

Internationalisierung der Forschung

Herausforderung Internationalisierung – Jahrestagung der
Gesellschaft für Hochschulforschung, Hannover

29. April 2010

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21 April 2010

International collaboration in research up 50%

8 May 2008

By [John Gill](#)

Researchers at UK universities are involved in 50 per cent more international collaborations today than they were ten years ago, a study has found.

The report published this week shows that international collaborative research output rose from 97,592 journal articles between 1996 and 2000 to 144,457 between 2001 and 2005.

International research activity has also increased its share of total UK research output from 30 per cent in the 1990s to about 40 per cent in 2005, the report said.

This was hailed as a strong record by Universities UK and the UK Higher Education International Unit, which commissioned the report.

However, the report says the UK is facing increasingly tough competition from countries such as China, which saw its international collaborative research more than double in the same period.

Countries such as the UK with large, well-established research sectors have seen a decline in their global share of international research output, and that trend is expected to continue, the authors suggest.

The UK's most productive international partnerships are with researchers in the US, Germany and France, the study shows, while the fastest-growing link is with China.

Illustrating the extent to which Britain has embraced international research are figures from the Higher Education Statistics Agency that show that, in 2007, 40 per cent of research council grants had an international component, while half of PhD students and 40 per cent of research staff were non-UK nationals.

The analysis says strengthening research collaboration is vital if science is to address global challenges such as



Wachsende internationale Zusammenarbeit

Table 5. Evolution of the share of internationally co-authored papers of the tetrad and four dynamic countries

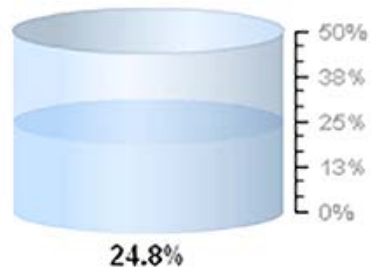
Country	1991	1998	2005
EU15	13.5%	21.5%	27.7%
USA	12.1%	20.7%	26.8%
JPN	9.8%	16.6%	22.4%
CHN	24.5%	26.2%	21.9%
KOR	28.3%	24.4%	25.7%
TWN	16.5%	16.3%	19.1%
BRA	29.0%	35.0%	30.7%
TRK	20.7%	18.1%	16.0%

W. GLÄNZEL & AL.: 'Triad' or 'tetrad'? On global changes in a dynamic world. In: *Scientometrics* 74 (2008)

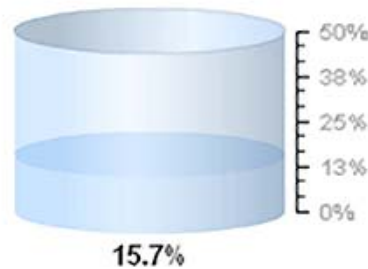
Growth of international co-operation

weltweite Entwicklung der Coautorschaft

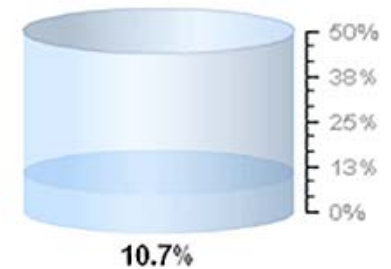
Anteil der Beiträge mit einem einzelnen Autor



1980

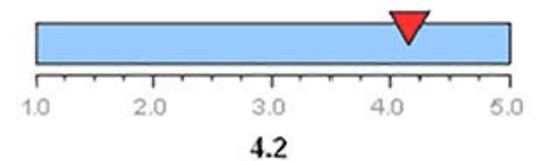
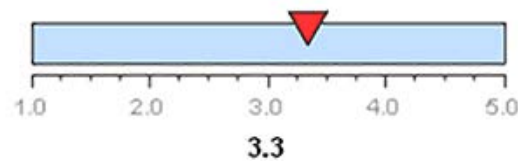
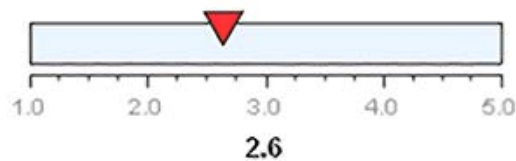


1990



2000

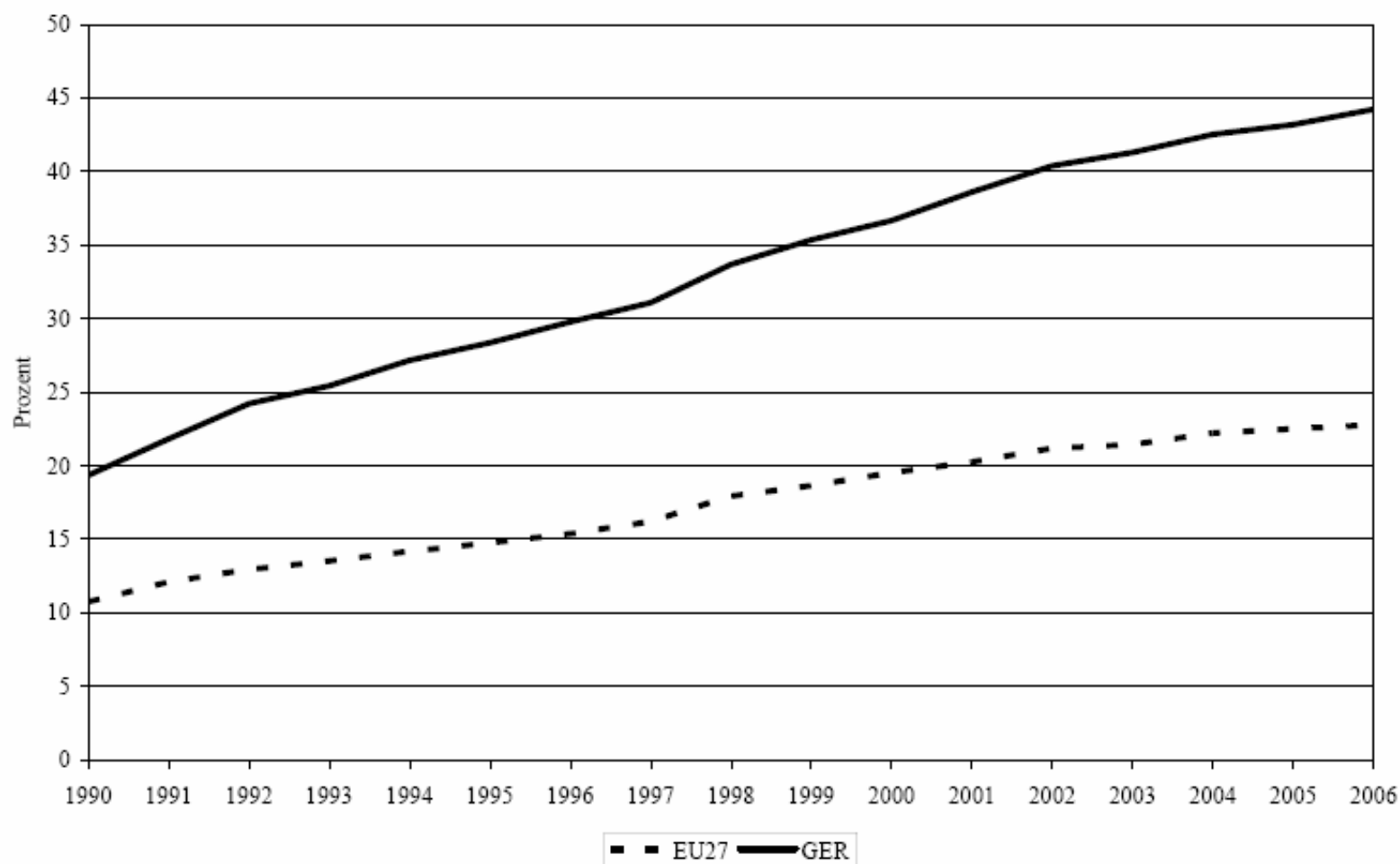
Mittlere Zahl der Autoren pro Beitrag



Source: Glänzel, W. & Schubert, A. (2004): Analyzing Scientific Networks Through Co-Authorship. In: Moed, H.F. et al.: Handbook of Quantitative Science and Technology Research, 257-276

 Steigender Anteil von Publikationen mit internationaler Koautorschaft

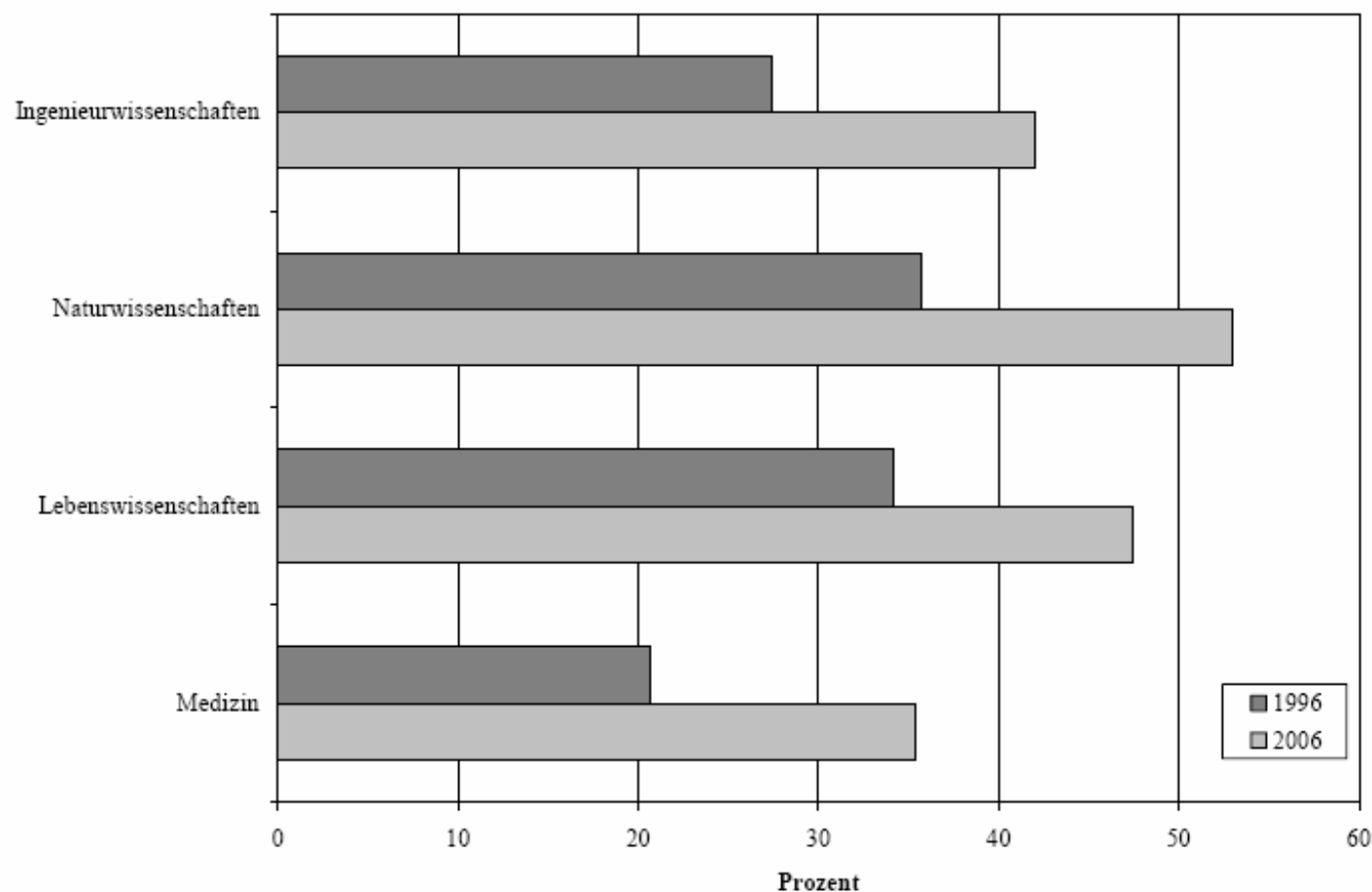
Abb. 3-1: Anteil der deutschen Publikationen im SCI mit mindestens einem ausländischen Partner im Vergleich zur Situation der EU27 Länder



Quellen: SCISEARCH (STN), Recherchen und Berechnungen des Fraunhofer-ISI

Sybill Hinze / Li Tang / Stephan Gauch: Leistungsfähigkeit und Strukturen der Wissenschaft im internationalen Vergleich 2007

Abb. 3-3: Anteile von internationalen Ko-Publikationen deutscher Autoren in den Jahren 1996 und 2006 nach SCI-Segmenten



Quellen: SCISEARCH (STN), Recherchen und Berechnungen des Fraunhofer-ISI.

Sybille Hinze / Li Tang / Stephan Gauch: Leistungsfähigkeit und Strukturen der Wissenschaft im internationalen Vergleich 2007

Tab. 2-5: Internationale Ausrichtung ausgewählter Länder und Regionen bei Publikationen im Science Citation Index (ohne Eigenzitate)³

Land/ Region	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
USA	35	35	35	34	35	35	35	34	36	36	34	33	33	32	32
JPN	-10	-11	-11	-13	-13	-15	-17	-14	-14	-14	-18	-11	-11	-10	-6
GER	3	-3	-2	0	0	3	4	3	3	5	7	6	8	9	11
GBR	7	4	7	5	5	7	6	11	10	12	15	15	19	19	20
FRA	1	4	1	1	0	-1	0	2	2	0	3	4	5	3	5
SUI	31	32	29	30	29	29	29	30	29	30	29	28	28	27	30
CAN	5	5	7	7	8	7	10	11	11	13	11	16	14	15	15
SWE	8	5	8	6	8	8	7	6	8	8	11	12	11	15	15
ITA	-3	-3	-2	-1	0	0	0	2	1	2	1	-1	-1	3	3
NED	11	12	12	11	12	14	13	13	14	21	20	19	21	24	26
FIN	-	-	-	-	-	-	-	-	-	8	10	6	8	9	8
KOR	-	-	-	-	-	-	-	-	-	-45	-38	-38	-37	-34	-32
CHN	-	-	-	-	-	-	-	-	-	-	-	-	-56	-47	-45
EU 15	-	-	-	-	-	-	-	-	-	1	3	2	4	5	6
EU 10	-	-	-	-	-	-	-	-	-	-	-	-	-38	-36	-38
EU 25	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3
Welt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Quellen: SCI, Recherchen und Berechnungen der Universität Leiden (CWTS), Berechnungen des Fraunhofer ISI.



Wachsende internationale Konkurrenz

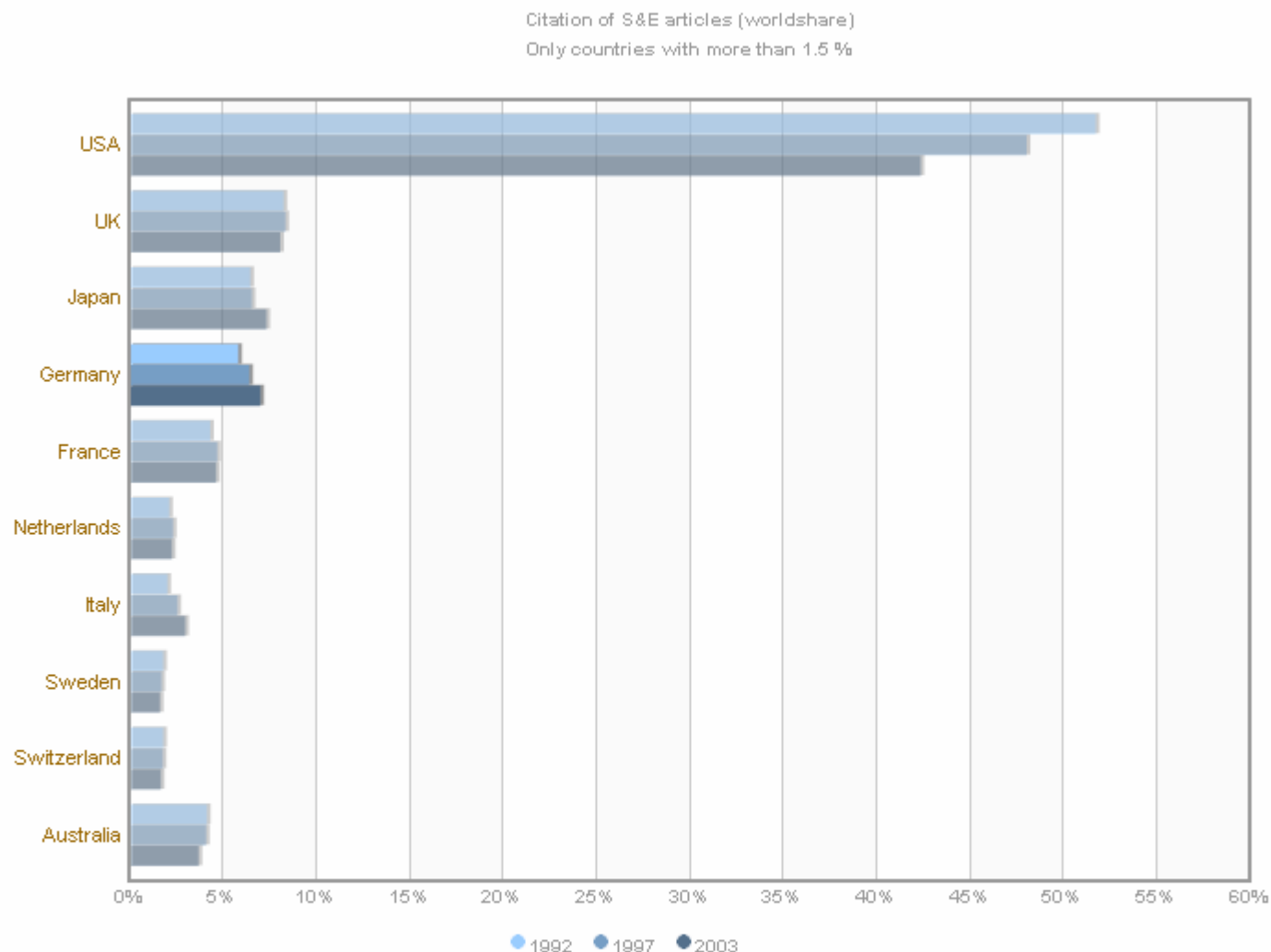
Tab. 2-1: Anteile ausgewählter Länder und Regionen an allen Publikationen im SCI

Land/ Region	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
USA	36,5	36,7	35,7	36,0	35,1	35,1	34,3	33,7	32,9	32,3	31,9	32,1	31,9	31,7	31,4	30,8	30,5
JPN	8,1	8,3	8,7	8,8	9,0	9,1	9,5	9,5	10,0	10,2	10,2	10,2	10,1	10,0	9,4	9,0	8,5
GER	6,4	7,3	7,5	7,4	7,8	7,9	8,2	8,6	9,0	9,0	9,0	9,0	8,8	8,7	8,4	8,4	8,2
GBR	8,9	9,1	9,1	9,3	9,5	9,5	9,6	9,3	9,4	9,3	9,4	9,1	8,8	8,6	8,4	8,2	8,1
FRA	5,4	5,5	5,9	6,0	6,1	6,3	6,4	6,6	6,7	6,7	6,6	6,6	6,4	6,4	6,1	6,0	5,9
SUI	1,5	1,6	1,6	1,7	1,8	1,8	1,8	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9
CAN	4,7	4,8	4,8	4,8	4,8	4,7	4,7	4,4	4,3	4,3	4,3	4,1	4,2	4,3	4,3	4,4	4,5
SWE	1,9	1,9	1,8	1,9	1,9	2,0	2,1	2,1	2,1	2,1	2,0	2,1	2,1	2,0	1,9	1,9	1,8
ITA	3,1	3,2	3,5	3,5	3,7	3,9	4,2	4,2	4,3	4,4	4,4	4,6	4,7	4,8	4,8	4,7	4,7
NED	2,3	2,3	2,3	2,5	2,5	2,6	2,6	2,7	2,6	2,5	2,5	2,5	2,5	2,5	2,6	2,6	2,6
FIN	-	-	-	-	-	-	-	-	-	1,0	1,0	1,0	1,0	1,0	0,9	0,9	0,9
KOR	-	-	-	-	-	-	-	-	-	1,7	1,9	2,1	2,3	2,6	2,8	3,0	3,1
CHN	-	-	-	-	-	-	-	-	-	-	-	-	5,2	5,8	6,5	7,6	8,6
EU 15	-	-	-	-	-	-	-	-	-	40,9	40,7	40,6	39,9	39,4	39,4	38,8	38,4
EU 12*	-	-	-	-	-	-	-	-	-	-	-	-	3,4	3,4	3,5	3,5	3,5
EU 27*	-	-	-	-	-	-	-	-	-	-	-	-	42,4	41,9	42,0	41,3	40,9
Welt	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

*Daten bis 2005 beziehen sich auf EU10, ab 2006 auf EU12; **Daten bis 2005 beziehen sich auf EU25, ab 2006 auf EU27.

Quellen: SCI, Recherchen der Universität, Berechnungen, Fraunhofer ISI

Sybillé Hinze / Li Tang / Stephan Gauch: Leistungsfähigkeit und Strukturen der Wissenschaft im internationalen Vergleich 2007



NOTES: Citation counts based on a 3-year period with 2-year lag, e.g., citations for 1999 are references made in articles published in 1999 to articles published in 1995-97. Citations on fractional-count basis, i.e., for cited articles with collaborating institutions from multiple countries/economies, each country/economy receives fractional credit on basis of proportion of its participating institutions. Detail may not add to total because of rounding. EU-15 consists of 15 EU countries before expansion of member countries on May 1, 2004 (listed countries plus Luxembourg). Germany data for 1992 include former East Germany. China data include Hong Kong. Czech

The world system of science is currently undergoing dramatic changes. Although, Europe has become the largest scientific producer and source of potential in the world, the race between the USA and the EU for world leadership in science and technology has already been overshadowed by a new dynamic of a group of emerging nations. A fourth member has now joined the triad formed by the USA, EU and Japan. China has transformed this group into a tetrad; and other countries already started to compete for a position among the leading nations in science and technology. China and other emerging scientific nations like South Korea, Taiwan, Brazil and Turkey are already changing the balance of power, thus contributing to the relative decline of the former triad.

GLÄNZEL, W / DEBACKERE, K / MEYER, M. (2008): 'Triad' or 'tetrad'? On global changes in a dynamic world, In: *Scientometrics*, Vol. 74, No. 1 (2008) 71–88 (DOI: 10.1007/s11192-008-0104-5)



Asymetrische Kooperationsbeziehungen

	ARG	AUS	AUT	BEL	BRA	CAN	CZE	DEN	FIN	FRA	GER	GRE	HUN	IND	IRE	ISR	ITA	JAP
ARG	--	0.66	0.77	0.47	6.80	0.70	0.70	0.35	0.33	1.10	0.70	0.29	0.56	0.91	0.27	0.51	0.97	0.37
AUS	0.65	--	0.65	0.53	0.55	1.49	0.25	0.81	0.56	0.60	0.73	0.16	0.36	0.95	1.05	0.63	0.49	1.12
AUT	0.76	0.66	--	1.14	0.59	0.41	2.09	1.39	1.01	0.93	2.13	1.90	1.94	0.47	0.79	0.47	1.28	0.46
BEL	0.46	0.53	1.13	--	0.91	0.73	1.27	1.01	0.92	1.83	0.97	1.21	1.02	0.43	1.34	0.57	1.04	0.45
BRA	6.75	0.56	0.59	0.92	--	1.01	1.03	0.74	0.54	1.24	0.84	0.83	0.29	0.88	0.38	0.52	0.91	0.46
CAN	0.68	1.46	0.40	0.71	0.98	--	0.55	0.64	0.61	0.88	0.62	0.53	0.75	0.83	0.67	1.09	0.61	1.03
CZE	0.70	0.26	2.10	1.28	1.03	0.57	--	1.01	0.96	1.21	1.37	1.58	0.90	0.72	0.46	0.44	1.06	0.94
DEN	0.34	0.81	1.39	1.02	0.74	0.65	1.00	--	2.10	0.88	1.12	1.52	0.69	0.32	1.13	0.46	0.97	0.47
FIN	0.33	0.56	1.01	0.92	0.54	0.62	0.96	2.10	--	0.75	0.94	1.00	1.60	0.66	1.11	0.51	0.90	0.58
FRA	1.03	0.57	0.88	1.75	1.17	0.85	1.14	0.83	0.72	--	1.04	1.21	0.99	0.73	0.88	0.78	1.36	0.65
GER	0.64	0.68	1.97	0.91	0.77	0.59	1.26	1.04	0.87	1.02	--	1.04	1.33	1.05	0.87	1.17	1.03	0.82
GRE	0.29	0.16	1.91	1.23	0.84	0.55	1.58	1.53	1.01	1.29	1.12	--	0.69	0.15	1.23	0.56	1.37	0.30
HUN	0.55	0.37	1.95	1.03	0.29	0.77	0.90	0.69	1.61	1.05	1.45	0.69	--	1.42	1.30	1.25	1.14	1.05

Co-operation preference Indices (co-authorship)

KOR	MEX	NLD	NOR	NZL	POL	POR	PRC	RUS	SAF	SGP	SPA	SWE	SWI	TUR	TWN	UK	USA	
0.75	4.26	0.54	0.26	0.66	0.79	0.66	0.53	0.31	0.43	0.12	3.94	0.47	0.39	0.35	0.19	0.70	1.33	ARG
0.62	0.66	0.70	0.70	8.41	0.33	0.22	1.79	0.33	2.58	3.74	0.39	0.90	0.64	0.30	0.70	1.69	1.47	AUS
0.10	0.27	1.06	1.07	0.32	1.27	1.48	0.53	0.70	0.68	0.29	1.08	1.03	1.53	0.70	0.05	0.75	0.87	AUT
0.16	0.54	2.58	1.04	0.52	1.10	1.55	0.42	0.90	1.17	0.59	1.25	1.05	1.12	0.43	0.10	1.11	0.75	BEL
0.42	2.01	0.57	0.89	0.44	0.77	2.68	0.59	0.92	0.44	0.36	1.41	0.58	0.44	0.50	0.21	0.96	1.45	BRA
0.94	0.90	0.63	0.63	1.50	0.60	0.28	1.12	0.55	1.13	0.98	0.47	0.68	0.66	0.79	0.78	0.96	2.14	CAN
0.33	1.16	1.02	1.33	0.23	2.35	1.63	0.25	1.66	0.11	0.23	0.96	1.25	1.16	0.52	0.20	0.82	0.62	CZE
0.17	0.24	1.35	4.00	0.73	1.01	1.56	0.56	0.80	0.71	0.32	1.06	3.07	0.92	0.43	0.12	1.21	0.90	DEN
0.60	0.19	1.33	2.99	0.44	1.11	1.25	0.56	1.55	0.42	0.27	1.05	3.52	1.13	0.39	0.94	0.91	0.89	FIN
0.42	1.06	0.94	0.93	0.41	1.19	1.40	0.50	1.11	0.64	0.17	1.45	0.78	1.35	0.64	0.40	1.02	0.91	FRA
0.49	0.52	1.17	0.69	0.57	1.32	0.76	0.80	1.67	0.95	0.35	0.89	0.94	1.60	0.87	0.49	0.94	1.07	GER

Coauthored Papers							
of Germany ^a with	U.S	EU 15	UK	Japan	China	Total coauthored	Total papers
1988	28.6%	38.7%	8.2%	3.8%	1.0%	6.435	29164
1996	24.6%	38.1%	8.4%	3.3%	1.7%	16.464	48333
2003	22.7%	37.9%	8.1%	3.5%	2.5%	26.689	59597

^a before 1990 Germany only West-Germany



Internationalisierung der Forschungsförderung

International Research Training Groups / Proposals

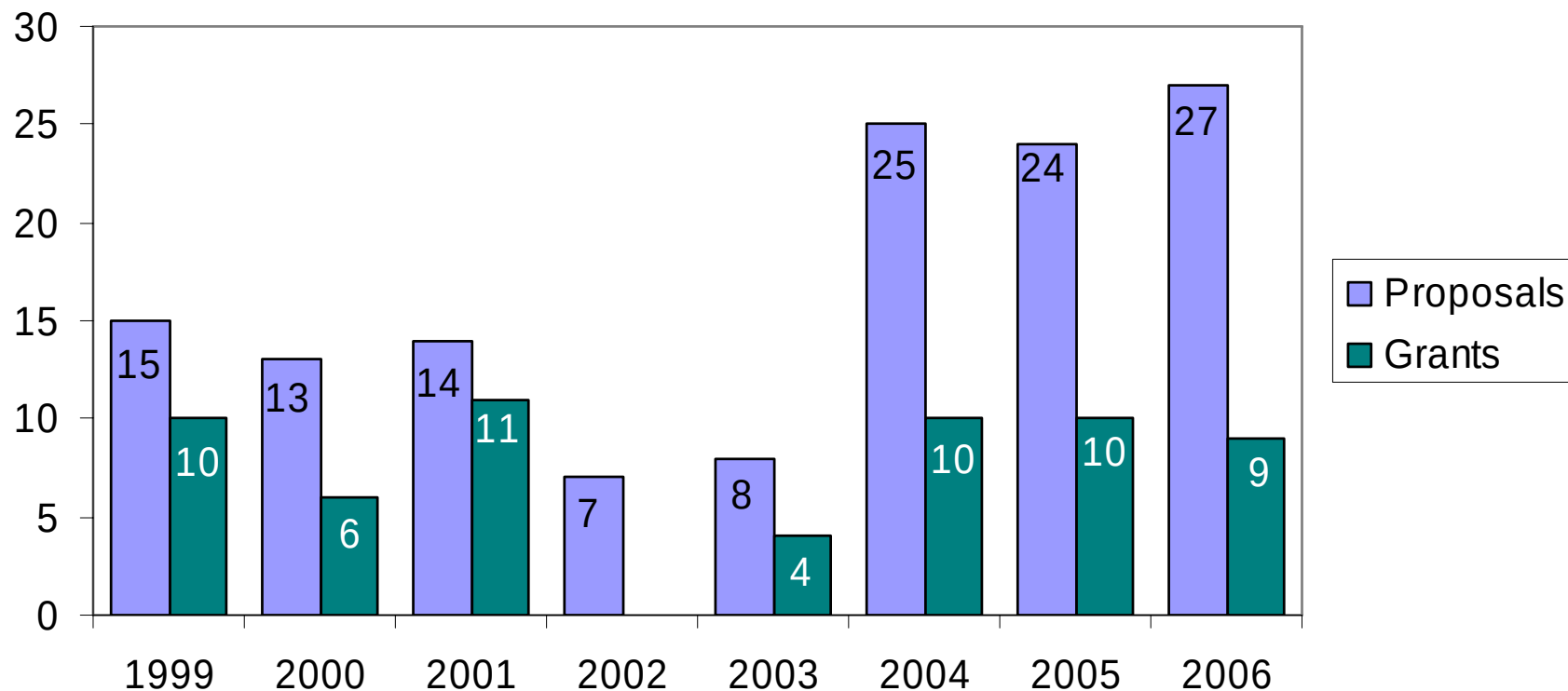
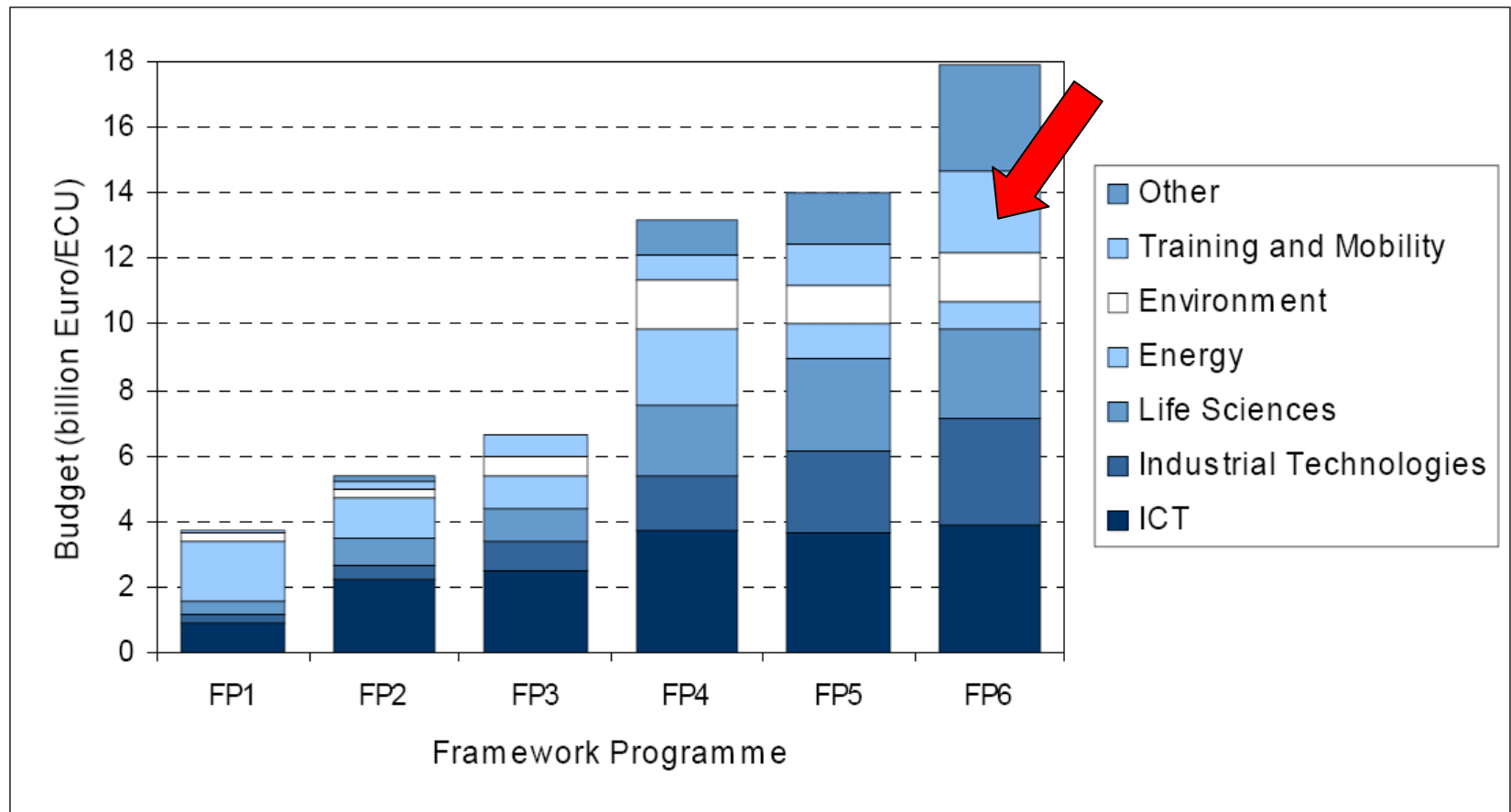


Figure 1: Budget FP1–FP6: Evolution and share of thematic priorities



Note: ICT ... information and communication technologies; industrial technologies include materials, aeronautics and space technologies; life sciences include biotechnology, genomics, biomedicine and food; environment includes transport; Other includes support for SMEs, dissemination, demonstration, co-operation with third countries, and ERA related measures.

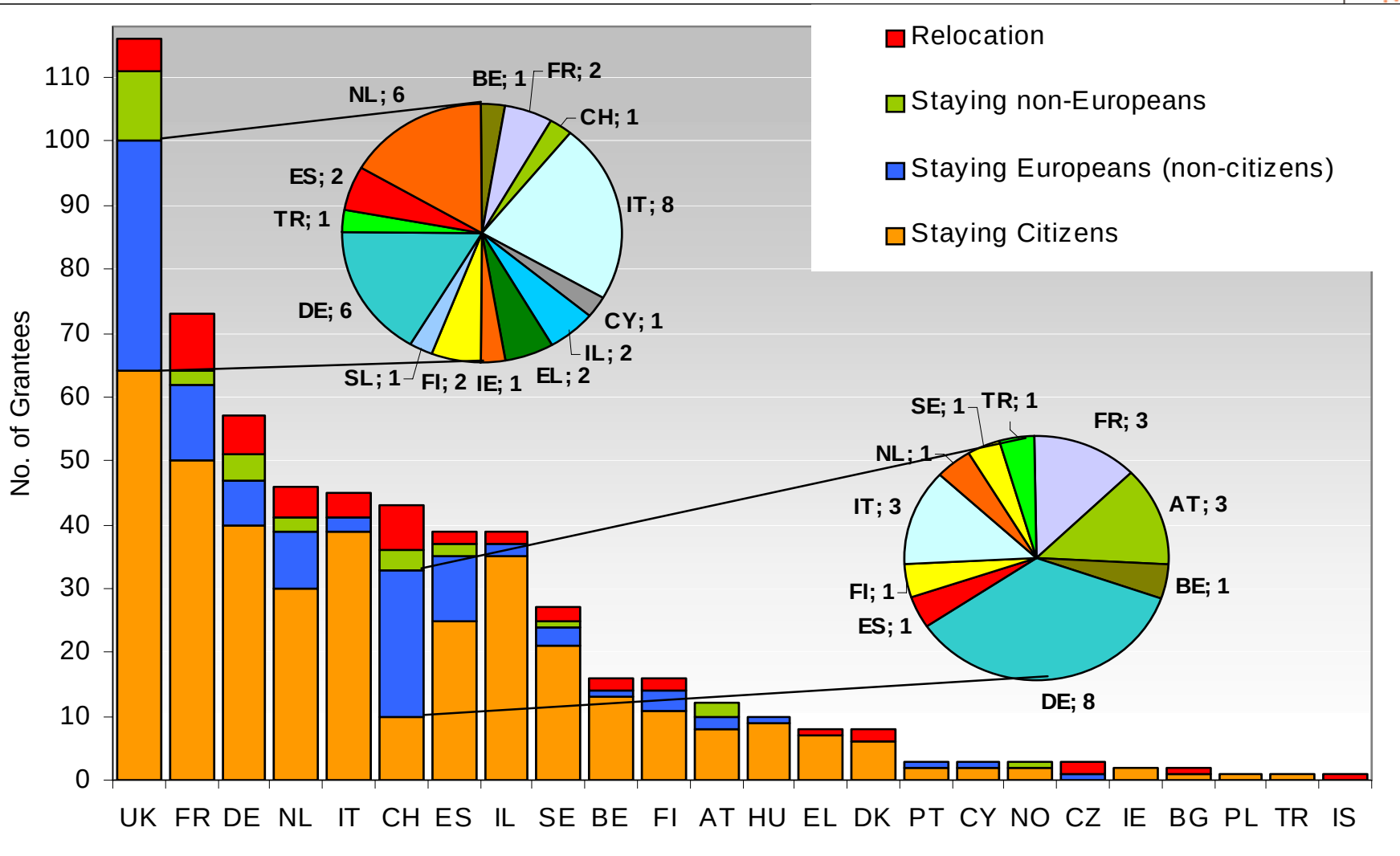
Source: adapted from CORDIS (2006c; 2006b); European Commission (2006); Barker and Cameron (2004, 172).



Standorte im internationalen Wettbewerb

ERC StG 2007 & ERC AdG 2008

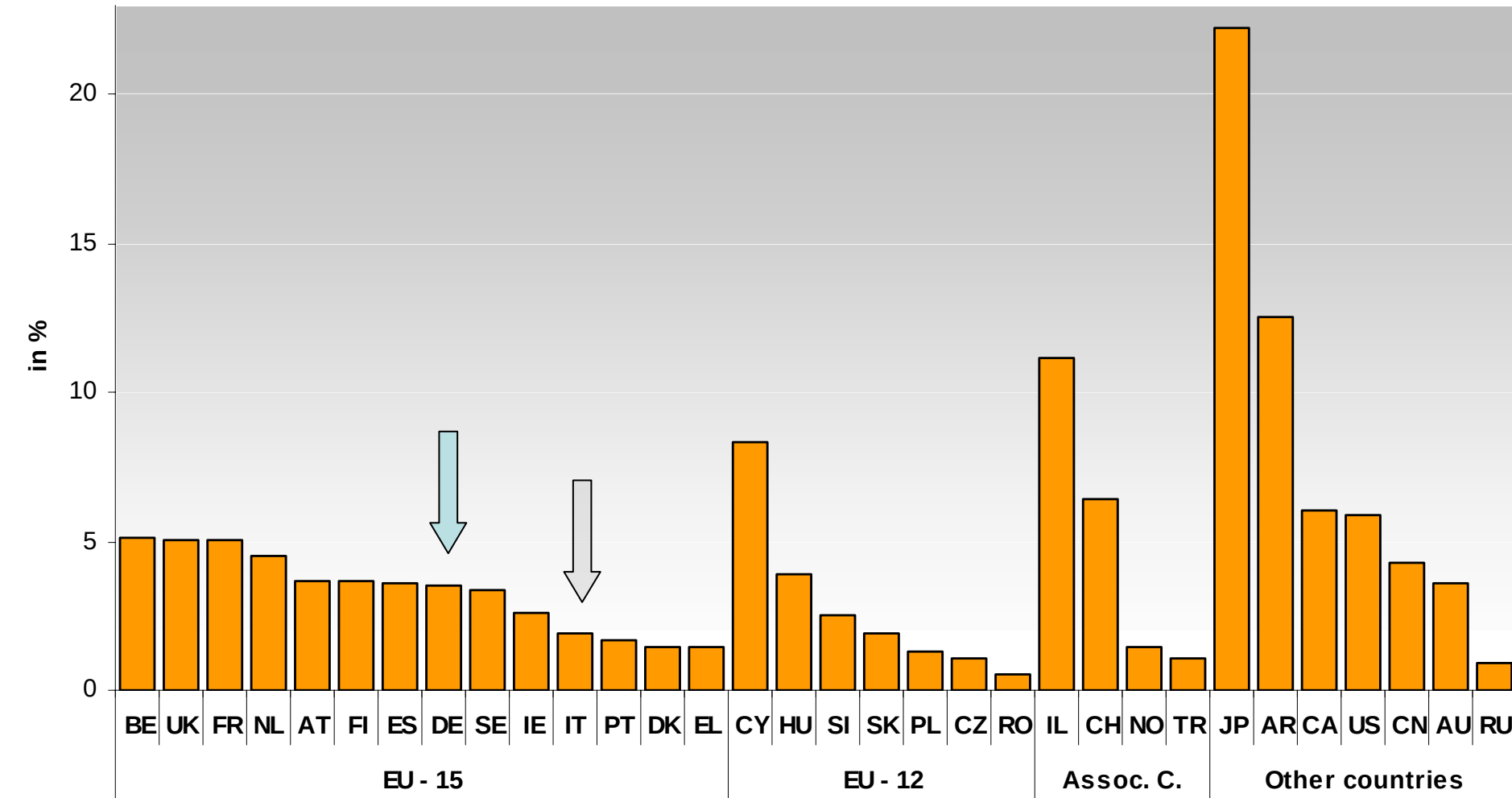
Mobility of grantees



ERC Starting Grant: 2007 call

Success rate by nationalities

Note: Relation between submitted proposals (9167) and 299 selected proposals



Source: All submitted proposals (9167) and 299 selected projects (11.11.2008)

Exzellenzinitiative: Personalrekrutierung

Stand Februar 2009 (absolut)	davon weiblich (Prozent)	aus dem Ausland* (Prozent)	hierunter aus dem Ausland rekrutierte Wissenschaftler mit deutscher Staatsangehörigkeit (Prozent von Personen aus dem Ausland)
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Graduierten- schulen (1. Förderlinie)	Professoren	34	29,4%		11,8%	75,0%
	<i>davon Juniorprof.</i>	16	43,8%		25,0%	75,0%
	Promovierte Nachwuchswiss. (inkl. Nachwuchsgruppenleiter)	75	42,7%		26,7%	35,0%
	Doktoranden (inkl. Fast-Track)	901	43,0%		33,3%	7,7%

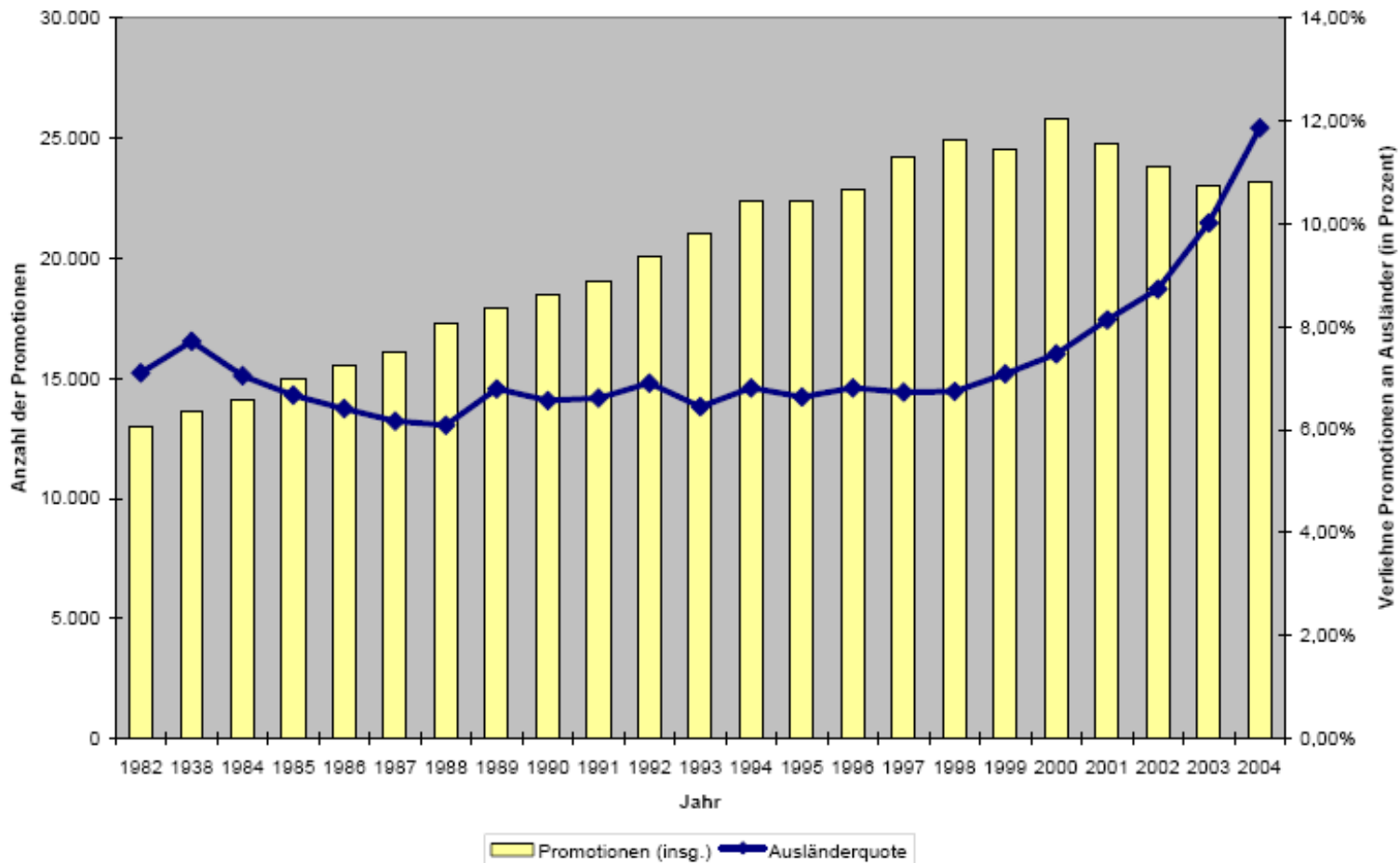
Exzellenz- cluster (2. Förderlinie)	Professoren	147	27,2%		28,6%	57,1%
	<i>davon Juniorprof.</i>	55	34,5%		38,2%	76,2%
	Promovierte Nachwuchswiss. (inkl. Nachwuchsgruppenleiter)	588	32,8%		22,8%	16,4%
	Doktoranden (inkl. Fast-Track)	1323	34,6%		17,5%	4,3%

Zukunfts- konzepte (3. Förderlinie)	Professoren	145	31,7%		27,8%	43,3%
	<i>davon Juniorprof.</i>	28	57,1%		48,1%	61,5%
	alle Nachwuchswissenschaftler (NGL, Postdocs und Doktorand.)	844	40,6%		17,5%	11,8%



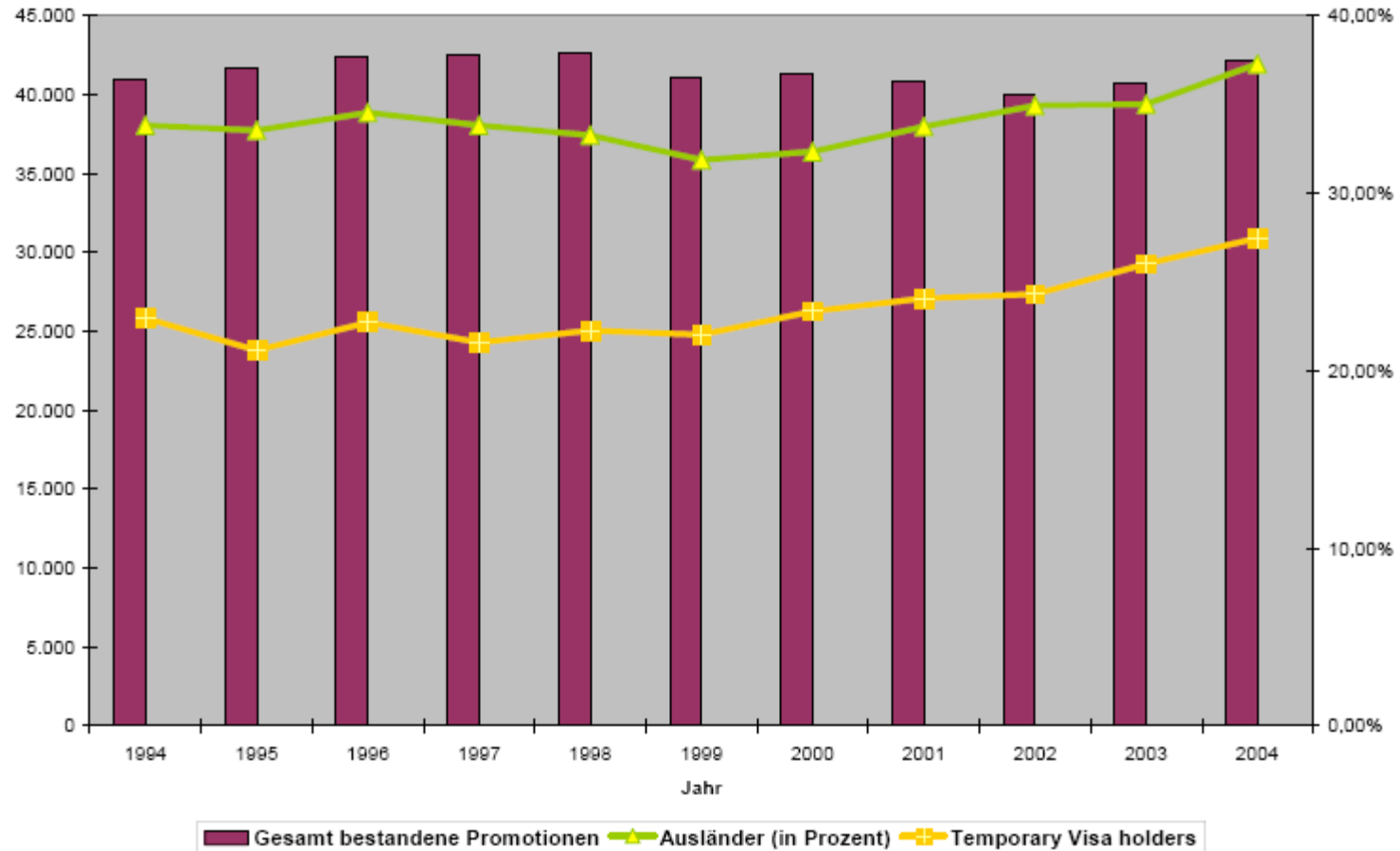
Internationaler Wettbewerb um den wissenschaftlichen Nachwuchs

Anzahl der Promotionsprüfungen und Anteil der Ausländer an bestandenen Promotionsprüfungen in Deutschland 1982-2004 (bis 1992 alte Bundesländer)



Aus: Kerstin Janson, Harald Schomburg, Ulrich Teichler (2006): Wissenschaftliche Wege zur Professur oder ins Abseits? Strukturinformationen zu Arbeitsmarkt und Beschäftigung an Hochschulen in Deutschland und den USA, Internationales Zentrum für Hochschulforschung Kassel

Anzahl der bestandenen Promotionen (gesamt) sowie das Verhältnis der bestandenen Promotionen von "Temporary Visa holders" und Non-US Citizens in den USA 1994-2004



Aus: Kerstin Janson, Harald Schomburg, Ulrich Teichler (2006): Wissenschaftliche Wege zur Professur oder ins Abseits? Strukturinformationen zu Arbeitsmarkt und Beschäftigung an Hochschulen in Deutschland und den USA, Internationales Zentrum für Hochschulforschung Kassel



Internationalisierung von Evaluationen und Rankings

Shanghai Ranking 2008

Regional Rank	Institution*	World Rank	Country	National Rank
13	Univ Munich	55	Germany	1
15	Tech Univ Munich	57	Germany	2
18	Univ Heidelberg	67	Germany	3
29	Univ Goettingen	90	Germany	4
32	Univ Freiburg	96	Germany	5
33	Univ Bonn	97	Germany	6
35-58	Univ Frankfurt	101-151	Germany	7-11
35-58	Univ Mainz	101-151	Germany	7-11
35-58	Univ Muenster	101-151	Germany	7-11
35-58	Univ Tuebingen	101-151	Germany	7-11

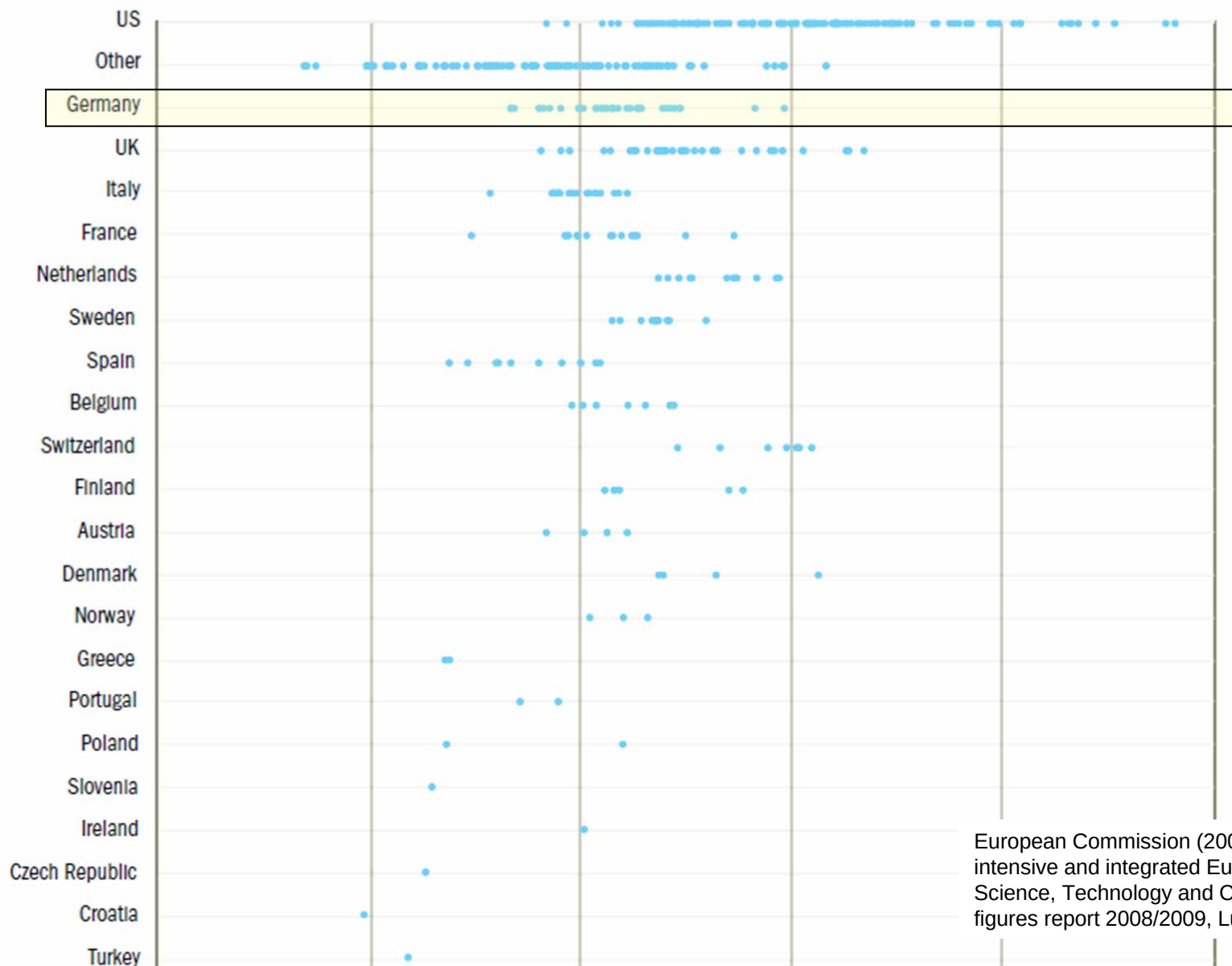
* Institutions within the same rank range are listed alphabetically.

Shanghai Ranking 2008

Statistics by Country

	Country	Top 20	Top 100	Top 200	Top 300	Top 400	Top 500
1	USA	17	54	90	114	139	159
2	UK	2	11	22	33	38	42
3	Japan	1	4	9	12	18	31
4	Germany	0	6	14	24	35	40
5	Canada		4	6	18	18	21
6	Sweden		4	4	9	9	11
7	France		3	7	14	17	23
8	Australia		3	6	9	14	15
9	Switzerland		3	6	7	7	8
10	Netherlands		2	9	9	11	12
	Total	20	100	200	302	401	503

FIGURE II.1.1 The most active research universities – normalised citation impact by country, 1997-2004



European Commission (2008): A more research-intensive and integrated European Research Area
Science, Technology and Competitiveness key figures report 2008/2009, Luxembourg

ERIH Categories



European Reference
Index for the Humanities
(ERIH)
Standing Committee for the Humanities

ERIH distinguishes between different categories of good research journals, those read internationally (here called A and B) and those read in scientific communities which are linguistically more circumscribed (here called C).

ERIH is therefore the first attempt to place “C category” journals in an internationally recognised context.

Category A (expected: 10%-25% of all titles):

- High-ranking, international level publication;
- Very strong reputation among researchers of the field;
- Regularly cited all over the world

Category B:

- Standard, international level publication;
- Good reputation among researchers of the field in different countries

Category C:

- Important local / regional level publication;
- Mainly local / regional readership, but occasionally cited outside the publishing country;
- Only European publications to be considered (ESF Member Organisations)

SciVal Spotlight Matrix View

Select the Matrix view to see Distinctive Competency performance relative to your largest competitors.



InCites™ Summary Metrics

Citation Metrics

Total citations	53,142
Total articles	2,174
Cites per article	24.44
H-Index	95
Median cites	12
2nd generation cites	1,644,878
2nd generation cites per citing article	45.23

Disciplinary Metrics

Disciplinary index	0.10
Interdisciplinarity index	1.34

Collaboration Metrics

Unique Authors	1,066
Average Authors per article	1.00
Unique Organizations	770
Average Organizations per article	2.14
Average Countries per article	1.35

Report Limited To



View Citation Frequency Distribution

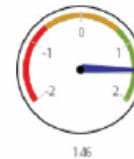
% Articles Cited/ Uncited



Mean Percentile



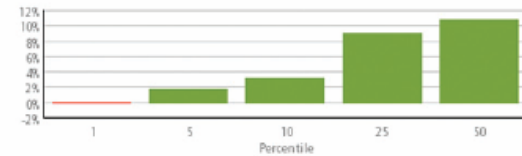
Category actual/ Expected Cites (CXC)



Journal actual/ Expected Cites (JXC)



Percentage articles above / below Expected Level



	1	5	10	25	50
Number of articles	21	148	286	738	1,320
Percent of articles	0.97%	6.81%	13.16%	33.95%	60.72%

Summary Metrics communicate the “big picture” for a dataset. Metrics are provided for citations, discipline, collaboration, and more.



Vielen Dank für Ihre
Aufmerksamkeit!