	Czech-rep	France	0.8
		Germany	0.9
		USA	0.9
2	Poland	France	0.5
		Germany	1.2
		Netherlands	1.3
		Hungary	3.5
		USA	1.0
		Israel	0.7
		Japan	0.7
		Russia	0.5
3	Hungary	Finland	1.7
		Netherlands	1.0
		Scotland	1.8
		Poland	3.5
		USA	1.1
		Canada	1.8
		Israel	1.3
4	Slovakia	Germany	1.3
		England	2.0
		Croatia	3.4
5	Slovenia	Italy	2.8
		Spain	3.0
		Sweden	1.6
		Croatia	4.1
6	Estonia	Sweden	4.1
		Russia	2.3
7	Cyprus	Greece	7.4
		Canada	5.5
		Russia	1.2
8	Lithuania	England	2.5
		N-Ireland	9.0
9	Malta	England	2.6
10	Latvia	England	1.4

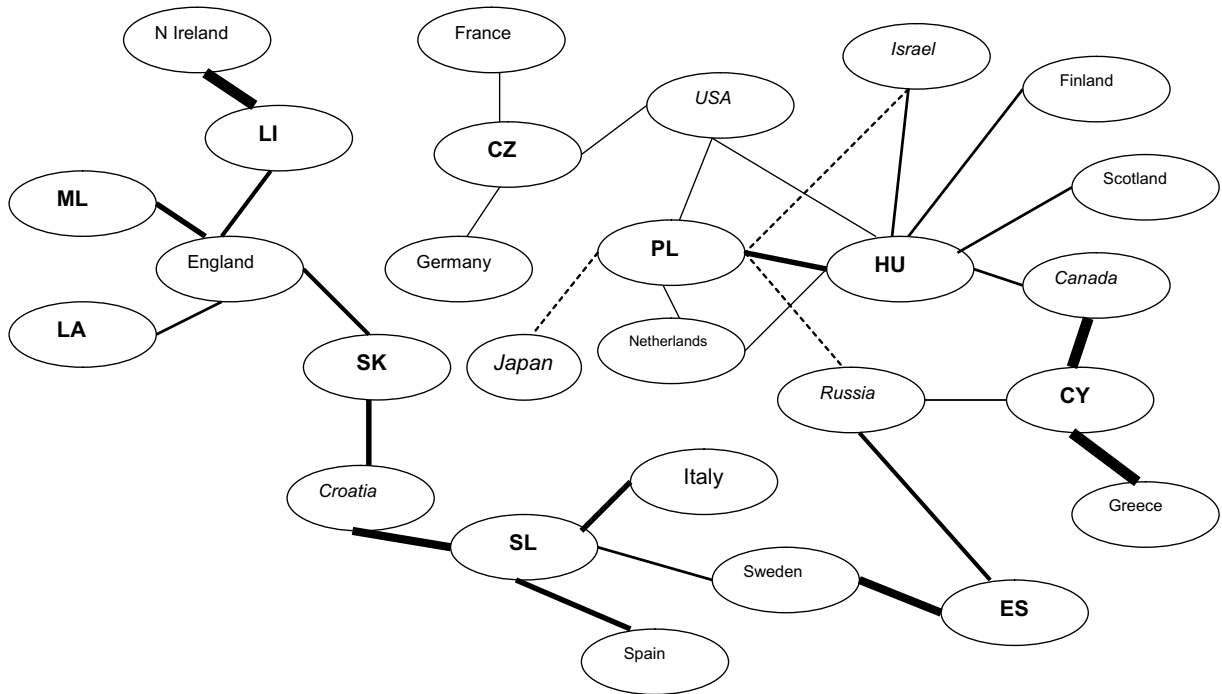


Fig. 1. Map of collaboration of 10 new EU member-states.

$$S = (X_{ij} - m) / \sqrt{m}$$

X_{ij} – real number of joint publications of countries i and j ;

m – mathematical expectation of number of joint publications of countries i and j ;

$$m = (F_i \bullet F_j) / N$$

F_i – number of joint publications of country i ;

F_j – number of joint publications of country j ;

N – total number of joint publications of 10 new EU countries ($N = 429$).

Collaboration relatedness between pairs of countries is given below in Table 6 (with $S > 0.5$) and Fig. 1 Map of collaboration of 10 new EU member-states.

4. Conclusion

1. The 10 new EU member-states collaborated with 45 countries including the leaders in scientific research: USA (101 joint publications), UK (55), Japan (5), Germany (44), France (16), Italy (8), Canada (11), China (2) and Russia (16), but also with such outsiders as Middle East countries (Iran, Jordan, Lebanon, Syria), Eastern Europe (Bulgaria, Romania, Georgia), the developing countries of Africa (Morocco, Ethiopia) and Latin America (Brazil).

Statistics of joint publication for the group of the 10 new EU member-states in the field of social sciences may be present in the following way:

Countries	Number of collaboration publication						
	EU (15 countries)	USA	10 candidate-countries	Russia	Canada	Croatia	Japan
10 candidate-countries	213	101	34	16	11	8	5

2. Analysis of thematics of scientific journals, their classification by JCR:SSE categories allow to show the fields of social sciences which collaboration has been quite active. It concerns first of all economics, business, sociology, psychology, psychiatry (social aspects), political science.
3. Fig. 1 demonstrates the collaboration relatedness (relations, connections) between countries. The most significant research cooperation among 10 new EU countries represents following groups of countries: Cyprus–Greece, Cyprus–Canada, Poland–Hungary, Slovenia–Croatia, Slovakia–Croatia, Slovenia–Spain, Slovenia–Italy, Estonia–Sweden, Lithuania–N-Ireland. On the other hand some ‘old’ EU countries show the less significant relatedness too: England with Lithuania, Malta, Latvia and Slovakia, Germany and The Netherlands with Poland and Hungary. Bibliometric map of scientific collaboration (Fig. 1) evokes a metaphor of space: the three clusters, represented here, are not separated by any barrier – they are bridged by Slovenia, Germany and Russia. Of course, those country to country links are valid in so far as collaboration with 10 new EU members is concerned. The data here do not tell us anything of direct cooperation among 15 old EU members.

On the whole bibliometric map of scientific cooperation (Fig. 1) shows slight collaboration of 10 countries both with 15 EU countries and their mutual collaboration in social science. There is no doubt that entrance into EU will boost research cooperation of new member-states with the core of EU. The EU scientific and education programs are sufficient proofs for that optimism.

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