Hot spots of climate action research: altmetric attention and bibliometric analysis

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Abstract
Purpose – The purpose of this study is to apply altmetrics and bibliometric indicators on the top 100 most mentioned articles published related to the sustainable development goal (SDG)-13, Climate Action.

Design/methodology/approach – The authors used the Altmetric Explorer’s SDGs filter to extract the most mentioned articles belonging to Climate Action and their other characteristics, such as DOI, titles, tools mentioning them and their demographic descriptions. The same set of papers was searched in the Dimensions database to extract them in the format importable in R-studio to check the distribution of papers across various journals and identify their subject category, countries and institutions publishing these papers. Further, SPSS was used to check the correlation between altmetric attention score (AAS) and citations.

Findings – The results of the paper showed the mean of AAS and the citations received by the articles was 3,556.35 and 304.04, respectively. Twitter has been the most used social media platform for mentioning the research related to climate action, covering 88.1% of the total mentions. The Twitter and the News mention demographics show the USA contributing the most tweet mentions (15.2%) as well as news mentions (57.65%) to the papers. Also, the USA has solely published 49 papers from the total papers selected for the study. The papers were published in 31 journals most of them belonging to the quartile first (Q1) category and primarily belonged to the subject category “Earth Sciences.” Pearson’s correlational method showed a significant but low positive correlation between AAS and citation counts ($r = 0.365, p < 0.001$) and a strong positive correlation between the citations and Mendeley readership counts ($r = 0.907$).

Originality/value – The research is original in nature and discovered very interesting results about climate action using altmetric and bibliometric techniques.

Keywords Altmetrics, Bibliometrics, Scientometrics, Research mapping, Research productivity, Climate action, SDG 13, Societal impact

Paper type Research paper

Introduction
It is essential to accurately quantify the impact of scientific articles to inform choices about financing, tenure and promotion and to pinpoint the most critical research in a particular area. Citations have been widely accepted as research impact measurement indicators of individual articles (Eyre-Walker and Stoletzki, 2013). Although widely used, citations have been criticized for failing to reveal the broader impact of research in terms of its societal, educational, cultural and environmental aspects (Holmberg et al., 2015). Also, the involvement of much time in accumulating citations to a paper from the day it gets published...
is another major drawback associated with the citations (MacRoberts and MacRoberts, 1989). The advent of the internet and the introduction of social media proved to be an excellent boon for disseminating scientific knowledge among a broader and diverse group of audiences (Trueger et al., 2015; Khan et al., 2022). The popularity of the social Web and its use for reaching out to a more significant number of readers led to the creation of Web-based metrics for academic publications known as altmetrics, proposed for the first time in 2010 by Jason Priem (Priem et al., 2010). Theoretically, altmetrics can be used in an evaluative capacity to provide early estimates of publications’ impacts or estimates of nontraditional forms of impacts (Sud and Thelwall, 2013). Altmetrics measures the number of engagements of an article based on the views it received on various websites, blogs and posts on social media networks like Twitter, Facebook along with its references in Wikipedia and Mendeley (online reference management tool), policy documents and other traditional media platforms (Trueger et al., 2015).

The sustainable development goals (SDGs) of the United Nations (UN), approved in September 2015, is an international political agenda that urges collaborative action to attain peace, prosperity and well-being for all by 2030. The SDGs, which have 17 goals and 169 targets, were created to replace the eight Millennium Development Goals completed in 2015 (Sachs, 2012). The SDGs include “Ending Poverty, Ending Hunger, Encouraging Good Health and Well-being, Providing Quality Education, Promoting Gender Equality, Providing Clean Water and Clean Energy, Providing Decent Work and Economic Growth, Addressing Industry, Innovation, and Infrastructure, Reducing Inequalities, Developing Sustainable Cities and Communities, Encouraging Responsible Consumption and Production, Taking Action on Climate Change, Promoting Life Below Water, Promoting Life on Land, Working Toward Peace, Justice, and Strong Institutions, and Creating Partnerships to Achieve Goals” (United Nations, 2015a, 2015b). One of the most significant worldwide challenges of the present time is climate change, which directly influences the environment, society and economy. It results from human activities like burning fossil fuels, clearing forests and changing land uses, all of which raise greenhouse gas emissions and cause global warming (Intergovernmental Panel on Climate Change, IPCC, 2014). In its foreword, the panel reported that it is 95% certain that humans cause current global warming (Anderegg et al., 2010). Due to anthropogenic emissions, the average worldwide temperature has risen by 0.5°C during the past few decades, and the predictions for the century 2100 AD indicate that the average temperature will rise by 2.4°C–5.8°C (Trenberth, 2001). Such a slow temperature rise will melt ice caps, coastal areas flooding, unfavorable precipitation events and frequent floods and droughts (McMichael et al., 2006).

Policymakers, academics and the general public, all work to address the prevention and treatment of problems brought forth by the changing climate. In supporting the SDGs, researchers and academic staff in universities are major players in playing a significant role in helping create new ways for the world by training global citizens and introducing innovations and information into society (Purcell et al., 2019). Because of its relevance and direct linking of the problem with humans, it is being well-researched, and the results are being widely discussed in the academic and online social world. Worried about the unavoidable results of climate change, organizations at national and international levels and scientists from different subjects have aimed to recognize the climate states in the past to predict future trends (Haunschild et al., 2016). To support sustainable development, SDG 13 aims to lower emissions and improve adaptability to changing times (United Nations, 2015a, 2015b). Considering the importance of climate action for the sustainable development of the globe, the present study aims to evaluate the most promising and highly cited articles on climate action using bibliometric and altmetric indicators.
Literature review
Scientometricians have been conducting bibliometric analyses of various fields of knowledge from time to time. Many works have been published dealing with the bibliometric analysis of the goals set for sustainable development by the UN. A study conducted on 377 papers by Ma et al. (2022) on understanding the support of forests and forestry to SDGs revealed that the USA is the highest output country worldwide and the Chinese Academy of Sciences has the most publications to its credit as an individual institution. Liang et al. (2022) found out that the number of articles published related to the blue economy, which is intrinsically linked to SDG 14, has risen considerably from 2017 to 2022. Similarly, many works carry out the bibliometric analysis of the research area of climate change. Li and Zhao (2015) used bibliometric analysis to study the environmental assessment from the past 20 years to see the growth trends, subject categories, collaboration, geographic distribution of publications and journals publishing the literature. Sweileh (2020) and da Costa et al. (2020) did a bibliometric analysis of the suicide mortality rate, which comes under the SDG “good health and well-being.” Hallinger and Chatpinyakoop (2019) and Prieto-Jiménez et al. (2021) carried out a bibliometric analysis of the SDG “Quality Education.” Basu and Dasgupta (2021) analyzed the SDG “Clean Water and Sanitation” while Herrera-Calderon et al. (2021) targeted the SDG “Zero Hunger.” Altmetric studies have been conducted in different areas of the literature. Cho (2021) studied the altmetric analysis of highly cited articles in the library and information science field. Nabavi (2022) did the altmetric research of journalism articles receiving high altmetric scores and found that the articles on journalism received the most attention through news mentions. Sener and Polat (2022) carried out their study of altmetric analysis of articles published on the retina, while Kolahi et al. (2017) analyzed dental literature using altmetrics. A few papers have focused on Twitter studies conducted to identify Twitter users tweeting about climate change articles (Toupin et al., 2022; Hopke and Hestres, 2018). Similarly, Bornmann et al. (2016) studied the use of policy documents for measuring the social impact through the number of times climate change research has been mentioned in policy-related documents. Many studies have simultaneously conducted bibliometric and altmetric analyses on different research areas. Azer and Azer (2019) checked the analysis of top-cited articles in medical professionalism (Grover et al., 2022) and analyzed obstetrics and gynecology research through altmetrics and bibliometrics. Suzan et al. (2021) used the techniques to check the themes and trends of osteoporosis. Much literature can be traced that studies the relationship between social indicators (altmetrics) and citations. Costas et al. (2014), in their article “Do Altmetrics Correlate with Citations,” found a significant but slight positive correlation between the two, thus endorsing that altmetrics reflect a different impact than citations. Many other studies have also pointed out that there is some relation between the two; however, both are different from one another (e.g. Zahedi et al., 2014; Thelwall et al., 2013; Sud and Thelwall, 2013; Mullins et al., 2020). However, to our knowledge, no such work has been done to date that has carried out the altmetric and bibliometric analysis of the most mentioned articles published under SDG 13, Climate Change. The purpose of the paper is to study the top 100 articles falling under SDG 13, having attained the most altmetric attention scores (AAS) and analyze their characteristics using both bibliometric and altmetric indicators and check if any relationship exists between the two indicators.

Methodology and datasource
The present study was a cross-sectional descriptive analysis (altmetric and bibliometric) of the most mentioned articles published on SDG-13, Climate Action. For the study’s purpose, Altmetric.com, one of the significant alternative metric providers, was selected as the data source. Altmetric scores, which represent the number of times an article has been mentioned on social media and the web, were collected using Altmetric.com. Bibliometric data, such as the number of citations, authors, and journals, were collected from the Web of Science database.
source because it is the most comprehensive source and covers the vast majority of online media activity related to scientific papers published in blogs, news outlets, online reference managers and social media sites like Facebook and Twitter. When it comes to the online attention surrounding research articles, the Altmetric Database monitors them more thoroughly than other contemporary sources (Haustein et al., 2015). A research output’s AAS gives an indication of how much attention it has gained. This score, obtained from an automated algorithm, is a weighted total of the attention that a research output receives. The AAS is a whole number provided by Altmetric.com to quantify the fundamental level of online impact resulting in specific research output (Trueger et al., 2015).

In early 2022, Altmetric Explorer introduced a new advanced search filter under the name “Sustainable Development Goals,” allowing users to explore the attention surrounding the research being published concerning all 17 SDGs of the UN. Hence, the data (research output and demographics) needed to carry out the study was harvested from the Altmetric Explorer database by searching particularly for the Climate Action SDG on the specific day, September 20, 2022 to avoid any variation in the altmetric scores of the publications. The search in the database showed that 292,700 publications related to SDG 13, were being tracked by the Altmetric Explorer database out of which 207,291 publications had gained an AAS of at least 1 or more. The articles were arranged in descending order of their AAS, and among them the top 100 most mentioned articles were exported in the .csv format. The file contained the article identifiers data like the DOI, the title and the mention counts received by the select articles through several altmetric tools, mainly including Twitter, Facebook, Blog mentions and Mendeley readership. The decision to include 100 top articles follows the trend set earlier by many studies analyzing altmetric data in other subjects (Wang et al., 2017; Moon et al., 2020; Rehman et al., 2023). Also, the Altmetric Explorer database provides access to the data pertinent to Twitter demographics and News mention demographics which were separately exported in the .csv format. Both the exported .csv files were merged into a single Excel file for their altmetric analysis.

For carrying out the bibliometric analysis of the articles under study, R-studio’s software package, Biblioshiny for bibliometrix was used. Since the software does not support importing the raw data as provided by the Altmetric Explorer database, to obtain such file, the select articles were searched manually through DOI’s in the Dimensions database and then the results were exported as .csv file on the same day the altmetrics data was fetched, for further bibliometric analysis. The citations received by these articles were also recorded from the Dimensions database for carrying out the correlation test between AAS and citations. Dimensions.ai and Altmetrics.com both belong to the same parent organization, Digital Science and Research Solutions and work closely with one another. Dimensions database combines clinical trials, financed grants, publication histories, patents and policies to provide a mechanism to follow research from its inception to its eventual effects (Singh et al., 2021).

The data loaded to R-Studio was used to identify the most relevant source titles publishing the articles and to identify leading countries that have published them. The obtained results were downloaded in MS Excel format so as to be analyzed and interpreted along with the other objectives. The articles published had multiple authorships, as depicted in earlier studies (Loan et al., 2021); as such, the criterion to showcase the affiliations was decided based on the first author’s affiliation only. The articles were accessed one by one in the Dimensions database and the affiliation of the first authors was recorded to identify the institutions from where the selected articles were authored.

To determine the correlation among AAS, Citation counts, Mendeley Readership, Twitter, News mentions and Facebook, IBM SPSS Statistics 29.0.0 was used. SPSS can
perform many statistical analyses (Arkkelin, 2014). The correlation matrix was carried out using Pearson’s correlation method, and the significance test was set as two-tailed since the type of relation (positive or negative) among the variables was not known. The value of significance for correlation was set at $p = 0.01$ level.

**Results**

*Altmetric attention score and citations*

Among the top 100 most mentioned articles in the field of climate action, the highest AAS was gained by an article published in the year 2020 in the journal *Nature* entitled “Mobility Network Models of COVID-19 Explain inequities and inform Reopening” with a total AAS of 11,442. The article “Global warming and recurrent mass bleaching of corals,” published in the journal *Nature* in 2017, has gained a maximum of 1,731 citations among all the selected articles for the study.

Table 1 below shows that the 100 articles have an AAS of 355,635, ranging from 2,262 to 11,442. The mean of the total AAS of the articles was found to be 3,556.35, with a median of 3,019.5. On the other hand, the articles gained a total of 30,100 citations with a range of 2–1,731 citations, having a mean of 304.04 and a median of 176.

*Mentions through different tools*

An analysis of the articles with the top AAS in SDG 13, Climate Action, to find out the altmetric tools through which they have been mentioned the most reveals in Figure 1 below that Twitter leads among all the platforms with a total of 332,540 (88.1%) mentions followed by News mentions amounting to 36,266 (9.6%). The other platforms have mentioned the articles less number of times, with 4,437 (1.2%) and 1,679 mentions (0.4%) received from Blogs and Facebook, respectively. No mentions were recorded through LinkedIn, Peer Reviews, Pinterest, Syllabi inclusions and Weibo. It is pertinent to mention that the sum of individual counts of the mentions on these platforms exceeds the total AAS. It is because the AAS is a weighted count of the amount of attention to the articles, which is influenced by the number of posts mentioning an output and the quality of the source of the post (altmetric, 2020).

**Demographic description**

*Twitter demographics*

The data shows that 332,540 tweet mentions have been found originating from 168,679 unique tweeters in 221 countries. However, out of these 332,540 tweets, 153,800 (46.2%) have been tweeted by 77,900 (46.2%) unique tweeters whose country details were not specified. Figure 2 below shows the Twitter demographics, specifically of the top 10 countries where the selected articles have been mentioned. It can be seen that the articles have received most of the tweet mentions from the USA, amounting to 50,474 (15.2%), followed by the UK with

<table>
<thead>
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<th>Citations</th>
</tr>
</thead>
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<tr>
<td>Total</td>
<td>355,635</td>
</tr>
<tr>
<td>Range</td>
<td>2,262–11,442</td>
</tr>
<tr>
<td>Mean</td>
<td>3,556.35</td>
</tr>
<tr>
<td>Median</td>
<td>3,019.5</td>
</tr>
</tbody>
</table>

**Source:** Authors’ own work

Table 1. Altmetric attention score and citations of articles
25,887 (7.8%) mentions and Australia with 23,607 (7.1%) tweets mentions. The map, apart from this, through the color intensity, shows the spread of attention throughout the different countries of the world compared to each other.

**News mention demographics**
The data pertinent to news mentions shows that, to date, 36,266 news mentions related to the articles have gained the highest AAS in SDG 13. These mentions have been gained from 2,885 unique news outlets in 121 countries. As evident from Figure 3 below, the USA has also topped the list of the ten most mentioned countries, with a news mention count of 20,907 (57.65%). The color intensity depicts the attention attained due to the frequency with which news outlets from those countries have mentioned the articles.

**Distribution of articles across the journals**
The 100 articles with the most AAS were published in 31 journals. Table 2 below includes the top 10 journals having published the majority of the articles. Nature Climate Change
(IF = 28.66, SJR = 6.849) and Proceedings of the National Academy of Sciences of the United States of America (IF = 12.77, SJR = 4.026) have taken the lead by publishing 16 articles each, followed by Nature (IF = 69.504, SJR = 20.957) with 15 articles and Science (IF = 63.714, SJR = 13.320) with 13 articles. These four contributing journals have together published 60 articles, whereas the rest of the 27 journals have published only 40.

**Year-wise distribution**

The year-wise distribution of the selected articles in Figure 4 below shows that the articles have been published within seven years, from 2015 to 2022. In 2021, the maximum number of articles (19) were published. Till the day the data was fetched, already 14 papers had featured among the top 100 mentioned papers related to SDG Climate Action.

**Top ten most relevant affiliations**

Figure 5 below shows that the top ten institutions from which the most articles related to SDG 13 got published were Stanford University (USA), The University of California (USA) and The ARC Centre of Excellence for Coral Reef Studies (Australia), each contributing five to the total 100 top-mentioned articles in the field. A total of 66 articles were such which have been published individually by 66 different institutions.

**Source:** Authors’ own work

<table>
<thead>
<tr>
<th>Source list</th>
<th>Rank</th>
<th>Frequency</th>
<th>Quartile</th>
<th>Impact factor (2022)</th>
<th>SJR (2022)</th>
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</thead>
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<tr>
<td>Nature Climate Change</td>
<td>1</td>
<td>16</td>
<td>Q1</td>
<td>28.66</td>
<td>6.849</td>
</tr>
<tr>
<td>Proceedings of The National Academy of Sciences of the United States of America</td>
<td>2</td>
<td>16</td>
<td>Q1</td>
<td>12.777</td>
<td>4.026</td>
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<tr>
<td>Nature</td>
<td>3</td>
<td>15</td>
<td>Q1</td>
<td>69.504</td>
<td>20.957</td>
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<tr>
<td>Science</td>
<td>4</td>
<td>13</td>
<td>Q1</td>
<td>63.714</td>
<td>13.320</td>
</tr>
<tr>
<td>Environmental Research Letters</td>
<td>5</td>
<td>5</td>
<td>Q1</td>
<td>6.947</td>
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<tr>
<td>Nature Communications</td>
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<td>Q1</td>
<td>17.694</td>
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<tr>
<td>Science Advances</td>
<td>7</td>
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<td>Q1</td>
<td>14.957</td>
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<tr>
<td>One Earth</td>
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<td>Q1</td>
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<td>Q1</td>
<td>202.731</td>
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<td>The Lancet Planetary Health</td>
<td>10</td>
<td>2</td>
<td>Q1</td>
<td>28.75</td>
<td>3.586</td>
</tr>
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</table>

**Source:** Authors’ own work
Upon analyzing the countries (based on the affiliations of the first author) from where the articles were produced, the USA has made the most contribution by publishing 49 articles out of the top 100 mentioned articles in SDG 13 (Climate Action) (Figure 6).

Subject categories
The subject categories to which the top-mentioned articles related to the SDG Climate Action belong are shown below in Figure 7. As per the data available, the highest number of articles (45) falls in the subject category of Earth Sciences, followed by Environmental Sciences with 27 publications. Because an article can be categorized into more than one subject category, the total number of articles, when summed, exceeds 100 across all categories, which shall not be mistaken as data variation.
Correlation analysis

The results of Pearson’s correlation method as shown below in Table 3 reveals that there is a significant but low positive correlation between AAS and Citation counts ($r = 0.365, p < 0.001$), AAS and Mendeley ($r = 0.383, p < 0.001$), News and Citations ($r = 0.415, p < 0.001$), News and Mendeley ($r = 0.409, p < 0.001$), Facebook and AAS ($r = 0.329, p < 0.001$). Meanwhile, the results showed that Mendeley readership and Citation Counts have a strong positive correlation ($r = 0.907, p < 0.001$). Also, Twitter and AAS ($r = 0.574, p < 0.001$) and News mentions and AAS ($r = 0.574, p < 0.001$) were seen to be having a statistically significant moderate positive correlation.

However, Facebook and Citations ($r = 0.295, p = 0.003$), Facebook and Mendeley ($r = 0.288, p = 0.004$) and Facebook and Twitter ($r = 0.289, p = 0.004$) were not found to be statistically significant, showing that there is no relation between the variables. Besides News mentions, Twitter ($r = -0.124, p = 0.218$) and Facebook and News mentions ($r = -0.20, p = 0.843$) had a very low negative correlation.
Discussion

Climate change is becoming one of the most noticeable problems among social issues, and tracking the digital traces of the related scholarly publications can be helpful in measuring the impact created by them in the academic world as well as outside it. The current study was undertaken to carry out the altmetric and bibliometric analysis of the top 100 most mentioned articles published, which belong to SDG 13. The findings reveal that the average AAS per article was 3,556.35, while the average of the citations per article was 304.04. This signifies that research related to climate action has been gaining recognition both in the online social world and the academic world. As the climate is directly related to human existence, the studies related to the field attract more attention, resulting in its higher AAS. However, the citation count tends to be on the lower side because of different reasons such as the extra time involved in gaining citations (MacRoberts and MacRoberts, 1989), limited journal coverage in different databases (Moed, 2006), unbalanced coverage of disciplines (Mingers and Leydesdorff, 2015). Social media, on the other hand, allows people to express their opinions about the research soon after it gets published, allowing for more thorough and quick coverage for altmetric tools that support articles’ visibility (Bar-Ilan et al., 2012; Priem et al., 2010; Mazov and Gureev, 2015).

The results also highlighted that the articles had received most of their mention counts through Twitter (88.1%) (Hassona et al., 2019; Kolahi et al., 2019; Robinson-Garcia et al., 2014). They confirmed that Twitter was the primary platform from where the articles were mentioned. Twitter can be a helpful tool for scientists because it enables them to interact with a global network of peers, stimulate multidisciplinary research and impart knowledge and gain insight from the community of collaborators and advisers on Twitter. Also, many journals use social media sites like Twitter to make their papers more accessible to people inside and outside the academic community (Franko, 2011; Kolahi and Khazaei, 2018). The data about Twitter demographics and the news mention demographics show that the articles have received the most tweet counts and news mentions from the USA. This suggests that the research on climate action is discussed widely on Twitter and across news platforms and people in the USA show interest in such articles concerning critical social issues. Also, news platforms mention such articles to highlight their role in dealing with this challenge. Boykoff (2008) also claims that the news media has contributed significantly to the public dissemination of science.

Furthermore, among the top 100 most mentioned articles in climate action, the USA has also outrun other countries in terms of publishing the maximum number of articles. Kim et al. (2019) also found the USA leading the way in his study of the bibliometric analysis of the 100 most mentioned articles in Neuroimaging. Numerous studies (Grammes et al., 2020; Fontelo and Liu, 2018) have tried to measure the research output of the countries with the

<table>
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<th>Platforms</th>
<th>AAS</th>
<th>Citations</th>
<th>Mendeley</th>
<th>Twitter</th>
<th>News</th>
<th>Facebook</th>
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<tbody>
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<td>AAS</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>Citations</td>
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<td></td>
<td></td>
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<td>Mendeley</td>
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<td>0.907**&lt;Sig&gt; &lt;0.001</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Twitter</td>
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<td>0.175(Sig)0.082</td>
<td>0.193(Sig)0.055</td>
<td>1</td>
<td></td>
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<td>News</td>
<td>0.574**&lt;Sig&gt; &lt;0.001</td>
<td>0.415**&lt;Sig&gt; &lt;0.001</td>
<td>0.409**&lt;Sig&gt; &lt;0.001</td>
<td>−0.124(Sig)0.218</td>
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<td>Facebook</td>
<td>0.329**&lt;Sig&gt; &lt;0.001</td>
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<td>0.288**&lt;Sig&gt;0.004</td>
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<td>−0.020(Sig)0.843</td>
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</table>

Note: **. Correlation is significant at the 0.01 level (two-tailed)
Source: Authors’ own work
maximum number of publications to their credit. They have also found that the USA is at the top. The top-mentioned articles on climate action have been published in 31 journals, with the journals Nature Climate Change and Proceedings of the National Academy of Sciences of the United States of America leading with the maximum publications. It means these journals have devoted themselves more to the topic. The USA being predominant may be because of the reason that the country publishes the most number of journals that have published these articles. The year-wise distribution of these top-mentioned articles shows that 18% of them were published together in 2015, 2016 and 2017 while the rest of 82% were published in the following five-year period. This lower presence of AAS in the articles published earlier conclude recent publications usually gather more AAS.

The results of Pearson’s Correlation showed a significant but weakly positive correlation between the Citation count and the AAS, as provided by Altmetric Explorer, which includes different mention tools (News mentions, Blog mentions, Policy mentions, Patent mentions, Twitter mentions, Peer review mentions, Weibo mentions, Facebook mentions, Wikipedia mentions, Google+ mentions, Video mentions, etc.). This has been confirmed by studies by de Winter (2014) and Demachki and Maricato (2022). Such a relationship suggests that the AASs do not show the same kind of impact as shown by citations and that the altmetric measures could act as complementary metrics to the traditional bibliometric metrics, showing the cultural and societal impact of the literature. The statistical results showed a strong correlation between Mendeley readership and Citation counts with the value of \( r = 0.907 \). Correlation coefficient values closer to +1 or −1 are understood as very high positive or negative correlation, respectively, and values closer to zero are interpreted as very low (Gupta and Kapoor, 2020). Many studies have confirmed a significant positive correlation between Mendeley Readership and Citation Counts (Mohammadi and Thelwall, 2014; Ravikumar et al., 2022; Thelwall, 2017). This suggests that Mendeley readership counts are not random but they have some kind of relationship with the citations and that the articles with a high Mendeley readership also have many citations thus making them the suggested alternative to citation metrics. However, the Mendeley counts should not be yet used for evaluation purposes as they are manipulable (Wouters and Costas, 2012). The strong correlation may only be sometimes prevalent because Mendeley users are usually specific and encompass mostly the researchers and the faculty. Besides, all subject categories need to be indexed in Mendeley, which decreases the readership count (Parabhoi et al., 2019). It should be kept in mind that there is no cause-and-effect relationship between the two in particular and AAS and citations in general. Some works reveal that using social media to disseminate the research results increases AAS and citations (Zahedi et al., 2014; Riahinia et al., 2018). This is also true that sometimes highly cited articles get attention on social media platforms, increasing their AAS.

The study of the top subject categories publishing articles on climate action helps us to identify that Earth Science as a subject has been leading in publishing articles that get more social citations. Almost half (45%) of the total top 100 articles on climate action have been published in the Earth Science subject category.

Conclusion
Altmetrics as metrics based on various social media platforms, microblogging sites, news media platforms and social reference managers, has been found to be a potential metric of research by revealing the broader impact of research especially when used complementarily with the other traditional metrics. The study carries out the altmetric and bibliometric analysis of the most mentioned articles belonging to SDG-13, Climate Action. Such periodic assessment is necessary to evaluate how academics and researchers are working together to
accomplish the worldwide 2030 agenda for sustainable development. The study shows that the most mentioned articles related to SDG-13 have been mostly discussed on Twitter with the attention mostly coming from European countries. These most mentioned articles have all been published in quartile 1 (Q1) journals indicating that the articles have occupied the best places to get published. There is no significant relation between the AAS and the citations of the climate action articles highlighting that altmetrics are not to be considered as the replacement to the traditional citation based metrics.

There is a broad scope to carry out future research. Ample literature has been published relevant to the field, and such an analysis can be carried out on larger collection of literature. Also, future studies can be carried out on all the SDGs laid down by the UN to check which goals are getting more attention in the social world and which goals are being targeted more by the academic world. Such studies can contribute to assessing the impact, the research worldwide is creating in achieving the set SDG.

The study has some limitations mainly that the population size is small compared to the total corpus of literature available in the field. The methodology applied is quantitative, and thus, there is a need to carry out a more in-depth methodology that touches the qualitative aspects more. Besides, the data source, Altmetric Explorer, needs to be more comprehensive and mainly serves to highlight reader engagement. It fails to tell us if it has brought some changes in public opinion. Also, when generating the scores, Altmetric Explorer is unable to distinguish between positive and negative publicity that an article may receive. When comparing traditional and alternative metrics, one must also take into account the ever-changing nature of social media and variations in AAS over time (Thelwall et al., 2013). Furthermore, including more data sources such as Plum Analytics, ImpactStory, ALM PLoS for altmetrics and Web of Science and Scopus for bibliometric analysis would have led to different results and a more exhaustive study because their algorithms vary.

References


Further reading


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