

# Assessing the early impact of ST-OPEN (2020–2025): Simulated impact factors and bibliometric indicators Across Google Scholar, Scopus, and Web of Science

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## Cite as:

Bašić Ž, Gudelj D, Marušić A. Assessing the early impact of ST-OPEN (2020–2025): Simulated impact factors and bibliometric indicators Across Google Scholar, Scopus, and Web of Science. ST-OPEN. 2025;6:e2025.2519.38.

## DOI:

<https://doi.org/10.48188/so.6.14>

**Aim:** *ST-OPEN* is a multidisciplinary, overlay diamond open access journal established by the University of Split in 2020. As a new journal, it is not yet included in major databases and thus has no official bibliometric indicators. The aim of this study was to evaluate the early citation trajectory of *ST-OPEN* and to calculate simulated citation metrics to assess its visibility and scholarly impact.

**Methods:** Citation data for all articles published between 2020 and 2025 were collected manually from Google Scholar, Scopus, and Web of Science Core Collection. The simulated impact factor (IF) was calculated using the standard Clarivate formula for all citation databases, while the h-index, and g-index were derived from cumulative citations. Self-citations were estimated based on overlapping authorship in citing and cited articles. Citation frequencies and distributions were cross-checked across sources to ensure accuracy.

**Results:** Between 2020 and 2024, *ST-OPEN* published 75 articles, which had received 95 citations in Google Scholar by 2025 (average 1.27 citations per article). The journal's h-index and g-index were both 5 in Google Scholar. Approximately 20% of citations represented self-citations. Simulated IF values peaked in 2022 (0.261). Scopus-indexed journals cited *ST-OPEN* 49 times between 2021 and August 2025, while Web of Science recorded 42 citations between 2020 and 2024.

**Conclusions:** The early citation indicators of *ST-OPEN* remain modest and volatile, consistent with patterns observed for new, small, multidisciplinary, and university-based open access journals. Despite the absence of indexing in Journal Citation Reports or Scopus Source, the journal is already cited in international outlets, suggesting initial visibility and potential for growth. Continued editorial development, international collaboration, and eventual indexing in global databases are likely to strengthen its bibliometric performance in the coming years.

**Keywords:** ST-OPEN; bibliometric indicators; simulated impact factor; diamond open access; Croatian scientific journals

## Introduction

*ST-OPEN* was established in 2020 as an overlay, multidisciplinary, diamond open access journal published by the University of Split (1). This means that we primarily publish articles from master or doctoral theses from the public repository of the University of Split and other universities from the European University of the Seas (SEA-EU) (2). It is published in full open access without article processing charges (1). As a new and multidisciplinary journal, *ST-OPEN* is not indexed in major bibliographical databases and therefore does not have officially assigned bibliometric indicators such as the Journal Impact Factor (JIF) or CiteScore. Nevertheless, assessing its early citation trajectory is important for understanding the journal's visibility and scholarly impact, as well as for situating it within the landscape of Croatian and international scientific publishing.

The evaluation of new journals is a well-known challenge in scientometrics. Because the JIF is calculated on the basis of citations to items from the previous two years, it typically takes at least three to four years after launch before a journal can receive its first official value (3). Even then, debut JIFs are often volatile. Small publication volumes mean that one highly cited article can disproportionately influence the average, while increases in article output can reduce early impact factors by expanding the denominator more rapidly than the numerator (4, 5). Studies have shown that for many university-based, non-commercial, and multidisciplinary open access journals, early JIFs are frequently below 1.0, often in the range of 0.3-0.8, before stabilizing as the journal matures and gets indexed (3, 6, 7).

In Croatia, several university-affiliated journals illustrate these patterns. *Acta Clinica Croatica* has maintained an impact factor of around one (8), as well as *Acta Botanica Croatica* (9), while more established titles, such as *Croatian Medical Journal*, report value above 2.0 (10, 11). These benchmarks suggest that the performance of *ST-OPEN* should be interpreted in light of the broader national publishing ecosystem, where a diversity of models exists, ranging from small institutional outlets to internationally co-published journals.

Given these considerations, it is valuable to explore how *ST-OPEN* is cited across major bibliographic platforms even before it qualifies for official Clarivate metrics. Google Scholar (<https://scholar.google.com/>) provides the broadest coverage, capturing citations from a wide range of scholarly outputs, but it includes self-archived and non-peer-reviewed content. Scopus (<https://www.scopus.com/>) offers a curated index of international journals with structured metadata and citation analysis, while Web of Science (<https://www.webofscience.com/>) remains the source of record for the JIF (12). By comparing these three sources, it becomes possible to simulate early bibliometric indicators such as the Impact Factor, h-index, and g-index, and to evaluate patterns of citation distribution, self-citation, and article visibility for *ST-OPEN*.

The aim of the present study was therefore to systematically collect citation data for *ST-OPEN* from Google Scholar, Scopus, and Web of Science for the period 2020–2025, to calculate simulated citation metrics, and to identify the most frequently cited contributions. This analysis provides an evidence-based overview of the journal's early scholarly foot-

print and offers insights into the potential trajectory of a new, multidisciplinary, university-based open access journal in Croatia.

## Methods

To assess the citation impact of *ST-OPEN*, data were collected from three major bibliographic sources: Google Scholar, Scopus, and Web of Science (WoS).

From Google Scholar, citation counts were retrieved manually by searching the journal title and extracting citation metrics for each article published between January 2020 and July 2025. The number of published articles per year was cross-checked against the journal's archive to ensure completeness. Although the three bibliographical databases have different coverage and methodological approaches to calculating impact of the indexed articles, we used calculation formula for the impact factor (IF) of the Web of Science:

IF in year X = citations in year X to articles published in X-1 and X-2 / number of articles published in X-1 and X-2.

This yielded simulated IF values for 2022, 2023, and 2024, with the interpretation that, if *ST-OPEN* were indexed in Web of Science Core Collection, the citation data would correlate with those observed in Google Scholar or Scopus.

The h-index is defined as the maximum value h such that the journal had h articles each cited at least h times (13). The g-index was defined as the largest number g such that the top g most cited articles received together at least g<sup>2</sup> citations (14). Both indices were calculated for the cumulative distribution of citations per article, ranked in descending order. Self-citations were estimated by identifying overlap of authorship between citing and cited articles.

For Scopus, citation data were retrieved using the query REFSRCTITLE("ST-OPEN"), which identifies all articles in Scopus-indexed journals that cite articles published in *ST-OPEN*. The total number of citing documents and their publication years were extracted, along with data on h-index based on citation frequencies of individual *ST-OPEN* articles. Citing articles were further analyzed to determine which *ST-OPEN* articles received the highest number of citations.

For Web of Science, citation data were retrieved by exporting all articles that cited *ST-OPEN* articles from the WoS Core Collection. The total number of citations per year and per article was tabulated using the TC (Times Cited) field. The h-index was calculated similarly as for the other sources.

All metrics were calculated manually in a spreadsheet. Final values were verified by cross-referencing citing article metadata, citation distributions, and matching articles to determine citation origins.

The full dataset is available in Zenodo (<https://doi.org/10.5281/zenodo.17332049>).

## Results

Between 2020 and 2024, *ST-OPEN* published a total of 75 articles (**Table 1**), which received 95 citations in Google Scholar as of 2025. This yielded an average of 1.27 citations per article. The journal's h-index and g-index were both 5 in Google Scholar, reflecting a small but consistent number of well-cited articles. An estimated 20% of all citations were self-citations from other *ST-OPEN* articles in Google Scholar. The highest simulated IF was in 2022 (0.261), with lower values in 2023 (0.125) and 2024 (0.250). Citations continued to grow in 2025.

**Table 1.** Annual publication and citation metrics for *ST-OPEN* articles in Google Scholar, 2020–2025\*

| Year | Number of articles | Cumulative number of articles | Number of citations | Cumulative number of citations | IF    |
|------|--------------------|-------------------------------|---------------------|--------------------------------|-------|
| 2020 | 15                 | 15                            | 2                   | 2                              | NA    |
| 2021 | 12                 | 27                            | 18                  | 20                             | NA    |
| 2022 | 14                 | 41                            | 20                  | 40                             | 0.261 |
| 2023 | 20                 | 61                            | 17                  | 57                             | 0.125 |
| 2024 | 14                 | 75                            | 29                  | 86                             | 0.250 |
| 2025 | –                  | –                             | 9                   | 95                             | –     |

\*Articles published in 2025 were not included in the analysis.

The most cited articles were in social or interdisciplinary sciences in Google Scholar (**Table 2**).

**Table 2.** Most cited articles and their corresponding scientific fields in *ST-OPEN* in Google Scholar, 2020–2025

| Article                                                                                                            | Number of citations | Corresponding scientific fields                                                                          | Scientific area            |
|--------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------|----------------------------|
| Moral Foundations Theory in the Context of a Political Scandal (15)                                                | 7                   | Social Sciences, Psychology, Political Science, Philosophy, ethics and religion                          | Social sciences            |
| Sex Estimation from Handprints in a Croatian Population Sample (16)                                                | 7                   | Medical and Health Sciences, Health sciences, Interdisciplinary Sciences                                 | Interdisciplinary Sciences |
| Forensic investigation of a mass grave at Ovčara, near Vukovar, of victims killed by the Serbian army in 1991 (17) | 7                   | Engineering and Technology, Medical and Health Sciences, Medical engineering, Interdisciplinary Sciences | Interdisciplinary Sciences |
| The Breivik Case and the Comparative Issues of Criminal (In)Sanity (18)                                            | 5                   | Social Sciences, Psychology, Law                                                                         | Social sciences            |
| Explaining Students' Test Anxiety and Depression (19)                                                              | 5                   | Social Sciences, Psychology                                                                              | Social sciences            |

Considering Scopus-indexed journals, they cited *ST-OPEN* articles 49 times since 2021 (5 times in 2021, 10 times in 2022, 6 times in 2023, 15 times in 2024 and 13 times until 30 August 2025). Based on this dataset, the journal's h-index in Scopus database was 2, indicating that two articles had received at least two citations each.

Between 2020 and 2024, 33 *ST-OPEN* articles were cited 42 times in Web of Science-indexed journals: 13 in 2020, 7 in 2021, 3 in 2022, 6 in 2023, and 4 in 2024. The top two most cit-

ed *ST-OPEN* articles in Web of Science addressed chemical aspects of thermogravimetric analysis (20) (4 citations) and sex estimation from handprints in a Croatian population (16) (3 citations).

## Discussion

The analysis of *ST-OPEN*'s early citation trajectory across Google Scholar, Scopus, and Web of Science provides a snapshot of how a new, multidisciplinary, university-based open access journal performed with respect to its impact in its first five years. With a total of 75 articles published between 2020 and 2024 and 95 citations as of 2025, *ST-OPEN* has achieved an average of 1.27 citations per article. While these values are modest, they are consistent with expectations for small, young, multidisciplinary, diamond open access journals, which typically accumulate citations more slowly than established or field-specific outlets (21–24). The simulated IF values derived from Google Scholar data (0.261 in 2022, 0.125 in 2023, and 0.250 in 2024) highlighted the inherent volatility of early bibliometric indicators. Previous studies have noted that debut journal IFs in the Web of Science often fluctuate due to small publication volumes (24) and the disproportionate effect of one or two highly cited articles on the overall average (25). In the case of *ST-OPEN*, the most cited articles, such as those on forensic investigations (17) and sex estimation from handprints (16), and the one from social sciences that dealt with moral foundations theory in the context of a political scandal (15), each received seven citations, which significantly influenced the journal's h-index of 5. The predominance of self-citations ( $\approx 20\%$ ) also reflects a common pattern observed in new or specialized outlets, where the limited size of the corpus leads authors to reference related work published in the same journal (26). Comparing across data sources, the Scopus and the Web of Science identified 49 and 33 citations, respectively starting from 2021, with a gradual increase through years.

The finding that *ST-OPEN*'s early citation indicators remained below 1.0 aligns with patterns observed for many small, university-based, and non-commercial journals. Scholarly analyses and publisher reports suggest that debut IFs for such journals often fall in the 0.3–0.8 range before stabilizing over time (27). For such small journals, sustained editorial development, visibility in international databases, and the ability to attract submissions from broader scholarly networks are critical for long-term growth (28–30). *ST-OPEN* has addressed these issues by enlarging its editorial board with experts from SEA-EU University Alliance, including active recruitment of submissions among early career researchers and their supervisors. We also introduced a special section on registered protocols, with the aim to stimulate preregistration of studies and thus promote research reproducibility (31).

## Limitations

This study has several limitations. First, the citation data were collected manually from Google Scholar, Scopus, and Web of Science, which may introduce inaccuracies in matching the citing and cited documents, including the possibility that some citations were overlooked and that there may be some time-lag in recording citations. Second, the coverage

varied substantially between databases: Google Scholar includes a wide range of non-peer-reviewed content, while Scopus and Web of Science are highly selective, leading to differences in citation counts. Third, simulated impact factors are highly sensitive to small publication numbers and should not be interpreted as equivalent to official JCR metrics. We used the IF formula from the Web of Science to estimate the IF of the journal in other two databases, which have different coverage and methodological approaches to calculating the impact factor. However, we believe that there is correlation among the estimated IFs in all databases. Finally, the analysis focuses only on citations and does not account for alternative measures of impact such as downloads, altmetrics, or engagement within local research communities.

## Conclusion

*ST-OPEN* has demonstrated early visibility with modest citation indicators, consistent with its profile as a new/young, multidisciplinary, university-based diamond open access journal. For *ST-OPEN*, the trajectory of its citation impact suggests cautious optimism. Its citation profile demonstrates that, despite the absence of indexing in major bibliographical/citation databases, the journal is already being cited in both domestic and international outlets. The diversity of topics, ranging from forensic anthropology to political science, reflects its multidisciplinary mission but may also diffuse citation concentration, thereby limiting short-term metric growth. Strategies that could support further development include increasing international collaborations, encouraging review articles or methodological articles that typically attract higher citation rates, and pursuing inclusion in Scopus and Web of Science indexes that provide formal bibliometric visibility.

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**Provenance:** Internally solicited.

**Received:** 8 September 2025 / **Accepted:** 14 October 2025 / **Published online:** 31 October 2025.

**Peer review:** Externally peer reviewed.

**Availability of data:** The raw data for this study are available in Zenodo (<https://doi.org/10.5281/zenodo.17332049>).

**Funding:** No funding was received for this study.

**Authorship declaration:** AM and ŽB gave the idea for the study, ŽB and DG collected the data, ŽB analyzed the data, ŽB, DG, AM interpreted the data for the study, drafted the manuscript and gave final approval for its publication. All authors take full accountability for the work and the manuscript.

**Disclosure of interest:** The authors have completed the ICMJE disclosure of interest form (available on request from the corresponding author) and declare that ŽB and AM volunteer as Co-editors in Chief of *ST-OPEN* and DG is employed as the Technical Editor of *ST-OPEN*. To ensure the integrity of the review process, the article has been reviewed in accordance with the guidelines and processes suggested by the Committee on Publication Ethics.

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