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Bibliometric and altmetric analysis of visibility of publications in social sciences

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Characteristics of publications in SSH

- The publication of social science and humanities (SSH) research findings is known to differ from that of other areas of knowledge:

  - The object of study in such disciplines is often local or national
  - Book chapters and monographs are the main researchers' options when publishing
  - There are a prevalence of singly authored texts and scant inter-institutional partnering
  - Citation patterns differ in SSH disciplines as well: references have much earlier dates and such particulars also affect impact.

- Such circumstances necessitate the pursuit of other variables that would provide information on SSH research activity and visibility.

Characteristics of publications in SSH

- Despite inter-area differences in output dynamics and the communication of scientific findings, SSH publication habits have been changing recently.

  - To improve the quality of national scientific journals and the concomitant inclusion of many such publications in international databases.

  - Speedy and convenient communication has also favoured greater international collaboration among researchers in the area and the resulting publication in international journals.

  - Growing number of SSH articles in international databases such as the SSCI, with a rise (165 % in social science from 2006 to 2015) in both the volume of papers listed and their proportion in the WoS total.

  - Partnering and co-authorship rates are also gradually rising and English is increasingly the language used.

  - Increasing use of social networks to disseminate research results.

Principal aims of this study are:

- detect patterns of scientific activity (in social science) considering scientific production, collaboration, impact and visibility.

- deepen the study of impact and visibility, both through bibliometric and altmetric indicators to identify similarities and differences.

- ascertain the possible existence of relationships between scientific impact, and social reaction (bibliometric versus altmetric indicators).

- discuss the possibility of using social media indicators to analyse the visibility of documents.

Main information sources

- **International database WoS**   WEB OF SCIENCE™

  Web of Science was chosen because it contains the information on document impact and visibility needed to conduct the analysis proposed and allows unbundling into very specific disciplines.

  Publication indexed in the Social Sciences Citation Index was analysed and Information on impact was drawn from the Journal Citation Reports.

- **Altmetric.com application**   Altmetric

  Altmetric.com was used to gather information on social media (blog posts, Twitter, Wikipedia citations, mainstream media, Google+ Facebook, RSS feeds and videos). This is one of the most thorough tools for studying visibility in such media.
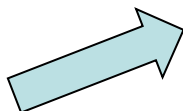
The following steps have been followed:

- **Information retrieval**

Publication in WC *Communication, Economics, Sociology* were collected From SSCI (Years: 2013-2015).

- **Data processing**

The papers identified in each discipline were downloaded and independent relational databases were built using MySQL.

- **Obtaining bibliometric and altmetric indicators**

| Type of indicator	Dimension	Simple indicators	Relational indicators
Bibliometric	Scientific activity	-Yearly No. of publications (absolute values. increase and proportion of SSCI database) -Documetnal type -Output by country -Language	-Citation/paper by collaboration -% of papers in Q1 by collaboration -Citation/paper by documental type -% of papers mentioned in social media WITH citations -% of papers mentioned in social media WITHOUT citations -Citation/paper in publication WITH mention in social media -Citation/paper in publication WITHOUT mention in social media -Citation/paper by social media
	Visibility	-Output by quartiles -% of papers in Q1 -% of papers in Open Access	
	Impact	-No. of citations received (cumulative from date of publication) -Citations/paper (mean. maximum number of citations. -% of documents not cited) -% highly cited papers (top 1 % of those most widely cited)	
	Collabora-tion	-Co-authorship index by year (No. of authors per paper) -Output by collaboration (no institutional collaboration. national collaboration. international collaboration)	
Altmetric	Presence in social media	-% of papers with DOI -No. of papers mentioned in Twitter. Wikipedia. blog posts. MSM. Google+. RSS feeds. videos (Youtube) -% papers with mentions in each social medium -Maximum No. of mentions in each source -% of documents cited and NOT cited with altmetric indicators -% papers with OA and altmetric indicators	

- **Bibliometric indicators:** _**Scientific activity**_

Year/Output	No. COM papers	No. ECO papers	No. SOCIOL papers	TOTAL SSCI
2013	4035	25258	7983	277119
2014	4243	25339	8178	280755
2015	4407	25803	8724	293386
Total	12685	76400	24885	851260
Growth in output	9.22	2.16	9.28	5.87
Proportion of SSCI	1.49	8.97	2.92	100.00
Growth in proportion of SSCI	3.16	-3.5	3.22	

- Total number of papers: **112 300** (1670 were classified under more than 1 of the WoS category)

- The steepest percentage rise from 2013 to 2015 was in **sociology** and **communication** at 9 %. Those values were higher than growth in the SSCI overall in the period (5.8%).

- Although the highest proportion of papers relative to total SSCI output was found for **economics**, growth in that proportion in the period analysed was negative (-3.5 %). In contrast, in percentage of the whole, communication and sociology rose by 3 %.

- **Bibliometric indicators:** _Scientific activity_

- The predominant documental type in **communication** and **sociology** are the articles followed by book review, while in **economics** the documental dispersion is much wider. In this discipline there is a variety of other typologies (such as meeting abstract, biographical material, retracted publications, letter, etc.) that together reach 16% of the documents.
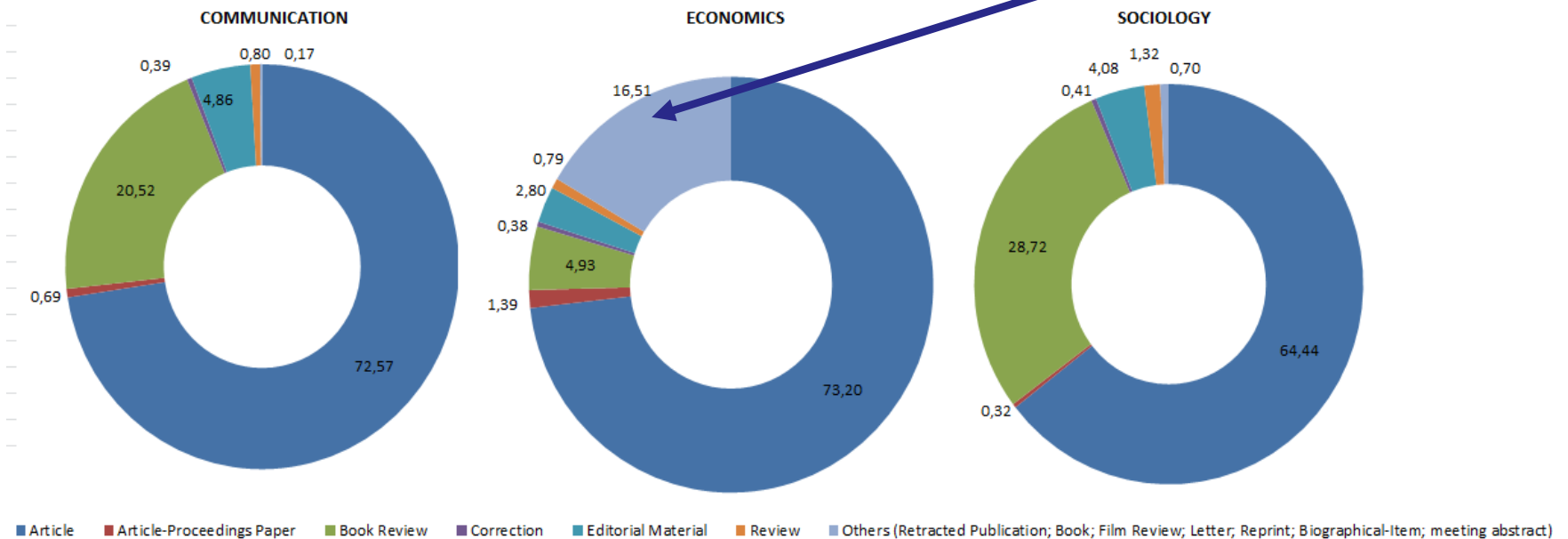
- **Bibliometric indicators:**
  Visibility

- The visibility analysis was based on the papers published in JCR-listed journals. Most of those journals had an impact factor (94% in communication and around 97% in the others).

- In **economics** the papers were clustered in Q1, whilst the highest percentage of **communication** and **sociology** papers were in Q2 and Q3.

COMMUNICATION

ECONOMICS

SOCIOLOGY

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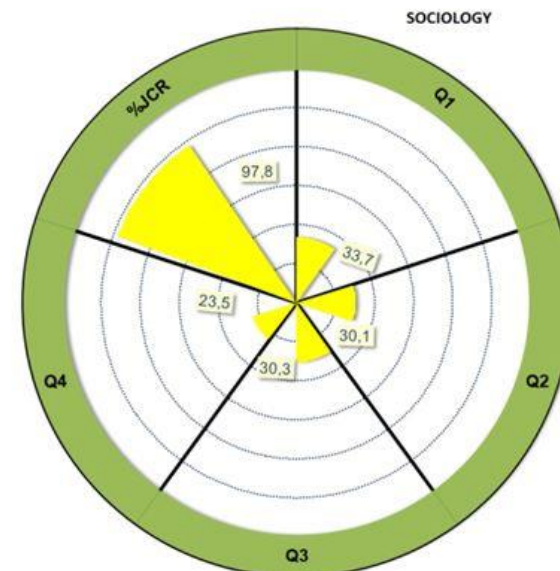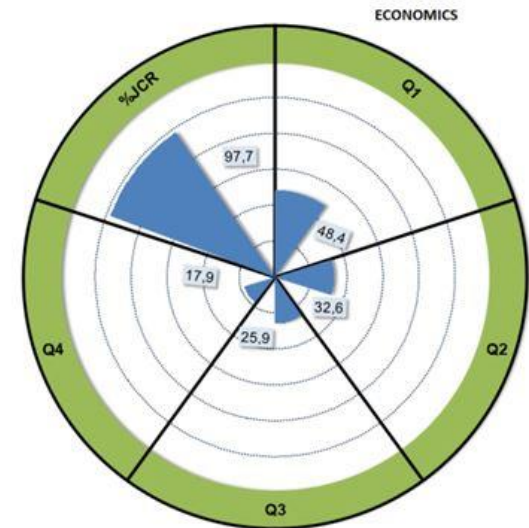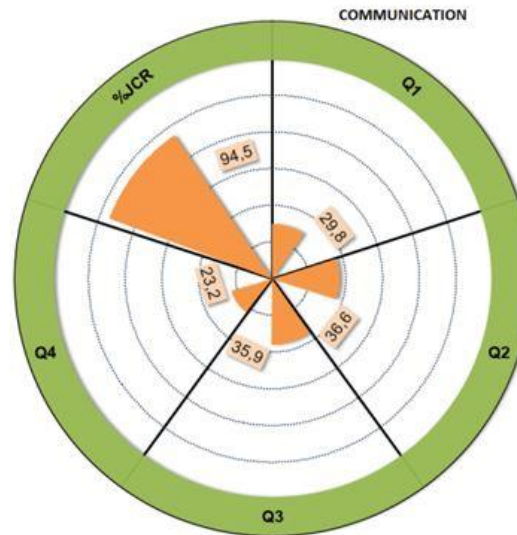
- **Bibliometric indicators: _Visibility_**

- The percentage of _open access_ papers was substantially higher in **economics** than in the other two disciplines and somewhat higher than the Social Science Citation Index mean.

COM
8%

SSCI
23%

SOC
11%

ECO
25%

- **Bibliometric indicators: _Impact_**

- The number of citations received not varied substantially among the three disciplines (4.04 citation/paper in sociology and 5.47 citation/paper in economics).
- The percentage of NON-cited papers ranging from 43 % in sociology to 33% in communication and economics.

Year	COM			ECON			SOCIOL		
	Cit./paper	Max cit.	% NON-cited	Cit./paper	Max cit.	% NON-cited	Cit./paper	Max cit.	% NON-cited
2013	6.45	174	31.35	7.46	458	29.03	5.55	257	40.25
2014	5.14	167	33.80	5.39	217	33.06	4.01	186	42.68
2015	3.43	98	34.15	3.59	370	37.29	2.68	146	46.44
Total	4.96	174	33.14	5.47	458	33.16	4.04	257	43.21

- The percentage of highly cited papers represent 0.36% in sociology, 0.41% in communication and 0.75% in economics.

Bibliometric indicators: _Collaboration_

- Economics was the discipline with the highest co-authorship Index, (4 author/paper). The highest percentage of papers involving international collaboration were found in the disciplines with the highest overall co-authorship rates. Despite the low percentages of international partnering, the proportion rose by around at least two percentage points in all disciplines in the period studied.
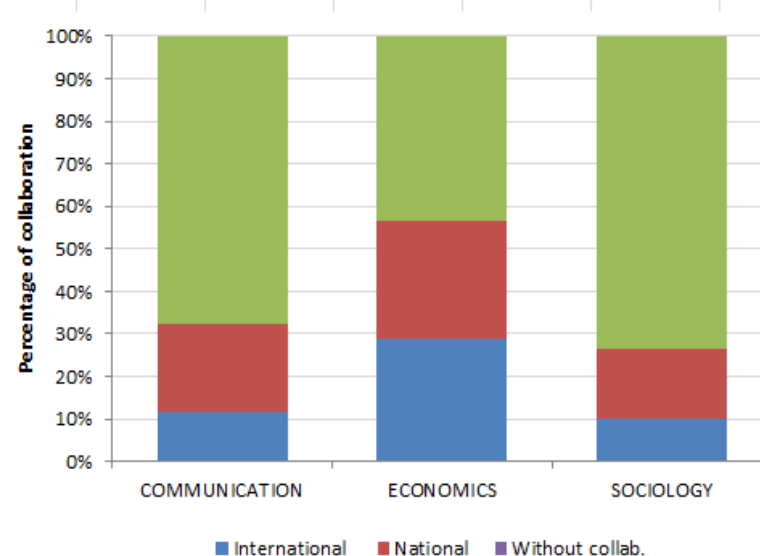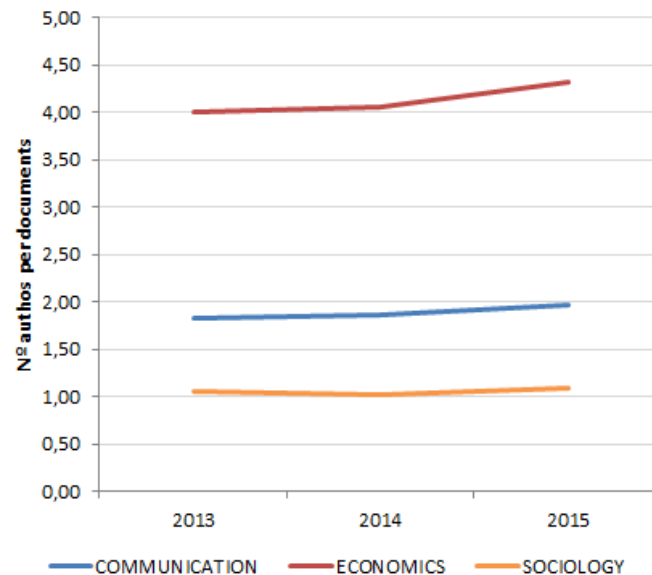

Impact was highest in the papers involving international co-authorship. Co-authored papers were also published in higher (Q1 and Q2) quartile journals

Type of collab./Discip.	Mean citations/paper			% Q1 papers		
	COM	ECON	SOCIOL	COM	ECON	SOCIOL
International	7.56	7.21	7.97	34.63	50.09	48.21
National	7.43	5.72	6.59	42.27	53.84	39.94
None	3.37	4.16	2.94	22.69	41.38	30.33

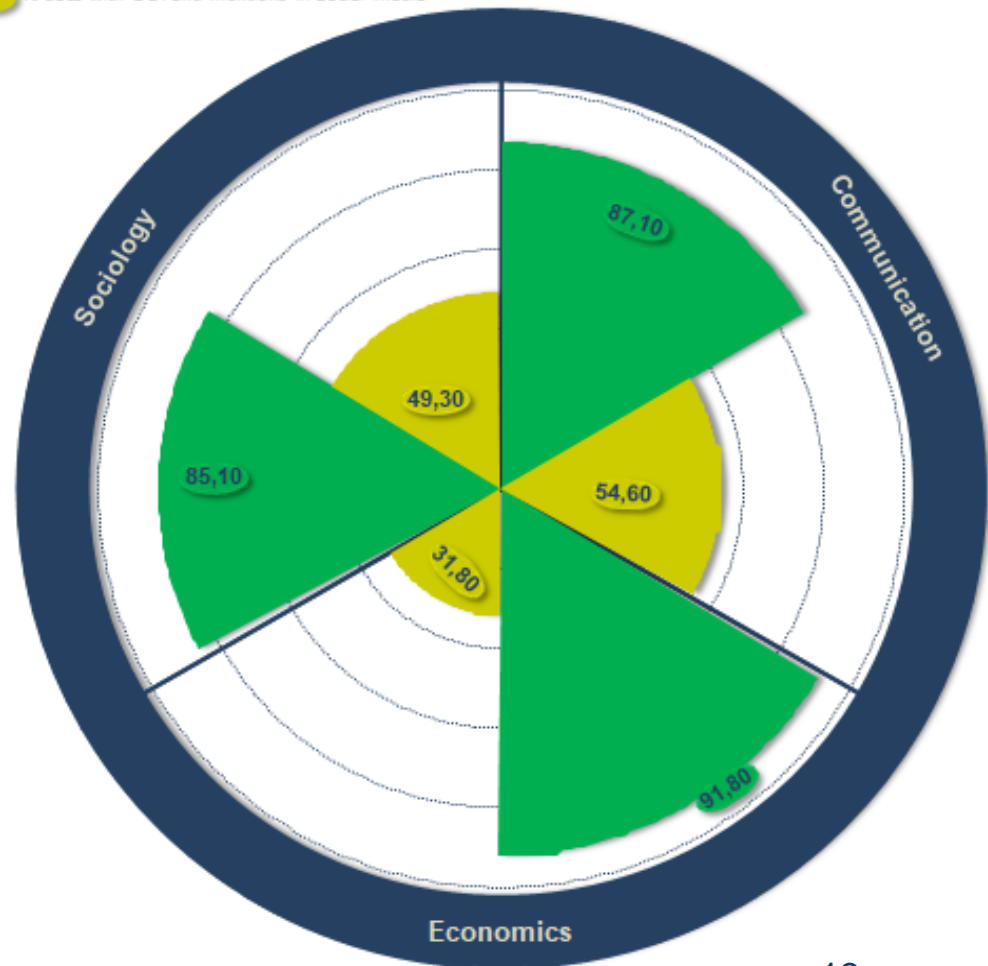- **Altmetric indicators: Presence in social media**
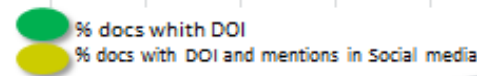
Between 85 % to 92 % of the papers had a DOI.

In all disciplines this percentage has grown, especially in communication, where it has increased by more than 3 percentage points.

Around 50% of the communication and sociology papers with DOI had mentions in the social media.

Despite the large proportion of economics papers with DOI, in contrast, less than one-third were mentioned in the social media. However, there has also been an increase in the proportion of documents with mentions, which has been 4 percentage points in communication and economics and double in sociology.

% docs whith DOI
% docs with DOI and mentions in Social media

Sociology 85,10
Communication 87,10
49,30
54,60
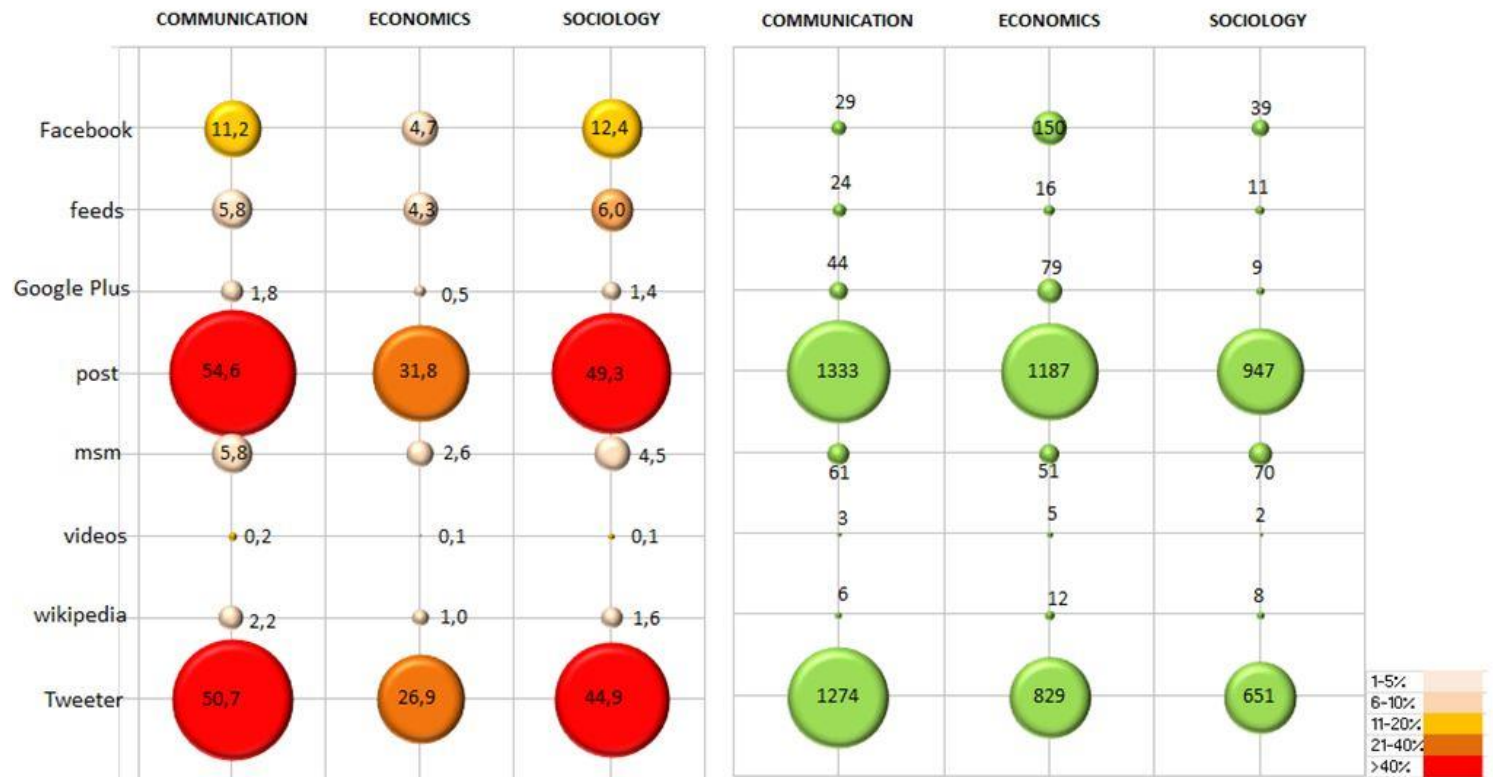31,80
Economics 91,80

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- **Altmetric indicators: Presence in social media**

The two most common types of mentions were tweets and blog posts, particularly in communication. Facebook was much less significant, especially in economics.

Considering the maximum number of mentions received, economics reaches 150 in Facebook and very high values in post and tweeter.

- **Altmetric indicators: Presence in social media**

- Data on citations and mentions were used to relate traditional to social media impact using Person correlation coefficient.

- Table shows the correlation values between the citations received and the number of mentions in the most frequent social networks (post and tweeter). The relationship between the two variables was very low. However most of the highly cited papers have mentions in social media. Considering citations and mentions only from these documents, the correlation values are somewhat higher, except in economics.

| Variables	COMMUNICATION	ECONOMICS	SOCIOLOGY
Citation-post	0.1885	0.1465	0.2150
Citation-tweets	0.1520	0.1318	0.2190
Citation-post (HCP)	0.3371	0.1190	0.2417
Citation-tweets (HCP)	0.3363	0.0776	0.2520
%HCP with mentions in social media	94.70	77.00	94.6

- **Altmetric indicators: Presence in social media**

Considering the percentage of papers cited and not cited in each discipline, communication and economics exhibited the highest proportion of the former (66.8 %). In all disciplines the percentage of papers receiving citations was highest. A large majority (from 79 % to 87 %) of the papers with mentions in the social media received citations.

Indicator	COM		ECON		SOCIOL	
	Not cited	Cited	Not cited	Cited	Not cited	Cited
% papers	33.14	66.86	33.16	66.84	43.21	56.79
% papers with DOI	27.77	72.23	30.49	69.51	38.45	61.55
% papers WITH mentions in social media	14.60	**85.40**	12.80	**87.20**	21.46	**78.54**
% papers WITHOUT mentions in social media	49.97	50.03	38.73	61.27	58.94	41.06

- **Altmetric indicators: Presence in social media**

The number of citations per paper with and without mentions in the social media were also compared. The number was consistently higher in papers mentioned in the social media. The differences between the average citations/paper are statistically significant in all disciplines (p value <0.0001).
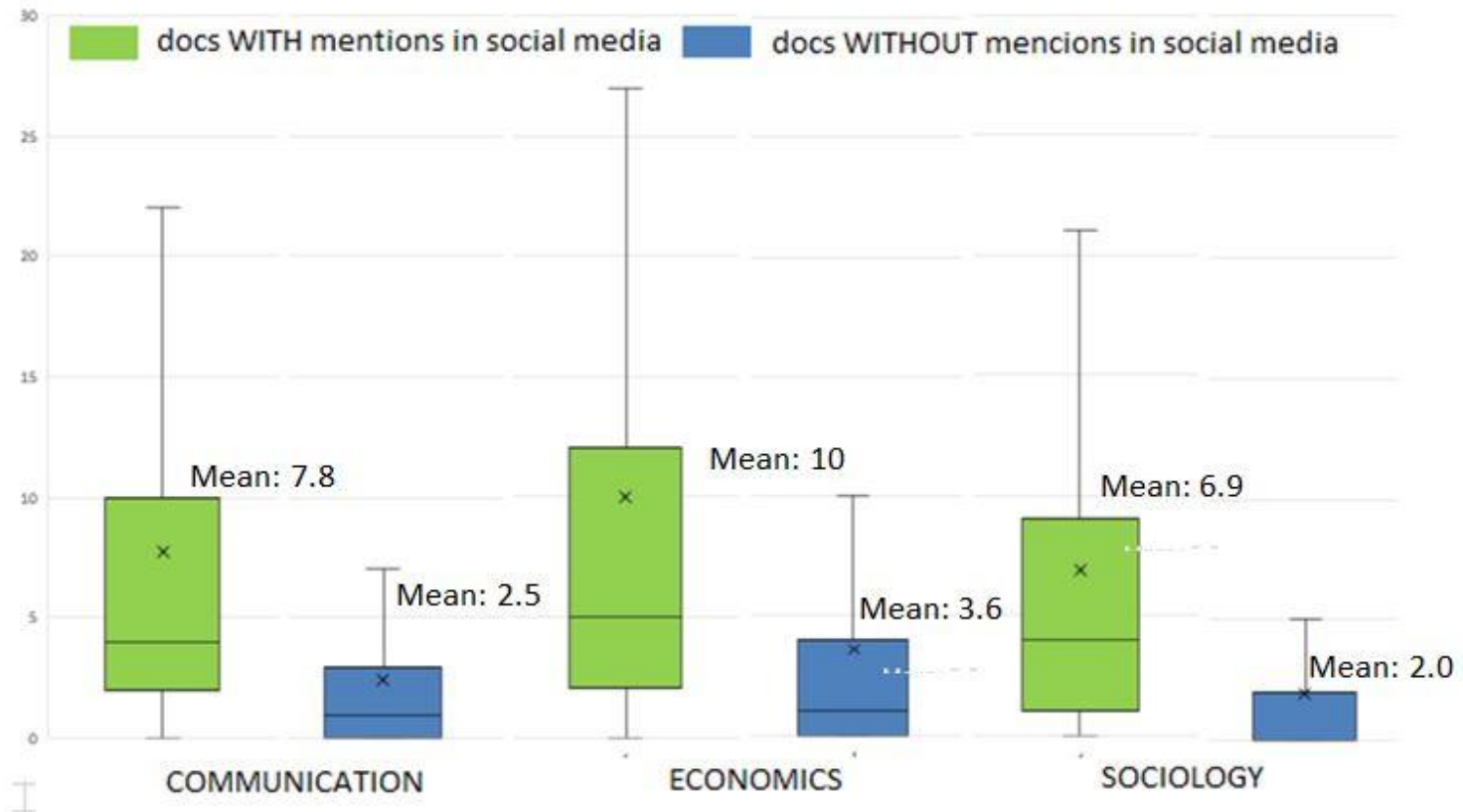
- **Altmetric indicators: Presence in social media**

The percentage of citations received by-source was higher than the overall mean in all three disciplines.
The papers with mentions in Google+, MSM, videos and Wikipedia were the ones most widely cited, although those were not the predominant media.

Source/Discipline	COM	ECON	SOCIOL
Facebook	9,56	10,95	8,26
Feeds	13,79	17,84	12,82
Google+	17,67	20,30	14,02
Posts	7,72	10,00	6,89
MSM	14,67	20,24	15,03
Videos	12,92	21,33	10,04
Wikipedia	13,70	20,16	12,72
Twitter	7,91	9,84	7,03
Mean citations/paper (in papers w/ DOI)	5,48	5,84	4,60

- **Altmetric indicators: Presence in social media**

The proportion of open access (OA) papers with mentions in the social media was higher than the percentage of open access papers in the respective discipline in three of the four. The exception was economics.

Indicator/Discipline	COM	ECON	SOCIOL
Total OA papers	1019	19133	2655
% OA papers	8.03	25.04	10.67
Total papers with mentions in the social media	6034	22271	10439
OA papers with mentions in the social media	718	3576	1403
% OA papers with mentions in the social media	**11.90**	16.06	**13.44**

▪ **Altmetric indicators: Presence in social media**

As for the documental type, in the three disciplines, the greatest impact in terms of citations/doc is received by the reviews.
Documents with mentions in social networks of all documentary typologies receive a greater number of citations.

Documental type	COMMUNICATION				ECONOMICS				SOCIOLOGY			
	With social media presence		Without social media presence		With social media presence		Without social media presence		With social media presence		Without social media presence	
	%	Citation /paper	%	Citation/ paper	%	Citation /paper	%	Citation/ paper	%	Citation /paper	%	Citation/ paper
Article	89,11	8,26	57,56	3,96	90,40	11,59	66,12	5,64	81,55	8,01	52,08	3,59
Article-Proceedings Paper	0,60	4,67	0,77	2,76	1,65	7,19	1,28	4,04	0,22	5,39	0,39	1,47
Book Review	5,52	0,13	34,13	0,03	2,05	0,16	6,12	0,05	12,78	0,09	40,24	0,04
Correction	0,08	0,00	0,68	0,13	0,15	0,76	0,48	0,14	0,13	0,00	0,60	0,10
Editorial Material	3,38	5,03	6,21	2,02	2,18	5,22	3,06	1,05	3,21	3,59	4,71	1,11
Review	1,21	12,34	0,42	5,89	1,52	15,04	0,50	8,18	1,86	7,65	0,93	3,64
Others (Retracted Publication; Book; Film Review; Letter; Reprint; Biographical-Item)	0,10	1,67	0,24	0,25	2,06	1,61	22,45	0,89	0,25	1,02	10,30	0,87
Total general	100,00	7,72	100,00	2,46	100,00	10,00	100,00	3,60	100,00	6,89	100,00	1,98

In line with the objectives set for this paper, the main conclusions can be grouped under the following points.

- **Patterns of activity of the disciplines**.

  In the case of economics, a more international and consolidated profile has been evidenced in the production of documents in international databases, while communication and sociology show similarities in their activity (closer to the general behaviour of the SSH disciplines).

- **Impact and visibility of publications.**

  When analysing these dimensions through bibliometric indicators, economics also stands out with higher citation/doc values and a higher proportion of documents in Q1 and in open access. However, the proportion of documents with social media mentions is higher in sociology and communication. The most frequent repercussion is through Twitter and post.

- **Relationships between metrics.**

  Statistical correlations between bibliometric impact (citations per document) and presence on social media (number of mentions) are low. However, in all disciplines, documents with presence in social media reach a higher number of citations/doc (with statistically significant differences), especially those published in Googleplus, msm, videos and Wikipedia. Almost all of the highly cited papers have mentions in social media (Twitter and post).

- **Validity of the use of altmetric indicators**.

  Given the diverse nature between traditional citation and presence in networks, as well as existing methodological problems, the use of altmetric indicators does not seem adequate for evaluation purposes. However, it is an interesting complement to the dissemination of publications, especially in areas of SSH, where it can help to improve the visibility and scope of documents (especially those of typology other than article and review).

¡Thank for your atention!

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