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Ranking of departments and researchers within a university using two different databases: Web of Science versus Scopus

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In this work, we compare the difference in the number of citations compiled with Scopus as opposed to the Web of Science (WoS) with the aim of analysing the agreement among the citation rankings generated by these databases. For this, we analysed the area of Health Sciences of the University of Navarra (Spain), composed of a total of 50 departments and 864 researchers. The total number of published works reflected in the WoS during the period 1999–2005 was 2299. For each work, the number of citations in both databases was recorded. The results indicate that the works received 14.7% more citations in Scopus than in WoS. In the departments, the difference was greater in the clinical ones than in the basic ones. In the case of the rankings of citations, it was found that both databases generate similar results. The Spearman and Kendall-Tau coefficients were higher than 0.9. It was concluded that the difference in the number of citations found did not correspond to the difference of coverage of WoS and Scopus.

Introduction

The last decade in the sphere of higher education has seen a proliferation of the publications of different university rankings in which the information related to research results is often included [BUELA-CASAL & AL., 2007; AGUILLO & AL., 2006] together with its international visibility [CWTS, 2007]. This phenomenon is not new in the context of bibliometrics, as we live immersed in what we might call a *culture of ranking*. Ranking is without a doubt one of the main protagonists of bibliometric studies and reports where such information is included to provide simplified information on the most qualified agents of a given scientific system. However, this widespread use should not blind us to its limitations and, especially, to the precautions that should be adopted both in its reading as well as its design [VAN RAAN, 2005].

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Traditionally, these rankings were based on the number of publications and citations, using the well-known Web of Science (WoS) distributed by Thomsom-ISI, which has dominated the world of multidisciplinary citation indexes. However, in 2004, a new alternative emerged, this being capable of competing with this monopoly – i.e., the multidisciplinary Scopus, distributed by Elsevier. This was a new commercial product that also compiles bibliographic references of the works. Faced with this new horizon of evaluation, with two information sources for which to calculate indicators, studies are proliferating on the comparison of the two databases from a bibliometric perspective.

One of the subjects that has attracted the most interest on studying both products has been its coverage, both in number of journals [KLAVANS, 2007; MOYA & AL., 2007] as well as in publications and references [CODINA, 2005]. Basically, Scopus covers a total of 14,671 active journals as opposed to 8,974 of WoS. In terms of thematic distribution, Scopus, as opposed to the more multidisciplinary approach of WoS, is clearly oriented towards health and life sciences, these two fields together covering some 51% of the journals, since Scopus has no journals of art or humanities [JACSO, 2005]. This thematic bias is intentional, since the publishing house Elsevier opted to give its product an "STM" orientation (science, technology, medicine). However, when the two products are studied from the standpoint of coverage, the origin of the two databases should not be overlooked; that is, while WoS founds its corpus on the practical application of the Bradford law [GARFIELD, 1990] to detect the main scientific journals, Scopus on the other hand emerged from a background of journals marketed by Elsevier itself and from EMBASE, also property of Elsevier. We are thus faced with two databases that from their very conception have diverging philosophies. This situation is also reflected clearly in their processes of evaluating and selecting journals, these being the most rigorous and complex in the WoS. Other recent studies, apart from the thematic distribution and the selection processes, have emphasized the differences of the indicators that generate both databases for broad fields of knowledge such as the social sciences [NORRIS & OPPENHEIM, 2007] or for specific disciplines [BALL & TUNGER, 2006; BAKKALBASI &. AL., 2007].

This demonstrate the interest that is being focussed on comparing different aspect of two databases; however, despite the great diffusion of rankings as an evaluation tool, only two works have taken it upon themselves to study the differences and similarities in rankings generated by WoS and Scopus. From this perspective, GORRAIZ & SCHLÖGL [2007] studied the Impact Factor of 82 journals in Pharmacology and Pharmacy. The study revealed that the IF generated by Scopus was superior to that of Thomsom-ISI, compiling 10% more citations for the first 10 journals. However, the rankings were quite similar, as evidenced by the Pearson correlation coefficient, which was set at 0.96. Working at a micro-level, BAR-ILAN [2007] studied the number of citations for 24 Israeli scientists in WoS and Scopus, and the similarity of their rankings using three

different statistical tools (Overlap, Fagin, and Inverse Rank). The final results reflected that both databases generate significantly similar and comparable lists, although the small sample of the study did not permit its conclusions to be generalized and therefore the author recommends studies to be made with broader and more reliable samples.

Including the results of Bar-Illan in this study, we seek to delve into the differences in the citation rankings generated by WoS and Scopus for evaluation purposes in the university context. For this, we used a larger, controlled sample that covers two levels of aggregation of the Spanish university: on the one hand, the departmental units and, on the other, the total of researchers that comprise them. With this sample, we endeavour to respond to two basic questions:

1) What is the difference in the number of citations provided by WoS and Scopus in the context of evaluating a university institution?

2) To what extent are the rankings of the WoS and Scopus alike or dissimilar for the broad sample of departments and researchers?

Materials and methods

The university analysed was Navarra, a private institution founded in 1954 with campuses in different places in Spain, such as Pamplona, Madrid, Barcelona, and San Sebastián. Considering all the departments making up this university, we selected for this study only those belonging to the area of Health Sciences, totalling 50. We selected these department because in the context of the scientific policy of the University of Navarre are the central research areas, so if important to them to know the actual impact of the university in Health Science. These departments are linked administratively to two faculties (Medicine and Sciences), a school of nursing, a clinic, and two research centres (Centre for Applied Medical Research, Centre of Applied Pharmacological Research). Together with the departments, the 864 researchers working there were studied, each having at least one publication in the WoS, under the condition that it had been cited at least once either in the WoS or in Scopus. These researchers have been identified by an administrative staff record provided by the university management itself. The period 1999–2005 was established as the general chronological record of the study.

The scientific production analysed and used in the different comparisons was composed of the set of all citable works (articles, reviews, notes, and letters) published in the WoS by the 50 departments selected. Also, the number of works cited exclusively by Scopus was determined. In compiling of both groups, we used research lists edited by the University of Navarra between the academic years 1998–1999 and 2005–2006. These lists contain all the works published in scientific journals by each of the departments. Afterwards, a search was made in the WoS through the field address to identify the production also. With these two datasets, a single relational database was

created, whereupon duplicates were eliminated and each of the records was assigned to the researchers studied and to their corresponding departments. After the production was determined for each of the agents evaluated, the citations were compiled. We searched for the citations in WoS and Scopus during July 2006 in an individualized way for each of the works; the results were exported and linked to the work cited. For the final count of the number of citations, a variable citation window covering 7 years (1999–2005) was used. Lastly, the final citation data for each of the aggregation levels were processed through the Free Statistics Software of the Office for Research Development and Education [WESSA, 2007]

The statistics used to compare the differences between the rankings generated by both databases were non-parametric correlation measurements: the Spearman correlation coefficient, now used in diverse bibliometric studies with similar purposes [BRAUN & AL., 2000; AGUILLO & AL., 2006]; and the Kendall Tau-b correlation coefficient. The final value of these statistical tools measured the degree of association of two variables, X and Y, based on the agreement or disagreement of the classifications by ranks. Both the interpretation of the Spearman coefficient as well as the Kendall Tau-b were identical.

Results

Differences in the number of citations found in the Web of Science and Scopus

The production of citable articles published in the Web of Science by the University of Navarra during the study period was 2,299 works, for a mean of 328 annually, with the year 2004 being the most productive at 357. The gross number of citations received by this group of works gave different results for the two databases. While the WoS added up to a total of 19,716, in Scopus this value was 22,618, representing a difference of 2,902 citations, or 14.7% more for Scopus than for to WoS (Table 1). The greatest annual discrepancy was found for the year 2000, where the difference in favour of Scopus rose to 23.5% (5,134 citations for WoS vs. 6.342 Scopus). This divergence in the citation gave rise to different averages according to the database consulted. For WoS, this indicator was 8.5 citations per document while Scopus rose to over 9.8. Nevertheless, both databases gave similar citation curves.

In addition, we recorded the number of Works that the University of Navarra had published in Scopus but are not indexed by the Web of Science. It is noteworthy that this set was considerably smaller, representing 15% of the total of the production of this university. These works also had a substantially lower average of citations, with only 1.9 citation per document, as opposed to 9.8 for those appearing in WoS.

Table 1. Number of citations found in the area of Health Sciences of the University of Navarra in the databases WoS and Scopus (1999–2005)

		Papers in Web of Science						Papers in Scopus and NOT in Web of Science		
Year	Nº Papers WoS	WOS Nº Cites	Scopus Nº Cites	WOS Citation Average	Scopus Citation Average	Cites in Scopus – Cites in WoS	RelDiff *(%)	Nº Papers Scopus	Nº Cites	Citation Average
1999	299	3537	3978	11.8	13.3	441	12	72	139	1,9
2000	343	5134	6342	15.0	18.5	1208	23	76	72	0,9
2001	305	3676	4074	12.1	13.4	398	11	61	67	1,1
2002	349	3278	3629	9.4	10.4	351	11	53	71	1,3
2003	320	1999	2311	6.2	7.2	312	16	58	72	1,2
2004	357	1496	1677	4.2	4.7	181	12	64	74	1,2
2005	326	596	607	1.8	1.9	11	2	52	30	0,6
Total	2299	19716	22618	8.6	9.8	2902	15	436	525	1,2

*RelDiff= (citations in Scopus-citations in WoS) / citations in WoS

Table 2 presents the same indicators for the 50 departments under study arranged according to the difference in citations. The department most cited in the two databases was Neurology and Neurosurgery, which reached 3,365 in WoS and 4,249 in Scopus, i.e. 26.3% more in the latter case. A general pattern was found by which the departments of a clinical nature presented a greater difference with respect to the basic nature; in these latter the number of citations was similar for the two databases. This was found also for the departments with more than 500 citations in WoS, as for these the differences remained close to the general value of 15% and only some departments, such as Preventive Medicine and Public Health & Endocrinology, presented 20% more citations in Scopus. In the contrary case, the departments that presented a smaller difference were Pharmacology, with identical values for WoS and Scopus, and Applied Oncology and Gene Therapy, for which the difference did not surpass 1.5.

Table 3 presents the results for the 50 researchers most cited. In the case of the researchers the differences were similar for the two databases, although the researchers associated with departments of Neuroscience (Obeso-JA, Rodríguez-MC and Martinez-JM) had almost 30% more citations in Scopus, as occurred in Endocrinology (Ambrosi-J and Fruhbeck-G). With respect to the most cited researcher (Prieto-J), WoS listed 1809 citations, this being some 10% less than in Scopus.

Comparison of the positions and rankings

Table 4 presents the positions and ranks occupied by each department in the different rankings generated by the two databases. Of the total of departments under study, a set of 19 (almost 40%) remained in the same position. It is noteworthy that the rankings in WoS and Scopus gave the same results for the first five positions. For the departments that did vary their position, those that rose or fell only one position were the predominant ones, for a total of 21. On the other hand, the highest value of variation was 4 positions, this affecting only one department.

Table 2. Number of citations found for the departments in the area of Health Sciences of the University of Navarra in the databases WoS and Scopus (1999–2005)

	Nº Cites		Scopus Difference	
Department	WOS	Scopus	NºCites	% Cites
OTORHINOLARYNGOLOGY	74	112	38	51.4
ALLERGOLOGY AND CLINICAL INMUNOLOGY	319	446	127	39.8
PLASTIC AND RECONSTRUCTIVE SURGERY	44	60	16	36.4
ANESTESIOLOGY AND REANIMATION	50	67	17	34
RADIOLOGY	263	345	82	31.2
DIGESTIVE SYSTEM	221	288	67	30.3
CLINICAL PHARMACY	94	122	28	29.8
ORTHOPEDICS	101	131	30	29.7
ENDOCRINOLOGY	648	829	181	27.9
PEDIATRICS	259	331	72	27.8
ANATOMY	402	512	110	27.4
DERMATOLOGY	230	293	63	27.4
NEUROLOGY AND NEUROSURGERY	3,365	4,249	884	26.3
PSYCHIATRY AND MEDICAL PSYCOLOGY	284	357	73	25.7
GYNECOLOGY AND OBSTETRICS	256	320	64	25
ADULT NURSING	8	10	2	25
PREVENTIVE MEDICINE & PUBLIC HEALTH	801	998	197	24.6
NEUROSCIENCE, APPLIED	2,939	3,572	633	21.5
CLINICAL PHARMACOLOGY	270	326	56	20.7
HEMATOLOGY AND HEMATOTHERAPY	1,200	1,429	229	19.1
PHYSIOLOGY AND NUTRITION	1,166	1,378	212	18.2
UROLOGY	67	79	12	17.9
GENOMICS PROTEOMICS & BIOINFORMATICS	442	519	77	17.4
GENERAL AND DIGESTIVE SURGERY	289	338	49	17
PHARMACY AND PHARMACEUTICAL TECHNOLOGY	855	999	144	16.8
CARDIOLOGY, APPLIED	1,507	1,759	252	16.7
CHILDREN NURSING	24	28	4	16.7
CARDIOLOGY AND CARDIOVASCULAR SURGERY	1,930	2,235	305	15.8
NUCLEAR MEDICINE	273	309	36	13.2
DIETETICS	8	9	1	12.5
INTERNAL MEDICINE	3,273	3,664	391	11.9
ANIMAL HOUSE	42	47	5	11.9
HISTOLOGY AND PATHOLOGIC ANATOMY	1,735	1,934	199	11.5
DRUGS RESEARCH AND DEVELOPMENT	413	459	46	11.1
GENE THERAPY	2,839	3,149	310	10.9
CHEMISTRY AND EDAPHOLOGY	357	391	34	9.5
IMMUNOLOGY	193	210	17	8.8
BIOCHEMISTRY AND BIOCHEMICAL BIOLOGY	1,266	1,373	107	8.5
BROMATOLOGY	493	522	29	5.9
ONCOLOGY	987	1,042	55	5.6
ORGANIC CHEMISTRY	410	433	23	5.6
OPHTHALMOLOGY	187	196	9	4.8
NEFROLOGY	93	97	4	4.3
BIOMEDICAL HUMANITIES	49	51	2	4.1
GENETICS	1,074	1,090	16	1.5
ONCOLOGY, APPLIED	1,880	1,906	26	1.4
MICROBIOLOGY AND PARASITOLOGY	803	814	11	1.4
PHARMACOLOGY	565	565	0	0
MORPHOLOGY AND IMAGE	122	120	–2	–1.6
CEREBRAL TUMOR BIOLOGY	25	24	–1	–4

Table 3. Number of citations found for the 50 most cited researchers in the Area of Health Sciences of the University of Navarra in the databases WoS and Scopus (1999–2005)

		Nº Cites	Nº Cites	Scopus Difference	
Researcher	Department	WOS	Scopus	N. Cites	% Cites
Obeso, JA	NEUROSCIENCE APPLIED / NEUROLOGY AND	1,375	1,977	602	43.8
Rodriguez, MC	NEUROSCIENCE APPLIED / NEUROLOGY AND	926	1,315	389	42.0
Martinez, JM	NEUROLOGY AND NEUROSURGERY	637	854	217	34.1
Ambrosi, J	ENDOCRINOLOGY	394	519	125	31.7
Fruhbeck, G	ENDOCRINOLOGY	588	756	168	28.6
Martinez, MA	PREVENTIVE MEDICINE & PUBLIC HEALTH	646	821	175	27.1
Rocha, E	CARDIOLOGY, APPLIED	503	637	134	26.6
Irala, J	PREVENTIVE MEDICINE & PUBLIC HEALTH	344	426	82	23.8
Marti, A	PHYSIOLOGY AND NUTRITION	416	507	91	21.9
Ruiz, J	INTERNAL MEDICINE / GENE THERAPY	277	336	59	21.3
Quiroga, JA	INTERNAL MEDICINE	276	333	57	20.7
Martinez, JA	PHYSIOLOGY AND NUTRITION	924	1,111	187	20.2
Guridi, J	NEUROSCIENCE APPLIED / NEUROLOGY AND	686	810	124	18.1
Mato, JM	INTERNAL MEDICINE / GENE THERAPY	751	870	119	15.8
Sangro, BC	INTERNAL MEDICINE	468	536	68	14.5
Corrales, FJ	INTERNAL MEDICINE	418	476	58	13.9
Avila, MA	INTERNAL MEDICINE / GENE THERAPY	513	570	57	11.1
Melero, IG	INTERNAL MEDICINE / GENE THERAPY	571	633	62	10.9
Mazzolini, G	INTERNAL MEDICINE / GENE THERAPY	567	629	62	10.9
Fortuño, MA	CARDIOLOGY AND CARDIOVASCULAR	439	487	48	10.9
Alava, E	HISTOLOGY AND PATHOLOGIC ANATOMY	312	346	34	10.9
Qian, C	GENE THERAPY	944	1,043	99	10.5
Sarobe, P	INTERNAL MEDICINE / GENE THERAPY	280	309	29	10.4
Prieto, J	INTERNAL MEDICINE / GENE THERAPY	1,809	1,996	187	10.3
Borras, F	NTERNAL MEDICINE / GENE THERAPY	396	436	40	10.1
Irache, JM	PHARMACY AND PHARMACEUTICAL	291	320	29	10.0
Lasarte, JJ	NTERNAL MEDICINE / GENE THERAPY	412	449	37	9.0
Pardo, FJ	HISTOLOGY AND PATHOLOGIC ANATOMY	332	362	30	9.0
Fortuño, A	CARDIOLOGY, APPLIED	395	428	33	8.4
SanJose, G	CARDIOLOGY, APPLIED	329	356	27	8.2
Narvaiza, I	GENE THERAPY	279	302	23	8.2
Zalba, G	CARDIOLOGY, APPLIED	466	503	37	7.9
Prosper, F	ONCOLOGY, APPLIED	325	350	25	7.7
Barajas, MA	GENE THERAPY	310	334	24	7.7
Diez, FJ	CARDIOLOGY, APPLIED	1,233	1,327	94	7.6
Monge, FJ	DRUGS RESEARCH AND DEVELOPMENT	364	391	27	7.4
Beaumont, FJ	CARDIOLOGY, APPLIED	350	376	26	7.4
Villoslada. P	NEUROSCIENCE APPLIED / NEUROLOGY AND	341	362	21	6.2
Berasain, MC	INTERNAL MEDICINE / GENE THERAPY	273	290	17	6.2
Vanaclocha, V	NEUROLOGY AND NEUROSURGERY	275	291	16	5.8
Etayo. JC	CARDIOLOGY AND CARDIOVASCULAR	295	311	16	5.4
Gomez, T	NEUROSCIENCE APPLIED / NEUROLOGY AND	707	739	32	4.5
Fernandez, OA	ONCOLOGY	292	304	12	4.1
Varo, N	BIOCHEMISTRY AND BIOCHEMICAL… /	443	460	17	3.8
Lopez, B	CARDIOLOGY, APPLIED	512	531	19	3.7
Montuenga, L	ONCOLOGY APPLIED/HISTOLOGY AND	433	440	7	1.6
Calasanza, MJ	GENETICS	803	806	3	0.4
Gonzalez, A	CARDIOLOGY, APPLIED	313	313	0	0.0
Garcia, JM	ONCOLOGY	625	617	–8	–1.3
DelRio, J	PHARMACOLOGY / NEUROSCIENCE, APPLIED	448	438	–10	–2.2

Table 4. Ranking of citations by departments in the area of Health Sciences of the University of Navarra in the databases WoS and Scopus (1999–2005)

	Citation Position		Scopus ranking variation	
Department	WOS	Scopus	Position change	Position Variation
NEUROLOGY AND NEUROSURGERY	1	1	=	0
INTERNAL MEDICINE	2	2	=	0
NEUROSCIENCE, APPLIED	3	3	=	0
GENE THERAPY	4	4	=	0
CARDIOLOGY AND CARDIOVASCULAR SURGERY	5	5	=	0
ONCOLOGY, APPLIED	6	7	▼	1
HISTOLOGY AND PATHOLOGIC ANATOMY	7	6	▲	1
CARDIOLOGY, APPLIED	8	8	=	0
BIOCHEMISTRY AND BIOCHEMICAL BIOLOGY	9	11	▼	2
HEMATOLOGY AND HEMATOTHERAPY	10	9	▲	1
PHYSIOLOGY AND NUTRITION	11	10	▲	1
GENETICS	12	12	=	0
ONCOLOGY	13	13	=	0
PHARMACY AND PHARMACEUTICAL TECHNOLOGY	14	14	=	0
MICROBIOLOGY AND PARASITOLOGY	15	17	▼	2
PREVENTIVE MEDICINE & PUBLIC HEALTH	16	15	▲	1
ENDOCRINOLOGY	17	16	▲	1
PHARMACOLOGY	18	18	=	0
BROMATOLOGY	19	19	=	0
GENOMICS PROTEOMICS & BIOINFORMATICS	20	20	=	0
DRUGS RESEARCH AND DEVELOPMENT	21	22	▼	1
ORGANIC CHEMISTRY	22	24	▼	2
ANATOMY	23	21	▲	2
CHEMISTRY AND EDAPHOLOGY	24	25	▼	1
ALLERGOLOGY AND CLINICAL INMUNOLOGY	25	23	▲	2
GENERAL AND DIGESTIVE SURGERY	26	28	▼	2
PSYCHIATRY AND MEDICAL PSYCOLOGY	27	26	▲	1
NUCLEAR MEDICINE	28	32	▼	4
CLINICAL PHARMACOLOGY	29	30	▼	1
RADIOLOGY	30	27	▲	3
PEDIATRICS	31	29	▲	2
GYNECOLOGY AND OBSTETRICS	32	31	▲	1
DERMATOLOGY	33	33	=	0
DIGESTIVE SYSTEM	34	34	=	0
IMMUNOLOGY	35	35	=	0
OPHTHALMOLOGY	36	36	=	0
MORPHOLOGY & IMAGE	37	39	▼	2
ORTHOPEDICS	38	37	▲	1
CLINICAL PHARMACY	39	38	▲	1
NEFROLOGY	40	41	▼	1
OTORHINOLARYNGOLOGY	41	40	▲	1
UROLOGY	42	42	=	0
ANESTESIOLOGY AND REANIMATION	43	43	=	0
BIOMEDICAL HUMANITIES	44	45	▼	1
PLASTIC AND RECONSTRUCTIVE SURGERY	45	44	▲	1
ANIMAL HOUSE	46	46	=	0
CEREBRAL TUMOR BIOLOGY	47	48	▼	1
CHILDREN NURSING	48	47	▲	1
DIETETICS	49	50	▼	1
ADULT NURSING	50	49	▲	1

Table 5. Ranking of the citations for the 50 researchers most cited in the Area of Health Sciences of the University of Navarra in the databases WoS and Scopus (1999–2005)

		Ranks		Scopus ranking variation	
		WOS	SCP	Position change	Position Variation
Prieto, J	INTERNAL MEDICINE / GENE THERAPY	1	1	=	0
Obeso, JA	NEUROSCIENCE APPLIED / NEUROLOGY AND	2	2	=	0
Diez, FJ	CARDIOLOGY, APPLIED	3	3	=	0
Qian, C	GENE THERAPY	4	6	▼	2
Rodriguez,	NEUROSCIENCE APPLIED / NEUROLOGY AND	5	4	▲	1
Martinez, JA	PHYSIOLOGY AND NUTRITION	6	5	▲	1
Calasanza,	GENETICS	7	11	▼	4
Mato, JM	INTERNAL MEDICINE / GENE THERAPY	8	7	▲	1
Gomez, T	NEUROSCIENCE APPLIED / NEUROLOGY AND	9	13	▼	4
Guridi, J	NEUROSCIENCE APPLIED / NEUROLOGY AND	10	10	=	0
Martinez,	PREVENTIVE MEDICINE & PUBLIC HEALTH	11	9	▲	2
Martinez, JM	NEUROLOGY AND NEUROSURGERY	12	8	▲	4
Garcia, JM	ONCOLOGY	13	17	▼	4
Fruhbeck, G	ENDOCRINOLOGY	14	12	▲	2
Melero, IG	INTERNAL MEDICINE / GENE THERAPY	15	15	=	0
Mazzolini, G	INTERNAL MEDICINE / GENE THERAPY	16	16	=	0
Avila, MA	INTERNAL MEDICINE / GENE THERAPY	17	18	▼	1
Lopez, B	CARDIOLOGY, APPLIED	18	20	▼	2
Rocha, E	CARDIOLOGY, APPLIED	19	14	▲	5
Sangro, BC	INTERNAL MEDICINE	20	19	▲	1
Zalba, G	CARDIOLOGY, APPLIED	21	23	▼	2
DelRio, J	PHARMACOLOGY / NEUROSCIENCE, APPLIED	22	29	▼	7
Varo, N	BIOCHEMISTRY AND BIOCHEMICAL… /	23	26	▼	3
Fortuño, MA	CARDIOLOGY AND CARDIOVASCULAR	24	24	=	0
Montuenga,	ONCOLOGY, APPLIED/ HISTOLOGY AND	25	28	▼	3
Corrales, FJ	INTERNAL MEDICINE	26	25	▲	1
Marti, A	PHYSIOLOGY AND NUTRITION	27	22	▲	5
Lasarte, JJ	NTERNAL MEDICINE / GENE THERAPY	28	27	▲	1
Borras, F	NTERNAL MEDICINE / GENE THERAPY	29	30	▼	1
Fortuño, A	CARDIOLOGY, APPLIED	30	31	▼	1
Ambrosi, J	ENDOCRINOLOGY	31	21	▲	10
Monge, FJ	DRUGS RESEARCH AND DEVELOPMENT	32	33	▼	1
Beaumont, FJ	CARDIOLOGY, APPLIED	33	34	▼	1
Irala, J	PREVENTIVE MEDICINE & PUBLIC HEALTH	34	32	▲	2
Villoslada. P	NEUROSCIENCE APPLIED / NEUROLOGY AND	35	35	=	0
Pardo, FJ	HISTOLOGY AND PATHOLOGIC ANATOMY	36	36	=	0
SanJose, G	CARDIOLOGY, APPLIED	37	38	▼	1
Prosper, F	ONCOLOGY, APPLIED	38	39	▼	1
Gonzalez, A	CARDIOLOGY, APPLIED	39	48	▼	9
Alava, E	HISTOLOGY AND PATHOLOGIC ANATOMY	40	40	=	0
Barajas, MA	GENE THERAPY	41	43	▼	2
Etayo. JC	CARDIOLOGY AND CARDIOVASCULAR SURGERY	42	49	▼	7
Fernandez,	ONCOLOGY	43	51	▼	8
Irache, JM	PHARMACY AND PHARMACEUTICAL	44	45	▼	1
Sarobe, P	INTERNAL MEDICINE / GENE THERAPY	45	50	▼	5
Narvaiza, I	GENE THERAPY	46	52	▼	6
Ruiz, J	INTERNAL MEDICINE / GENE THERAPY	47	42	▲	5
Quiroga, JA	INTERNAL MEDICINE	48	44	▲	4
Vanaclocha,	NEUROLOGY AND NEUROSURGERY	49	53	▼	4
Berasain, MC	INTERNAL MEDICINE / GENE THERAPY	50	54	▼	4

The situation described thus reveals minor variations in the two classifications, reflected in the Spearman and Kendall-Tau correlation coefficients. The two statistical tolls offer an almost perfect correlation, the first reaching a value of 0.996, and the second 0963. In Figure 1, this similarity is evident in the strong agreement between the two rankings.

Table 5 gives the results for the 50 researchers most cited in WoS and Scopus. In this case, given the minimum level of aggregation of a bibliometric study, the variability was greater than in the departments. Basically, of the 50 authors, a total of 10 (20%) maintained the same rank or position, these including the ones that occupied the first three positions. The greatest difference affecting one author was found in position 31 of WoS, which varied 10 positions with respect to Scopus. However, despite the lower agreement between the rankings of researchers, the correlation coefficients (calculated for the entire population of 864 researchers) maintained rather high values. The Spearman coefficient was 0.986 and the Kendall-Tau 0.919.

In the dispersion graph (Fig. 2), the strong correlation is obvious. Clearly, in the highest zones of the ranking the fit between the rankings is greater, while progressively descending to the lower positions the classification discrepancies become more evident.

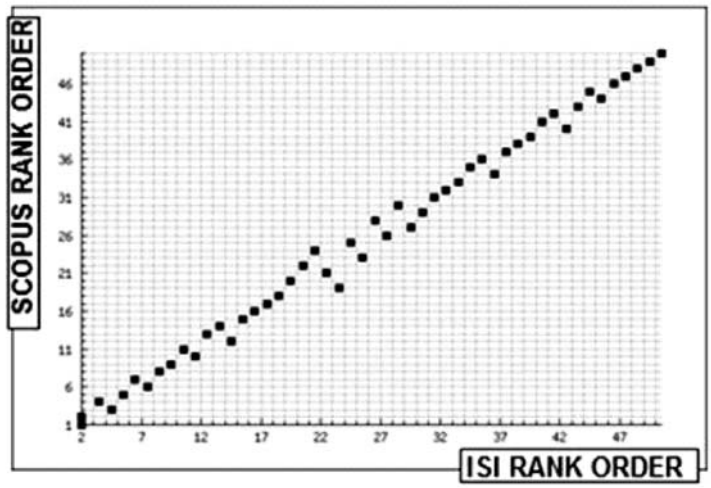

Figure 1. Graph of the dispersion in the rankings of citations for the departments in the area of Health Sciences of the University of Navarra in the databases WoS and Scopus (1999–2005)

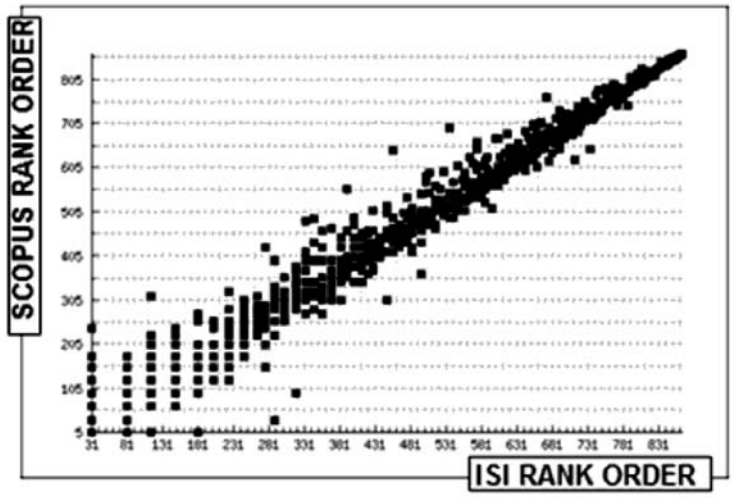

Figure 2. Dispersion graph for the citation rankings of 864 researchers in the area of Health Sciences of the University of Navarra in the databases WoS and Scopus (1999–2005)

Discussion and conclusions

As reflected in the results of this study on the same population of documents, the multidisciplinary database Scopus of Elsevier is capable of recovering a number of citations exceeding that of WoS. Specifically, for the area of Health Sciences of the University of Navarra, Scopus provided 14.7% more citations, although this distribution was not homogeneous among researchers or departments. In the case of the latter, a greater percentage of citations was compiled for those that had a clinical nature as opposed to those of a basic scientific orientation. However, considering that Scopus includes among its health-science journals practically all the Medline databases, the differences should have been greater. It should be taken into account that the *Journal Citation Report* has some 2500 journals in Health Sciences while in Scopus this sum rises to 5300 (more than double).

In addition, the analysis was made on articles published by Spanish researchers. In this sense, it bears pointing out that the WoS indexes a total of 24 Spanish health-science journals, while Scopus indexes 175. Therefore, it does not appear that the differences between the two databases fits the level of coverage of the journals. With the data collected, it is possible to venture a hypothesis that explains the slight divergence, although these results were repeated in other studies. BAKKALBASI & AL.

[2006] in Oncology detected a mean number of citations per document of 8.3 for WoS and 8.9 for Scopus, which coincides rather well with the differences found in the present study.

Discrepancies are in fact appreciated in the works indexed by Scopus but not in the WoS. Their impact, analysed through the mean number of citations is only 1.9 citations per document, signifying that although the number of documents compiled is greatly increased (which is the case at least for the University of Navarra), the differences in the citation percentages tend to decline.

Regardless of the difference in the number and the averages of citations, the analysis of agreement between rankings appears to reflect the similarity in the final classifications. Both for departments as well as for researchers, the Spearman and Kendall-Tau coefficients were higher than 0.9 in all cases. Other studies also have examined the differences between rankings; for example, GORRAIZ & SCHLOEGL [2007] analysed the impact factor of WoS for the 100 Pharmacy and Pharmacology journals, comparing it to another impact factor calculated through Scopus. Comparing the two values, the authors found a rather high correlation (Pearson's r=0.96). Analysing different units, departments, and researchers, our study corroborated the same situation: the two different databases did not generate different rankings, at least within the sphere of Health Sciences.

Precisely one of the limitations of the present work consists of centring on one university specializing in Health Sciences, an area which in both databases represents about 35% of the total journals indexed [BALL & DIRK, 2006]. Therefore, we worked with a well-represented thematic field having a similar representation in the two databases.

Thus, we conclude that the results have diverse implications for the selection of the sources of information for bibliometric research related to Health Sciences. First, if the aim of the study is to be more exhaustive in compiling citations, Scopus offers better results, with slightly higher values than WoS. However, this final number of citations does not appear to have a determinant value in constructing a ranking of the agents evaluated; if this is our objective, both databases are equally valid in their results and we do not find major differences in the positions, especially in the first positions. But we have to take into account that the results are not the same for departments or researchers. The differences between rankings of departments are minimal and there is little variation. On the other hand there is greater variability in the rankings of researchers with most significant differences, especially on the tail of the distribution.

Therefore, a second implication of this study is that the final selection of the source of information does hardly determine the positions of the rankings, at least for Spanish universities. Therefore, although Scopus can be considered a valid alternative in the context of universities specializing in Health Sciences for locating information, the results can also be interpreted to conclude that Scopus is a redundant product with

respect to WoS, given that, at least in the sphere of Health, Scopus does not appear to provide any significant new information. Furthermore, from the standpoint of evaluation, it lacks (at least for now) some of the added values of the WoS, as for example the indicators of impact related to the journals or the Essential Science Indicators. With regard to evaluation, this is not a minor question.

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