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Fine tuning assessment of research: The hKA index

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Introduction

During the past few years, institutions, scientific academies and government funding offices have adopted the h-index (Hirsch, 2005) as a parameter to measure research achievement. Several groups have discussed the limitations of the h-index (Costas and Bordons, 2007; Lawrence, 2007; Qiu et al., 2008). However, none of them have considered if the person being analyzed is a corresponding author or a coauthor of any published work. Being a corresponding author implies a distinctive role in the development of the reported research and is primarily liable for the information presented on the published work. Thus, any person with a large-enough collaboration network may have a high h-index value without being the main author of the work published.

I have derived a novel index, hKA, which estimates the h-index for the corresponding author. The use of this index can be extended to institutions and countries in order to compare their scientific productivity as it is currently being done by SCImago (SCImago, 2009). To validate this new index I analyzed the impact that Chile has had in the past 10 years in the field of “Astronomy and Astrophysics” as a country leading the research being published and as part of a global collaborative endeavor.

Methodology

Using the ISI Web of Science database, a query was made on August 26th, 2008 that searched for records that were indexed from 1996 to 2005 and that were registered to Chile. All records that were categorized as “Astronomy and Astrophysics” among the ISI disciplines were retrieved. The documents were analyzed according to their type, citation number, h-index, most frequently used journals and most frequently cited articles. For this study, records that were categorized as “meeting abstracts” and corrections were discarded.

Results

A total of 2.543 papers were published in the Web of Science database by Chile in the field of “Astronomy and Astrophysics” during the 10-year period studied. An analysis of the countries involved in the generation of papers on this field revealed that these were the product of an interaction between Chile and 50 other different countries. However, 53% of the research published was led by scientists from one of the ten countries listed on Table 1, accounting for 68.8% of the accumulated citations.

Table 1. The 10 most prolific collaborations in the field of “Astronomy and Astrophysics” from 1996-2005. Country indicates the name of the country leading the research. Number of papers indicates the total amount of papers generated. Number of citations indicates the accumulated number of citations to the papers.

Country	Number of Papers	Number of Citations
USA	545	24384
GERMANY	191	3771
FRANCE	151	5531
ITALY	140	2597
ENGLAND	82	1892
SPAIN	66	1200
CANADA	57	1395
BRAZIL	47	500
MEXICO	46	554
BELGIUM	42	628
	1367	42452

Conversely, scientists affiliated to Chilean institutions led the research for 31.5% of the total amount of papers published between 1996-2005, receiving 18.8% of the accumulated citations (Table 2) for the ISI field. Since the number of accumulated citations affects the h-index, the hKA-index was estimated for Chile and all the countries without including Chile. As Figure 1 shows, the h-index for Chile in the “Astronomy and Astrophysics” field was 88, while the hKA-index was reduced to 44. In addition, all the other countries revealed an hKA-index of 79, thus implying that the high h-index that Chile has on this ISI field is due mainly to research being guided by scientists affiliated to foreign institutions.

Table 2. Number of papers published by corresponding authors associated to a Chilean and foreign institution in the field of “Astronomy and Astrophysics”.

	ARTICLE		REVIEW		LETTER		TOTAL	
	Nº papers	Nº citations	Nº papers	Nº citations	Nº papers	Nº citations	papers	citations
Chile	773	10748	17	625	15	214	805	11587
Other countries	1651	39424	56	10051	31	618	1738	50093
Total	2424	50172	73	10676	46	832	2543	61680

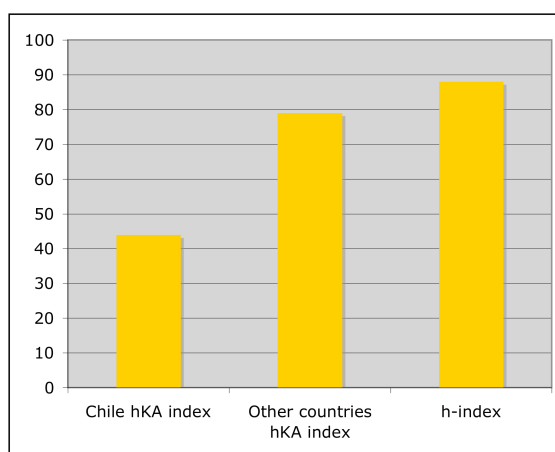


Figure 1. Estimated hKA- and h-index within the field of “Astronomy and Astrophysics” between 1996-2005. “Chile hKA index” indicates the value for Chile; “Other countries hKA index” refers to the all the countries without including Chile; “h-index” corresponds to the h-index value for Chile in the field of “Astronomy and Astrophysics”.

Discussion

The impact of the research being published by individuals, institutions or countries has been estimated in the past few years by using the h-index. I have presented data that shows that this index is heavily influenced by the collaboration network surrounding the subject being evaluated. In the specific case of Chile in the field of “Astronomy and Astrophysics”, the high h-index may be strengthened by the many remarkable observatories set in Chile.

The use of this new hKA-index provides a more accurate vision of the scientific productivity of an individual/institution/country. An interesting outcome might be that young researchers might be better ranked, as their networks are comparatively smaller than the one from well-established scientists.

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