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Introduction of the True Impact Function (TIF) and the Journal Integrity Score (JIS) for Scholarly Journal Bibliographic Analysis

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Abstract

Scholars place their completed studies in the public view so that they can be read and utilized by others, particularly by those in the same or similar fields. However, many barriers exist to prevent others from learning of the research effort. Article processing charges (APCs) are increasingly utilized by publishing houses to enable any reader access to work at no cost; however, authors must pay the fee. This Gold Open Access model is increasingly becoming the standard for academic publishing, with costs often ranging from $3,000 to $10,000 for exclusive journals. By comparison, if a publisher adheres to the Diamond Open Access model, the cost to both authors and readers is $0, enabling scholarly work to be accessed without barrier worldwide. Another issue is the lack of a transparent database to check journal ease-of-access and integrity. To address these challenges, the True Impact Function™ (TIF)—a real-time, dynamic calculation of citations per article—and the Journal Integrity Score™ (JIS), a 7-bit binary metric evaluating journal transparency and ease-of-use, are introduced. The JIS evaluates seven "pillars" of publishing: retraction history, formatting standards, word/figure limits, metadata entry requirements, decision speed, copyright retention, and APC costs. The utility of these tools is demonstrated by comparing a TIF snapshot (analysis - April 2026) against traditional metrics, including the Journal Impact Factor™ (JIF), for journals within the Cardiac & Cardiovascular category of the Journal Citation Reports™ (Clarivate Plc).

Keywords: bibliographic, citations, Harzing's Publish or Perish, Impact Factor, OpenAlex

Introduction

Publishing scholarly research, reviews, and commentary is important to academics and allied professionals. The Gold Open Access model has been promoted to improve article accessibility – i.e., no charges are imposed for journal readers [1]. Yet, this shifts the publication costs to authors, institutions, and granting agencies. For example, grant recipients for a major American funding agency, the National Institutes of Health (NIH), spend an estimated 0.8% of their total direct grant costs on article processing charges (APCs) and other publication fees [2]. Investigators pay about $3,000 per article on average, and up to $13,000 [3]. Pricing has risen well beyond the inflation rate [4]. Total

NIH investigator spending on APCs and related fees is estimated at $300 million - $1 billion annually. In one study, 16% of investigators paid the APCs from their personal funds [5].

Two major concerns have been raised in relation to APCs: 1. the inability of poorly funded authors to publish research, and 2. their impact on journal quality [6]. In part to ameliorate these issues, Australia's largest medical research funder has suggested that the disclosure of payments to publishers should be mandated in the published article [7]. The NIH has imposed some payment limits beginning in 2026. Yet besides the APC, authors face additional hurdles to publishing in terms of preparing their article for journal submission [8]. Formatting a manuscript to meet specific journal guidelines (e.g., citation style, word counts, and figure resolutions) can take hours to days. The physical act of filling out web forms, uploading files (cover letters, declarations of interest, and raw data), and assigning author roles in a submission portal requires many minutes to hours for successful completion. Once submitted, a technical editor often performs similarity checks and ensures that all ethical declarations and metadata are complete before officially assigning a manuscript number, which may take days. If the manuscript fails the technical check, it is sent back to the authors, sometimes multiple times. In Figure 1 these concepts are examined in illustrated form.

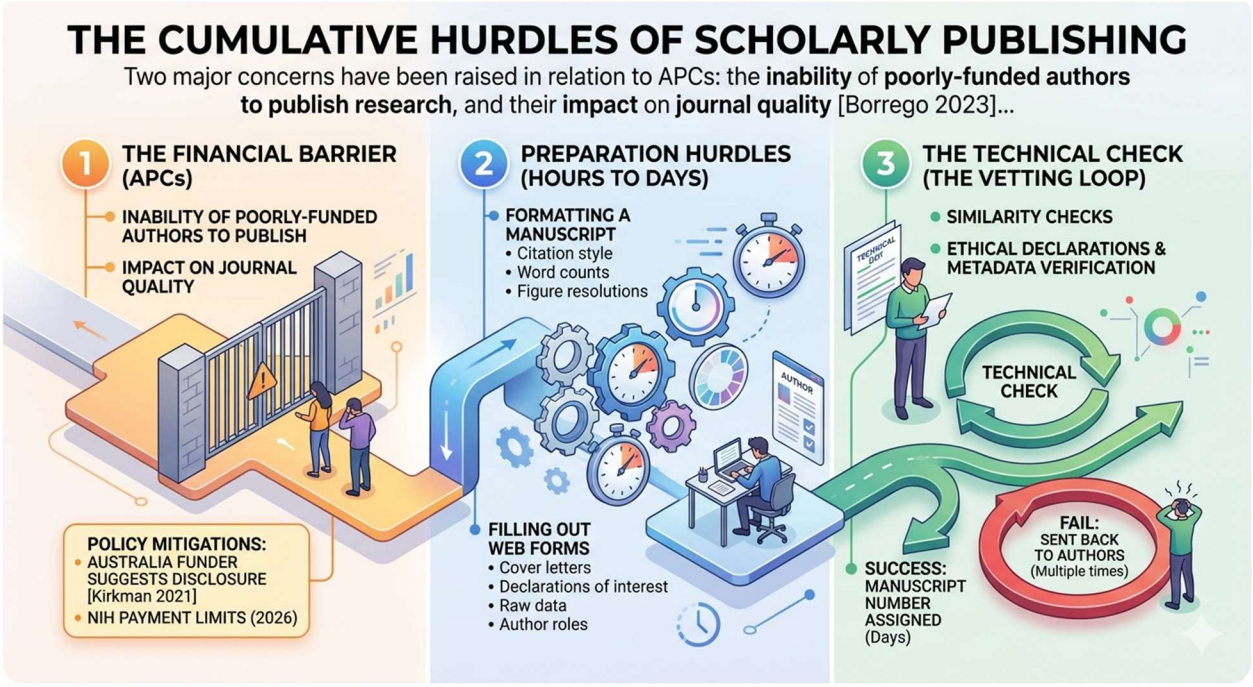

Figure 1 The Cumulative Hurdles of Scholarly Publishing. This figure illustrates the primary financial and administrative barriers currently faced by research investigators during the publishing process.

The Financial Gate represents the APC barrier, particularly their impact on poorly funded authors and journal quality, alongside evolving policy responses like the 2026 NIH payment limits. The Preparation Slope visualizes the hours lost per manuscript submitted to journal-specific formatting (citations, resolutions) and the minutes to hours required for portal tasks like metadata entry and role assignment. The Technical Loop depicts the cyclical nature of technical vetting—including similarity and ethical checks—which often requires multiple pre-revisions before a manuscript number is assigned [5].

To maximize scientific output, hurdles and barriers to publishing should be minimized. The Diamond Open Access model – i.e., all articles are published free of charge to the authors, and they are free to read without paywalls, cost: $0, would be ideal. Likewise, ease-of-use for authors in the manuscript submission process is sorely in need of improvement. To these ends, two mathematical formulations have been devised and are described below to assess journal quality and integrity. These were initially published in brief form elsewhere [9, 10].

Method

True Impact Function

The True Impact Function™ (TIF) was developed to assess journal quality with real-time update – i.e., it reflects immediacy and velocity. Broadly, it is defined as the total number of citations received by all journal articles in an index year, scaled by number of articles published by the time since publication. This is mathematically implemented in the CAT (Citations–Articles–Time) equation:

$$TIF = \frac{C}{A * T} \; in \; units \; of \; \frac{citations}{article * year}$$

where C is the total number of citations received by all journal articles in the indexed year, A is the number of articles published during that year, and T is the mean time since their publication. As a standard, for current year X, the index year is X - 2 which, at the time of writing in April 2026, the index year X - 2 is 2024. During 2024, for any given journal, the number of articles A and their total number of citations C, up to the day of analysis, are determined. T can be calculated directly, or supposing a uniform distribution, the mean time of publication can be approximated as the midpoint in the year 2024. Mid-2024 to onset of 2026 equals a time duration of 1.5 years. At the start of April 2026, another ¼ year has passed, thus:

$$T = 1.5 + 0.25 = 1.75 \; years$$

T is written more precisely as:

$$T = 1.5 + \frac{(day \; number)}{365} \; in \; years$$

where the quantity 1.5 is the midpoint from the index year to the start of the current year, in units of years.

As an example of the TIF calculation, if a journal publishes 100 articles in 2024, each having been cited 2x by April 2026, and using a mean time since publication T = 1.75 years:

$$TIF = \frac{200}{100 * 1.75} = 1.14 \frac{citations}{article * year}$$

The TIF is readily calculated from available sources. For this article, Harzing's Publish or Perish (PoP) was utilized (Tarma Software Research Ltd, 2025). It was set to pool OpenAlex, Years 2024 – 2024. OpenAlex offers an open replacement for industry-standard scientific knowledge bases, i.e., there is no paywall [11]. The cost to use both these resources was $0. These bibliographic research tools include many article types. From the resulting list of published articles in PoP, included in the TIF calculation are: research articles, reviews, editorials, commentary, rapid and brief communications, letters, case reports, and images. Excluded from the assessment are other content such as: abstracts, tables of contents, issue information, board of directors, withdrawal notices, retraction notices, editorial information, corrigendum, erratum, reply or response by authors, and comment on or commented on.

Consider the journal Informatics in Medicine Unlocked (Elsevier B.V.), which is not currently indexed in the Journal Citation Reports (JCR) nor in the Web of Science Core Collection - hence it does not have a JIF (Clarivate Plc). However, OpenAlex includes information from all journals with ISSNs / e-ISSNs. The e-ISSN for Informatics in Medicine Unlocked is 2352-9148. Using this number to identify the journal in POP, and including only those types of articles accepted in the TIF calculation as described above, for the index year 2024, 162 papers were published, which had 1842 cites at the time of writing of this article. Hence:

$$TIF = \frac{1842}{162 * 1.75} = 6.50 \frac{citations}{article * year}$$

TIF as calculated by the CAT equation enables real-time update of journal citations per article. Thus, the day of

calculation should be included in the assessment. As the year progresses, TIF changes because it is a velocity, i.e., a real-time update, and therefore, for journals comparison, it should be computed for all journals in the category being evaluated. At the start of each calendar year, for the standard method of calculation, a new assessment year X - 2 begins. Hence, the metric should be reported as Year X TIF, currently 2026 TIF, and analysis date. It may also be used to assess journals for other years and ranges of years, if those parameters are provided with the assessment. For example, to evaluate journals by their more recently published articles, the indexing year could be set to 2025. Supposing a uniform publishing distribution, the approximation mean time from publication would be:

$$T = 0.5 + \frac{(day\ number)}{365}\ in\ years$$

for appraisal during 2026. TIF will be lower valued as compared with an index year of 2024, since the total number of citations C will be smaller. Similarly, the range could be increased, for example, a two-year range of 2023-2024 instead of 2024. Then, supposing a uniform distribution,

$$T = 2.0 + \frac{(day\ number)}{365}\ in\ years$$

where 2.0 represents the time in years from midpoint 2023-2024, i.e., the onset of 2024, to the onset of 2026, for TIF assessment during the year 2026. In this case TIF would be higher valued since T has increased. The index years should be reported as 2023-2024. Changing the range in years does not require a scale, since it is covered in the CAT equation by C/A. Thus, TIF may be interpreted as the average citation rate per article per year since publication.

Journal Integrity Score

The Journal Integrity Score (JIS) is a mathematical formulation of journal factors important to scholarly authors. It consists of a set of factors, or pillars, represented as a 7-bit binary code, described in Table 1.

Table 1: Description of the Journal Integrity Score

Bit	Description of bit	Value of 1	Value of 0
1	retractions	zero in last 12 months	otherwise
2	formatting	standard/simple	otherwise
3	limits	no word or figure limits	otherwise
4	forms	no manual metadata re-entry at submission	otherwise
5	speed	≤ 21 days to first decision	otherwise
6	copyright	author retains copyright and article is distributed under an open reuse license, e.g., CC BY	otherwise
7	cost	$0 APC / Diamond Open Access	otherwise

For authors, bit 1 is important because if a journal has substantial retractions, it suggests that the editors may be failing to correctly appraise the incoming submissions. Any author should desire their work to be well appraised to prevent a retraction of their own paper from occurring. Bit 2 evaluates the formatting required for submission. When the author decides the format, so long as it adheres to conventional standards, such as having as sections: Abstract, Introduction, Method, Results, Discussion, and Conclusions for most articles, without further stipulations, it represents ease-of-use. Furthermore, when figure, table, and word limitations are not imposed (Bit 3) it simplifies the article draft. Upon decision, reviewers and editors may then suggest personalized limitations according to their expertise and familiarity with the topic. Bit 4 describes the additional process of re-entering, during submission, the same data present on the Title page – it is redundant, takes time, and helps the publisher but not the author. Bit 5 sets a cut-point for rapid turnaround of the manuscript, rather than not knowing as weeks go by when a decision

may be made. When the authors retain copyright (Bit 6) they can reuse or republish their article, so long as the original article is referenced. Bit 7, the cost, is $0 for Diamond Open Access, versus an average of $3,000 currently and as high as $10,000+ for elite journals. The seven components were selected to represent core dimensions of author burden, transparency, and accessibility. Equal weighting is used for interpretability; future work may explore weighted or continuous variants.

JIS components were determined through structured review of journal policies, supplemented by AI-assisted retrieval for efficiency, with manual verification. As an example, one of the highest citing journals in the field of heart research, Nature Reviews Cardiology (Springer Nature / Nature Portfolio), has a JIS binary code of 1000000, as described in Table 2. Similarly, the JIS binary code can readily be determined for other journals.

Table 2: Binary Code Breakdown - Nature Reviews Cardiology

Bit	Description of bit	Value	Description
1	retractions	1	zero retractions in last 12 months
2	formatting	0	adheres to specific Nature Portfolio house styles, including precise typography
3	limits	0	strict word and figure limits
4	forms	0	manual metadata entry (such as author details and abstracts)
5	speed	0	often > 21 days, rigorous commissioning
6	copyright	0	publisher retains certain rights
7	cost	0	subscription model or requires APC

Results

An example research category was appraised for TIF and JIS scoring using JCR as a reference, which only lists journals indexed in their system. The category selected for appraisal was: Cardiac & Cardiovascular Systems, and the JCR query found 231 journals listed under this heading. After removing journals not having published in the index year 2024, or that did not have a valid e-ISSN, 224 journals remained, which were then assessed for TIF and JIS code via PoP / OpenAlex. The resulting list is provided in the Appendix, Table 3 (https://concettapress.net/appendices/Table_3_TIF_JIS.xlsx). The listing is ordered from highest to lowest TIF value. Included in the columns are the e-ISSN, JIS binary code, values C and A utilized in the CAT equation, with the value of T set to 1.75, and the TIF score. The TIF quartile was determined based on 224 appraised journals/4, and is so depicted. A graph of 2026 TIF versus 2024 Journal Impact Factor values obtained from the 2025 Journal Citation Reports release is shown in Figure 2 as a quantitative validation of the TIF metric. The values of JIF were obtained from Journal Citation Reports (Clarivate Plc). The regression line is described by:

$$JIF = 1.78 * TIF - 0.63$$

Using the Pearson Product Moment correlation (SigmaPlot for Windows ver. 15, 2022, Grafiti LLC), the coefficient of determination $r^2 = 0.87$ ($p<0.001$).

Discussion

Comparison of JIF versus TIF scores

In the Results section, Table 3, the journals for JCR category: Cardiac & Cardiovascular Systems were ordered by

2026 TIF, and for comparison, the corresponding 2024 Journal Impact Factor values obtained from the 2025 Journal Citation Reports release are shown. The definition of the JIF is (Clarivate Plc):

$$JIF\ (X) = \frac{\text{Citations in year X to items published in years } (\text{X}-1) + (\text{X}-2)}{\text{Total citable items published in } (\text{X}-1) + (\text{X}-2)}$$

where the current year during which the analysis is done is X + 1. Because JIF has a standard index interval of two years, and up-to-date information is not included, there is no factor T in the equation. The JIF, although it is calculated with Year X - 2, is presented as the score for a Year X being the previous full year, i.e., X = 2025 currently, and it is often announced mid-Year X+1. The 2025 JIF, due to be released in June 2026, will represent articles published in 2023 and 2024. Unlike JIF, which aggregates citations across two fixed prior years without temporal normalization, TIF explicitly incorporates elapsed time, enabling real-time estimation of citation velocity and responsiveness to emerging high-impact publications. The TIF includes all citations to the time of analysis.

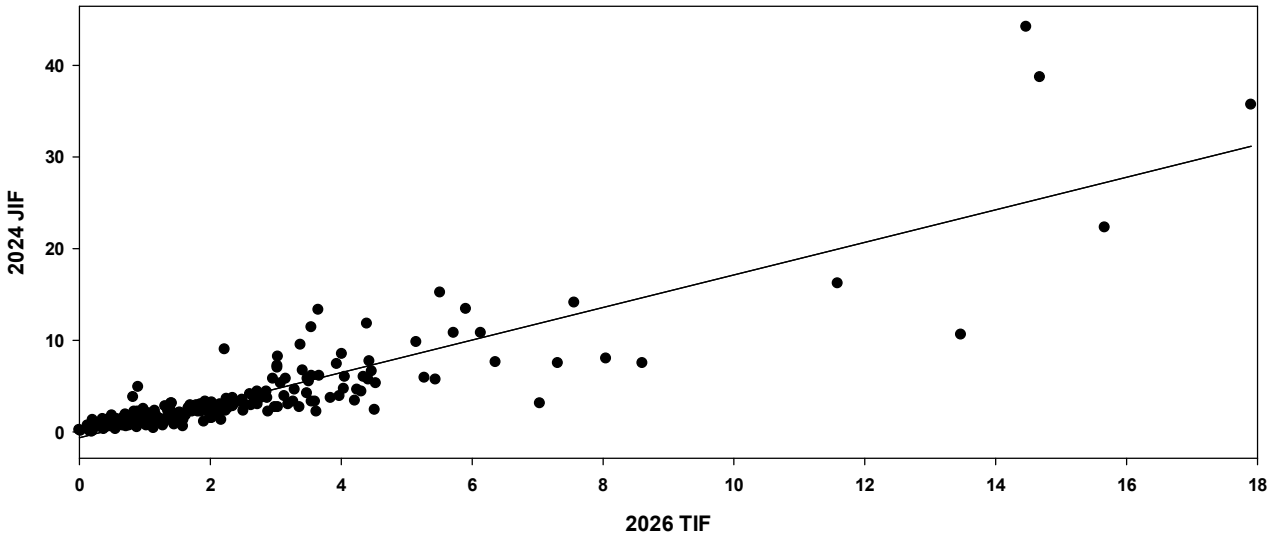

Figure 2 Scatterplot of 2024 JIF versus 2026 TIF. The regression line equation is JIF = 1.78 x TIF - 0.63. JIF data are sourced from the 2024 Journal Impact Factor values in the 2025 Journal Citation Reports release (Clarivate Plc).

The JIF includes citations from all sources indexed in Clarivate's Web of Science. The citable items consist of: original research articles, reviews, and proceedings papers. Non-citable items such as editorials, letters, and news items are generally excluded from the denominator, but their citations still count toward the numerator. Hence TIF and JIF represent different journal citation aspects, published in different time periods and for different index periods. TIF is calculatable at any time. Since TIF includes all citations to the present time it therefore serves as a velocity as well as a citation assessment. Articles from the index year that are recently high citing will be evident in the score. JIF is calculated once per year and is typically released in June.

Data repository for TIF and JIS

Table 3 represents a single, albeit large, JCR category (224 titles). A data presentation and repository website has been established so that readers can participate and present their own scores calculation using JCR research categories. Any submission will be validated for accuracy and, when so validated, will be included in the website repository. This resource, Ignatius Journal Services, has as its URL: https://ignatiusjs.net . Therein is contained an introduction and an explanation of the TIF score and the JIS binary code, as well as particulars concerning the goals of the project. Ignatius Journal Services will also act to provide a transparent platform for reporting and addressing publishing ethics and transparency concerns. TIF for various categories as listed in the JCR can be calculated by any scholars interested in the free access of journal bibliographic information, and those who are interested are invited

to consider calculating the scores for their topic(s) of expertise as listed in JCR. They are encouraged to include additional journals not listed in JCR but having an e-ISSN as part of their analysis. The JIS binary code can be accessed by checking the journal website or querying artificial intelligence (AI). The ultimate goal is to eventually include all journals with an e-ISSN / all categories, not just those listed in JCR, for assignment of a TIF score and JIS binary code, with timely update rather than just once per year, accessible to all free of charge. Scholars with additional ideas to poll information and to more efficiently calculate TIF and JIS are encouraged. For example, use of another citation database and/or an automation process could be assistive to more rapidly generate journal information.

Limitations

The TIF score was computed manually by polling OpenAlex via PoP, and the JIS binary code was determined via a structured review of journal policies. Although this information was carefully examined, the scores should be confirmed by others in subsequent analyses. The inclusion/exclusion of article types was done based upon articles oft-cited versus those that are not. Alternative inclusion criteria would slightly alter the resulting journal quality assessment. The uniform time approximation (midpoint assumption) for T is invalid for journals whose inauguration occurred during the index year. Then T should be approximated as the midpoint from journal onset to the end of the year, plus the subsequent time interval to the date of analysis. As an alternative for best accuracy, calculation of T can be done by ascertaining the date of publication of each article included in the analysis and then computing the mean time from publish date to the analysis date for all articles. The JIS represents a binary quantification of journal ease-of-use and integrity, designed for high-level screening rather than exhaustive qualitative review. Additional information, such as a description of how each bit was coded as 1 or 0, may be provided to the repository as a separate file.

Conclusions

AI has opened new avenues for bibliographic research, and it is able to provide concise information in readable form [12]. The combination of AI assistance with an emphasis on no-cost publication [13] and journal assessment, as described herein, provides potent tools for improving author experience and efficiency in the publishing of scholarly work. Two scores were introduced, the True Impact Function, and the Journal Integrity Score, the latter of which is written as a binary code. The scores measure journal quality and integrity, and can be updated at any time. The concept of a data repository to showcase this information was introduced, with the long-term goal being for it to be populated by scholar volunteers to keep costs low or ideally at $0. This resource potentially makes up-to-date publishing resources interpretable and accessible to all scholars, without the need to impose high costs or rules that make journal publishing a difficult experience. Ideally, it will enable research investigators to focus more on their research work and less on how to find a way to present it for public view.

The conclusions of this work are summarized in Figure 3. The Bibliographic AI Assistant shows the use of AI to generate concise, readable research information, streamlining the initial literature review phase. The Real-Time Assessment Engine illustrates the integration of the True Impact Function and Journal Integrity Score, the latter of which operates as a binary code to provide immediate transparency regarding journal quality. The Scholar-Led Data Repository details a volunteer-populated, $0 cost publication model [13] that removes formatting hurdles and financial barriers, allowing investigators to focus exclusively on research production.

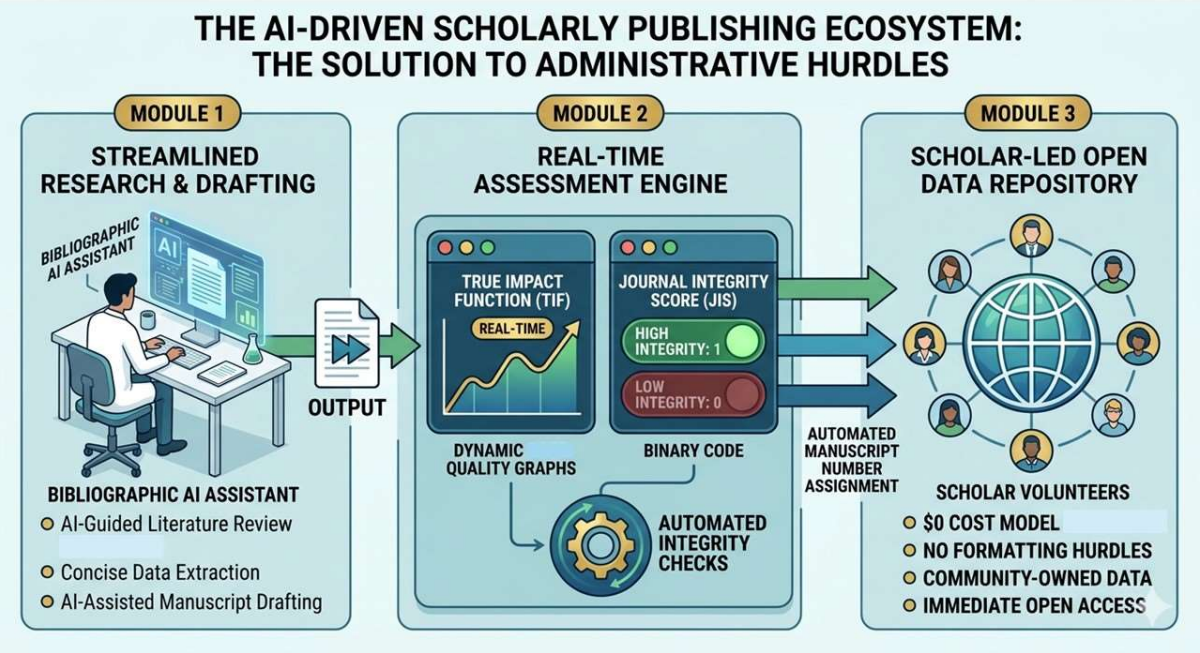

Figure 3 The AI-Driven Scholarly Publishing Ecosystem. This figure presents a proposed model for a streamlined, AI-driven publishing framework designed to maximize author efficiency and research accessibility.

Conflicts of Interest

None.

Acknowledgements

Journal Citation Reports™ and Journal Impact Factor™ (JIF) are trademarks of Clarivate Plc and are used herein for comparative bibliometric research purposes only. All rights reserved. The author gratefully acknowledges the assistance of OpenAI's ChatGPT (GPT-5) and Google AI in editorial review and linguistic refinement. Some figures in this work were conceptualized and drafted with the assistance of Google AI.

Data Availability

The comparative metrics analyzed in this study were derived from the 2024 Journal Impact Factor values obtained from the 2025 Journal Citation Reports™ release (Clarivate Plc). While the authors have provided a graphical representation of the relationship between the True Impact Function™ (TIF) and the Journal Impact Factor (JIF), the raw underlying JCR data are proprietary to Clarivate and were accessed under institutional license. Researchers wishing to replicate this analysis may access the original data via Web of Science™.

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