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Alternative Metrics for the Evaluation of Scholarly Activities: An Analysis of Articles Authored by Greek Researchers

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Abstract. Recently, altmetrics have emerged as alternative means of measuring scholarly impact, aiming at improving and complementing both traditional and web-based metrics. The aim of the present study is to contribute to the altmetrics literature by providing an overview of the coverage of altmetrics sources for the Aristotle University of Thessaloniki (AUTh) publications. We used Scopus to collect all research articles stating AUTh as the affiliation of at least one author and published from 2010 to 2016. The altmetric data originated from Altmetric Explorer, a service provided by Altmetric.com. Only 17% of all publications retrieved from Scopus had some kind of mentions, while there was a clear increasing trend over the years. The presence of altmetrics was different from each Altmetric.com attention source. Around 81% of all mentions came from Twitter. Facebook was a distant second, followed by news outlets. All other sources had very low or negligible coverage. The overwhelming majority of tweets had been posted by members of the public, who do not link to scholarly literature. Medical Sciences had by far the highest number of publications with altmetric scores, followed, in a distance by Sciences. However, Arts, Humanities and Social Sciences publications exhibited a significant altmetric activity. More research is needed in order to get a better insight into the altmetric landscape in Greece and develop an understanding about the kind of influence altmetrics measure, and the relationship, if any, between altmetric indicators and scientific impact.

Keywords. Bibliometrics, altmetrics, social media metrics, research impact, Greece

1. Introduction

The problem of measuring the impact of scientific publications is of high importance to scholars, research teams and academic institutions. The impact of research is being taken into account in decisions about tenure, promotion, and fund allocation. “As the demand for greater accountability in all areas of public expenditure is constantly growing, the topic of research assessment becomes very relevant” [1]. A common

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approach to scholarly impact that prevails today is using bibliometric indicators based on citation analysis. Citations are being used to measure the impact of articles [e.g., 2,3], journals [4], researchers [5–7], and scientific fields [8,9].

However, several limitations question the validity and reliability of these traditional measurements. Citations take time to accumulate [10] and measure only one type of research product, peer-reviewed articles [11]. There is also evidence that authors cite only a fraction of their influences, and they do not always cite important works in a positive manner [12]. In addition, there are variations in citation practices across different countries, time periods, disciplines, and even specialties within the same discipline, while some areas of research are not frequently cited [13–15]. Another problem with impact indicators based on citation counts is that they assess the extent to which research is noticed by other researchers, and are not informative of the impact on stakeholders outside the academy, like students, practitioners, policy makers, and even the general public [16].

In order to alleviate some of these problems, scientometricians have created more diverse measures of research impact [17], while the World Wide Web provided new mechanisms of measuring access to information, and made possible the development of webometrics or cybermetrics, a modern branch of bibliometrics, which embraces the quantitative analysis of activity on the Web [18]. But even these new approaches have limitations and are incapable of capturing the real impact of scientific endeavors. Webometrics, for instance, "are affected by the distributed, diverse and dynamical nature of the Web and by the deficiencies of search engines" [19, p. 78]. Recently, altmetrics have emerged as alternative means of measuring scholarly impact, aiming at improving and complementing both traditional and web-based metrics [20]. Altmetrics "measure Webdriven scholarly interactions, such as how research is tweeted, blogged about, or bookmarked" [21]. Altmetrics cover a wide range of research products, since they not only measure article-level metrics, measure impact in a broader sense by looking at more than citations, give an insight into impact on diverse audiences, and an indication of societal impact of research, and provide a better understanding of how a scholarly product is being used [22,23].

While altmetrics is a growing research area and have the potential to meet many of the challenges faced by traditional bibliometric indicators, there is a need to further investigate their reliability, validity and context [24,25]. Therefore, the present study seeks to contribute to the altmetrics literature by providing an overview of the coverage of altmetrics sources for the Aristotle University of Thessaloniki (AUTh) publications. In particular, the study focuses on the following research questions:

1. How much and what kind of altmetrics data exist for the documents authored by AUTh faculty members and published between 2010 and 2016?
2. What is the presence of altmetrics for AUTh publications across different subject fields?
3. What is the demographic breakdown of the mentions for the top mentioned publications?

2. Related Work

Several studies have been conducted to investigate the usefulness of altmetrics as sources of impact assessment. These studies examine the extent to which scholarly

journal articles are represented on various social media platforms, the attention they receive, and their correlations with citations. Basic measures, such as coverage, density and intensity of altmetrics have been reported, and composite indicators, such as the the Altmetric Score, have been proposed [26]. "Coverage is defined as the percentage of papers with at least one social media event or citation. Density is the average number of social media counts or citations per paper (…) while intensity indicates the average number of social media or citation counts for all documents with at least one event (non-zero counts)" [27, p.5].

Coverage of research articles on social networking sites, such as Facebook and Twitter, has been found to be rather low. Twitter seems to be the source that provides more scores, while the values for other social media counts, such as Facebook and blogs, are very small, with coverage values usually below 10% [17,27–31]. Lower rates (just over 8%) have been found for publication from Latin-American countries [28], while a cross-disciplinary study of altmetrics found that only 1.6% of the sampled papers published between 2005 and 2011 had at least one tweet. [30].

On the other hand, online reference managers have significantly higher coverage of documents. Mendeley, in particular, seems to dominate, as it has been shown to have a much greater number of readers per document than other online reference managers. In a number of studies, Mendeley has emerged as the most exhaustive altmetrics data source [17,28,30,32–36].

There is evidence, however, that social media coverage is increasing over time, and varies by discipline and specialty. In a study of tweets in biomedical literature, the proportion of papers having at least one tweet increased from 2.4% of the papers published in 2010 to 20.4% of the papers published in 2012 [32]. According to [31] the percentage of publications that received some altmetric score increased from around 11% in 2011 to over 25% in 2013. Furthermore, in a recent investigation of the coverage of altmetrics in Singapore, a significant increase from 7% in 2009 to 28% in 2013 was observed [37].

In a number of studies, Medical and life sciences had a comparatively high share of publications with altmetric scores [30,33,34,40]. Articles from the social sciences and humanities also exhibit a high altmetric activity, while their altmetric density is similar to their citation density [30,34,39]. On the contrary, Mathematics, Physics, Computer Science and Engineering seem to receive lower number of altmetric scores [27,33,34,39], although in one case the most papers mentioned on Twitter related to Physics [38].

Many researchers have examined the correlation between altmetrics and citation counts, often with contradictory and inconclusive results. There is evidence that publications cited in Wikipedia and blog posts are mostly in high impact journals [39,40]. A study of eleven altmetrics showed that six of them (tweets, Facebook wall posts, research highlights, blog mentions, mainstream media mentions and forum posts) associated with citation counts, but no evidence about the strength of the correlation was provided [41]. Among social media metrics, citations seem to correlate the most with Mendeley, with correlations ranging from moderate to high [17, 30, 35–37, 40, 43–45]. Strong correlations have been found between citations from Google Scholar and tweetations [46], and between Twitter mentions, arXiv downloads, and article citations [38]. Other studies, however, found weak correlations between altmetric indicators and citations. [27], [33] and [44] identified low correlation between the number of citations and tweets per document, a finding in accordance with [31] and

[28], who suggested that correlations, where existed, were positive but low, and [37], who identified small to medium correlations between citation counts and altmetrics.

3. Methodology

The aim of the present study is to give an overview of the coverage of altmetrics sources for Aristotle University of Thessaloniki (AUTh) publications. Therefore, we used Scopus to collect all research articles stating AUTh as the affiliation of at least one author and published from 2010 to 2016. Scopus was selected because it seems to have more thorough coverage than the Web of Science, at least for more recent articles [47]. The altmetric data used in the study originated from Altmetric Explorer for Institutions, a service provided by Altmetric.com. Altmetric Explorer gathers article-level metrics from a range of sources, including policy documents, social networks, online reference managers, mainstream media and blogs, post-publication peer review forums, and other online sources, such as Wikipedia and multimedia platforms. Once the Altmetric data have been retrieved, they are displayed on the Altmetric details page, along with the Altmetric Attention Score and donut, which demonstrate how much and what kind of attention a research output has received [48]. Altmetric Explorer was chosen because it has been reported as the most comprehensive source of altmetric data associated with scholarly articles [27].

A prerequisite for retrieving data from Altmetric Explorer is that the specific item has a unique identifier, such as a PubMedID, or a Digital Object Identifier (DOI). Thus, altmetric data were gathered only for publications having a DOI. All data were collected during the last week of January 2017. Mendeley was excluded from the analysis.

4. Findings

4.1 Presence of Altmetrics for AUTh Publications

Table 1 presents the number of AUTh publications indexed in Scopus for the period 2010-2016, the number of publications for which altmetric data were gathered via Altmetric Explorer, and the number of publications with altmetrics. As it can be seen, only 17% of all publications retrieved from Scopus had some kind of mentions. There is a clear increasing trend over the years, with coverage ranging from about 5% for items published in 2010 to above 25% for documents published in 2016.

Table 1. Altmetrics coverage for AUTh publications

Year	Publications in Scopus	Publications with DOI entered in Altmetric Explorer	Publications with altmetrics
2010	2681	2102	127 (4.7%)
2011	2962	2308	229 (7.7%)
2012	3054	2379	499 (16.3%)
2013	2861	1907	512 (17.9%)

2014	3174	2597	649 (20.4%)
2015	3091	2526	739 (23.9%)
2016	3190	2623	811 (25.4)
Total	**21013**	**16442**	**3566 (17.0%)**

The presence of altmetrics was different from each source. Around 81% of all mentions came from Twitter. Facebook was a distant second (7.5%), followed by news outlets. All other sources had very low or negligible coverage (Table 2).

Table 2. Mentions by source

Source	**Mentions**
Twitter	20828 (81.5%)
Facebook	1912 (7.5%)
News	1212 (4.7%)
Blogs	494 (1.9%)
Wikipedia articles	435 (1.7%)
Google +	305 (1.2%)
Policy docs	143 (0.6%)
Other	225 (0.9%)
Total	**25554**

4.2 Presence of Altmetrics Across Subject Fields

In order to examine the presence of altmetrics across different subject fields, we grouped the 26 subject categories of Scopus in four broad domains: Sciences, Arts, Humanities & Social Sciences, Engineering, and Medical Sciences, following the organisation of faculties and departments in AUTh. Table 3 presents the distribution of altmetrics across fields. Medical Sciences have by far the highest number of publications with altmetric scores, followed, in a distance by Sciences.

Table 3. Mentions across subject fields

Subject field	**Scopus subject category**		**Mentions**	**Publications with altmetrics**
Sciences	1.	Computer science	7048 (25.5%)	1469
	2.	Physics		(18.4)
	3.	Biochemistry		

	4.	Agricultural & biological sciences		
	5.	Chemistry		
	6.	Environmental		
	7.	Earth & planetary		
	8.	Mathematics		
Arts, Humanities & Social Sciences	9.	Social sciences	1445 (5.2%)	352 (21.2%)
	10.	Arts & humanities		
	11.	Psychology		
	12.	Business management		
	13.	Economics		
	14.	Decision sciences		
Engineering	15.	Engineering	1066 (3.9%)	352 (7.9%)
	16.	Materials science		
	17.	Chemical Engineering		
	18.	Energy		
Medical Sciences	19.	Medicine	18085 (65.4%)	2266 (34.4%)
	20.	Veterinary		
	21.	Dentistry		
	22.	Nursing		
	23.	Health professions		
	24.	Neuroscience		
	25.	Pharmacology		
	26.	Immunology		

As depicted in Table 4, medical publications received the highest number of mentions in all data sources. The major source for altmetrics data in all subject fields was Twitter. Publications in Medicine and Sciences received a considerable amount of attention in news outlets, and have been mentioned in several Wikipedia articles, while documents in all subject fields have been mentioned in policy documents.

Table 4. Mentions by source and subject field

	Sciences	**Arts, Humanities & SS**	**Engineering**	**Medical Sciences**
Twitter	5495	1152	866	14763
Facebook	626	197	75	1480
News	363	38	26	801
Blogs	215	18	13	273
Wikipedia articles	108	8	11	324
Google +	118	12	21	219
Policy docs	56	10	16	92
Other	67	11	38	133

4.3 Characteristics of the Top Mentioned Documents

The fifty publications with the highest attention score are presented in Table 5. The Altmetric Attention Score is automatically calculated, and is based on three main factors: the number of people who mention an item, the sources of mentions, and the authors of mentions. Instead of representing the raw number of mentions, the attention

score is a weighted count of online attention a research output has received [48]. All fifty articles have been published in highly prestigious journals, mostly in the field of medicine, among which stand out the Lancet and Nature. There seems to be no obvious relationship between Altmetric Attention Score and number of citations, as papers with high score have very few citations and vice-versa. Twenty-two percent of the papers belong to open-access journals.

Table 5. The fifty papers with the highest Altmetric Attention Score

Altmetric Attention Score	Title	Journal	Year	Scopus citations	Open-access
2152	Global, Regional, And National Incidence, Prevalence, And Years Lived With Disability For 301 Acute And Chronic Diseases And Injuries In 188 Countries, 1990–2013: A Systematic Analysis For The Global Burden Of Disease Study 2013	The Lancet	2015	677	
1280	Global, Regional, And National Age-Sex Specific All-Cause And Cause-Specific Mortality For 240 Causes Of Death, 1990-2013: A Systematic Analysis For The Global Burden Of Disease Study 2013	The Lancet	2015	983	
1266	Global, Regional, And National Comparative Risk Assessment Of 79 Behavioural, Environmental And Occupational, And Metabolic Risks Or Clusters Of Risks In 188 Countries, 1990–2013: A Systematic Analysis For The Global Burden Of Disease Study 2013	The Lancet	2015	258	
591	Global, Regional, And National Disability-Adjusted Life Years (Dalys) For 306 Diseases And Injuries And Healthy Life Expectancy (Hale) For 188 Countries, 1990-2013: Quantifying The Epidemiological Transition.	The Lancet	2015	219	
503	Widespread Exploitation Of The Honeybee By Early Neolithic Farmers	Nature	2015	7	
486	Meta-Analysis Of 74,046 Individuals Identifies 11 New Susceptibility Loci For Alzheimer's Disease	Nature Genetics	2013	639	
355	Early Farmers From Across Europe Directly Descended From Neolithic Aegeans	Proceedings of the National Academy of Sciences of the United States of America	2016	15	
291	Effect Of Increased Gravitational Acceleration In Potato Deep-Fat Frying	Food Research International	2014	0	
250	Exome Sequencing And The Management Of Neurometabolic Disorders	New England Journal of	2016	19	

Altmetric Attention Score	Title	Journal	Year	Scopus citations	Open-access
		Medicine			
210	Evaluation Of Excess Significance Bias In Animal Studies Of Neurological Diseases	PLoS Biology	2013	91	Y
192	Probiotic Microbes Sustain Youthful Serum Testosterone Levels And Testicular Size In Aging Mice	PLoS ONE	2014	19	Y
179	Plasma Proteins Predict Conversion To Dementia From Prodromal Disease	Alzheimer's & Dementia: the Journal of the Alzheimer's Association	2014	60	
158	Prevalence Of Cerebral Amyloid Pathology In Persons Without Dementia: A Meta-Analysis.	JAMA: Journal of the American Medical Association	2015	118	
157	3d In Vitro Model Of A Functional Epidermal Permeability Barrier From Human Embryonic Stem Cells And Induced Pluripotent Stem Cells	Stem Cell Reports	2014	40	Y
157	Multiple Independent Variants At The Tert Locus Are Associated With Telomere Length And Risks Of Breast And Ovarian Cancer	Nature Genetics	2013	215	
149	Dynamics Of Extinction Debt Across Five Taxonomic Groups	Nature Communications	2016	1	Y
134	Genome-Wide Association Analysis Identifies Txnrd2, Atxn2 And Foxc1 As Susceptibility Loci For Primary Open-Angle Glaucoma	Nature Genetics	2016	19	
126	Management Of Hyperglycemia In Type 2 Diabetes: A Patient-Centered Approach Position Statement Of The American Diabetes Association (Ada) And The European Association For The Study Of Diabetes (Easd)	Diabetes Care	2012	3	
125	Crimean-Congo Hemorrhagic Fever: Epidemiological Trends And Controversies In Treatment	BMC Medicine	2011	13	Y
124	Meeting Report: First International Conference On Crimean-Congo Hemorrhagic Fever	Antiviral Research	2015	6	
123	Tt-Seq Maps The Human Transient Transcriptome	Science	2016	6	
121	Reconstructing The Population History Of European Romani From Genome-Wide Data	Current Biology	2012	28	
114	Management Of Hyperglycemia In Type 2 Diabetes, 2015: A Patient-Centered Approach: Update To A Position Statement Of The American Dabetes Association And The European Association For The Study Of Diabetes	Diabetes Care	2015	731	

Altmetric Attention Score	Title	Journal	Year	Scopus citations	Open-access
114	Queen Mary: Nobody Expects The Spanish Inquisition	The Lancet	2012	2	
112	Tocopherols And Tocotrienols Plasma Levels Are Associated With Cognitive Impairment	Neurobiology of Aging	2012	40	
108	The Protagoras Study To Evaluate The Performance Of The Endurant Stent Graft For Patients With Pararenal Pathologic Processes Treated By The Chimney/Snorkel Endovascular Technique	Journal of Vascular Surgery	2016	8	
97	Dysfunction Of Lipid Sensor Gpr120 Leads To Obesity In Both Mouse And Human	Nature	2012	2035	
96	Pharmacologic Interventions For Painful Diabetic Neuropathy: An Umbrella Systematic Review And Comparative Effectiveness Network Meta-Analysis	Annals of Internal Medicine	2014	24	
95	Fastkd2 Is Associated With Memory And Hippocampal Structure In Older Adults	Molecular Psychiatry	2015	8	
93	Early Patterns Of Blood Pressure Change And Future Coronary Atherosclerosis	JAMA: Journal of the American Medical Association	2014	4	
91	Kinetic Trapping Through Coalescence And The Formation Of Patterned Ag–Cu Nanoparticles	Nanoscale	2016	2	
90	Treatment Of Non-Small Cell Lung Cancer (Nsclc).	Journal of Thoracic Disease	2013	51	Y
84	Inherited Mutations In 17 Breast Cancer Susceptibility Genes Among A Large Triple-Negative Breast Cancer Cohort Unselected For Family History Of Breast Cancer	Journal of Clinical Oncology	2015	101	
82	Economic Crisis, Restrictive Policies, And The Population's Health And Health Care: The Greek Case	American Journal of Public Health	2013	60	
80	The Bite Of The Honeybee: 2-Heptanone Secreted From Honeybee Mandibles During A Bite Acts As A Local Anaesthetic In Insects And Mammals	PLoS ONE	2012	9	Y
80	Synonymization Of Key Pest Species Within The	Systematic Entomology	2015	44	
80	Astromap European Astrobiology Roadmap	Astrobiology	2016	3	
79	Actn3 R577x And Ace I/D Gene Variants Influence Performance In Elite Sprinters: A Multi-Cohort Study	BMC Genomics	2016	5	Y
79	Reinforcement Learning Agents Providing Advice In Complex Video Games	Connection Science	2014	10	
78	Microbial Symbionts Accelerate Wound Healing Via The Neuropeptide Hormone Oxytocin.	PLoS ONE	2013	37	Y

Altmetric Attention Score	Title	Journal	Year	Scopus citations	Open-access
73	The Role Of Human-Related Risk In Breeding Site Selection By Wolves	Biological Conservation	2016	0	
69	Microbial Reprogramming Inhibits Western Diet-Associated Obesity	PLoS ONE	2013	47	Y
68	The Effect Of High Vs. Low Carbohydrate Diets On Distances Covered In Soccer.	Journal of Strength & Conditioning Research	2013	8	
64	Pneumoscrotum After Tracheal Intubation	Acta Anaesthesiologica Taiwanica	2015	1	
63	Prevalence Of Refractive Error In Europe: The European Eye Epidemiology (E3) Consortium	European Journal of Epidemiology	2015	35	
63	Low Vitamin C Values Are Linked With Decreased Physical Performance And Increased Oxidative Stress: Reversal By Vitamin C Supplementation.	European Journal of Nutrition	2016	4	
63	Environmental Radioactivity Measurements In Greece Following The Fukushima Daichi Nuclear Accident	Radiation Protection Dosimetry	2012	14	
62	Musical Expertise Is Related To Altered Functional Connectivity During Audiovisual Integration	Proceedings of the National Academy of Sciences of the United States of America	2015	6	
61	The Professional Status Of European Chemists And Chemical Engineers.	Chemistry - A European Journal	2015	1	Y
60	Plasma Protein Biomarkers Of Alzheimer's Disease Endophenotypes In Asymptomatic Older Twins: Early Cognitive Decline And Regional Brain Volumes.	Translational Psychiatry	2015	2	

As Twitter was the main source of altmetrics, we examined the demographics collected from the profiles of tweeters who shared the highly mentioned papers. The overwhelming majority of tweets (over 70%) have been posted by laypersons, members of the public who do not link to scholarly literature. Approximately one quarter of the mentions came from members of the scientific community (researchers or clinicians), while around 5% came from journalists, bloggers or journal editors [48]. The mean values of mentions from each category are presented in Figure 1.

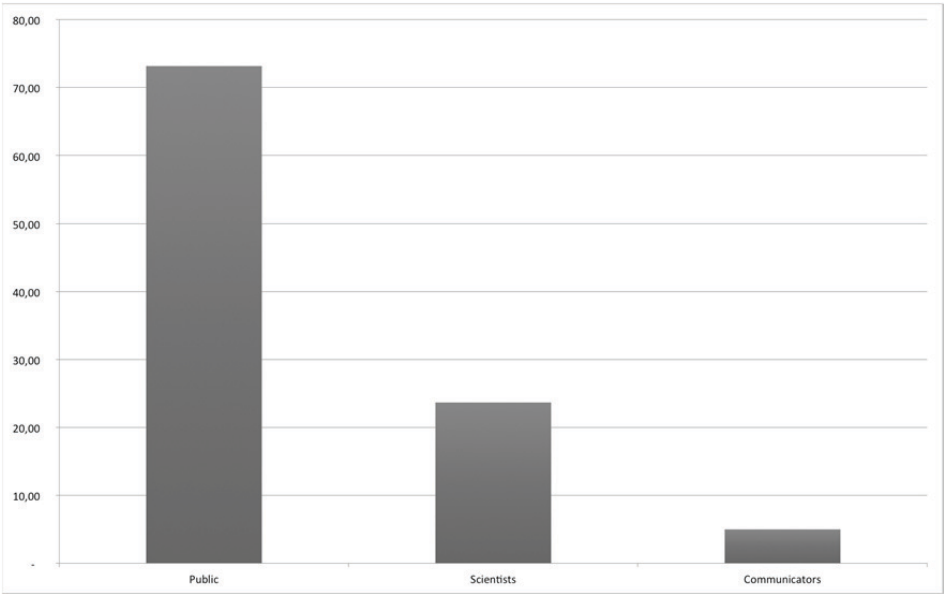

Figure 1. Twitter demographics for the fifty papers with the highest Altmetric Attention Score

5. Discussion and Conclusions

The purpose of the present paper was to present the altmetric landscape of Greece, taking as a case study the Aristotle University of Thessaloniki (AUTh) publications. Although this is a small-scale study, it seems to confirm the general patterns in the presence of altmetrics identified in previous studies. The coverage of altmetric indicators observed in this study is rather low (17%), and similar to that reported earlier in the literature. For instance, [31] found that around 15% of the publications they examined had any altmetric measures, and [37] found a coverage of 18% for the years 2009-2013. We also observed higher mentions for more recent publications, a finding in accordance with [32] and [37] who found a significant increase in altmetric coverage over the years.

Twitter emerged as the most prevalent source, accounted for over 80% of total mentions. In earlier studies Twitter was ranked second, after Mendeley, in social media activity associated with scholarly articles [27,36]. Twitter demographics revealed that overwhelmingly more attention comes from the general public, a finding that contributes to the idea that altmetrics are different from citations, as they trace a different kind of post-publication reception of research [27,31,44].

Altmetric mentions were more frequent in Medical Sciences, a pattern observed by other researchers as well, who reported that the highest share of publications with altmetric scores were the Biomedical and Health Sciences [27,30,32,37]. Moreover, although the absolute value of Arts, Humanities and Social Sciences publications mentioned in social media is relatively small, their percentage suggests a significant altmetric activity, a finding in line with that of other studies [31,36]. The present study

seems to support the argument that "altmetrics scores could have an interesting added value for the analysis of humanities and social sciences, fields that traditionally are not well represented by traditional citation analysis" [31, p.20].

An interesting finding was the mentions of publications in mainstream media and policy documents. This finding indicates a broader impact of AUTh's research on both peers and the general public, difficult to be captured through other means. In recent years, societal impact of research is gaining increasing importance, as funding bodies, evaluators, and national assessment systems are interested in understanding the diffusion and use of research outputs beyond the academic audiences [49–51]. Societal impact is perceived by evaluators as an "outcome" that brings change or makes a difference in people's lives [52]. According to Wilsdon et al. [53] "research has a societal impact when auditable or recorded influence is achieved upon non-academic organisation(s) or actor(s) in a sector outside the university sector itself—for instance, by being used by one or more business corporations, government bodies, civil society organisations, media or specialist/professional media organisations or in public debate" (p.6). Non-academic organisations or stakeholders outside academia are usually involved in writing policy documents [54], thus mentions of scholarly papers in these documents signify that research preformed in AUTh influences policy formulation and policy-making process, and has tangible effects on larger society. This kind of information can help faculty and institution administrators to monitor and assess their outreach endeavours.

This is an exploratory study confined to publications authored by researchers of a single institution. As such, its findings are difficult to generalise beyond AUTh and should be interpreted with caution. A replication of the study with larger and more diverse sample of publications would be desirable, in order to get a better insight into the altmetrics landscape in Greece. Moreover, the aim of the study was to give a general overview of the presence of altmetrics for AUTh publications, and it did not go into much depth on the correlation between altmetrics and traditional citations, or about understanding how scientific publications are mentioned in social media, who publishes citations to scholarly articles in social web and why they publish them [29,41]. Large-scale quantitative analysis should be complemented with qualitative research and content analysis in order to reach safe conclusions about the kind of influence altmetrics measure, and the relationship, if any, between altmetric indicators and scientific impact [34,44].

There is evidence that an active online presence and visibility on social media networks is likely to have an impact on the attention that researchers get via altmetrics [55]. Yet, there is no relevant research regarding Greek researchers' online presence, or their attitudes in relation to scholarly communication. The only study available is that of "101 innovations of scholarly communication" [56]. Aristotle University of Thessaloniki Library & Information Centre participated in this survey with 217 respondents, but due to the small sample size no solid conclusions can be drawn. Therefore, a study focusing on Greek scholars' attitudes towards Open Science and new scholarly communication tools, as well as their online presence would reveal trends, habits and practices.

Finally, it should be noted that altmetrics may include more and different metrics than those provided by the Altmetric.com. Altmetric Explorer is not but a tool for detecting the activity around research products in online environments, and should be carefully distinguished from altmetrics as a concept. If we only see what the specific tool enables us to see, that could be a serious limitation on how we view and

comprehend alternative indicators, and their potential to capture the impact of research and the multidimensionality of scholarly discourse.

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