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Journal Citation Reports: Understanding Rank Proportions, Quartile Boundaries, and the 2025 Retraction Citation Policy

Maen Mahfouz

clinicaiorthodontic@gmail.com

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Abstract

Purpose: Journal Citation Reports (JCR) from Clarivate provides annual rankings of scholarly journals through Journal Impact Factor (JIF) quartiles and percentiles. These metrics are widely used in research evaluation, funding decisions, and academic promotion across all scientific disciplines. Despite their institutional significance, persistent misunderstandings remain regarding the precise mathematical derivation of quartile boundaries, the distinction between rank proportion and percentile measures, and the implications of the June 2025 policy reform that excludes retracted citations from JIF numerators—a fundamental methodological change that has not yet been systematically analyzed in the scientometrics literature. This study addresses these gaps by providing the first consolidated methodological synthesis of JCR quartile mathematics, systematically distinguishing between quartile classification and JIF Percentile calculation, and presenting the first detailed analysis of the 2025 retraction citation exclusion policy.

Methods: A documentary research design was employed, comprising systematic collection, critical evaluation, and synthetic analysis of primary and secondary sources. Primary sources comprised official Clarivate technical documentation accessed through the Clarivate Scientific and Academic Research support portal in March 2025, including the definitive specification of quartile and percentile calculation methodologies. Secondary sources comprised five institutional research guides from major universities, peer-reviewed editorial commentary, independent bibliometric analysis, and foundational scientometrics literature. Analytical procedures proceeded in three stages: (1) extraction and verification of the rank proportion formula ($Z = X/Y$) and quartile boundary definitions; (2) extraction and verification of the JIF Percentile formula $(N - R + 0.5)/N \times 100$ and analysis of its mathematical relationship to quartile classification; and (3) synthesis of policy specifications, rationale, estimated effects, and potential implications of the 2025 integrity reform.

Findings: Three principal findings emerge. First, JCR quartile assignment follows a precise mathematical specification with rank proportion ($Z = X/Y$) and strict boundary definitions invariant across all subject categories and publication years: Q1 ($0.0 < Z \leq 0.25$), Q2 ($0.25 < Z \leq 0.5$), Q3 ($0.5 < Z \leq 0.75$), and Q4 ($0.75 < Z$). Borderline cases at $Z = 0.25$ and $Z = 0.50$ are explicitly classified as Q1 and Q2 respectively. Derived quantile rankings—terciles, quintiles, and deciles—can be mathematically consistently generated using the identical rank proportion convention, although these are not officially published or endorsed by Clarivate. Second, JIF Percentile provides granular, cross-categorically comparable information that quartile classification necessarily discards. The formula $(N - R + 0.5)/N \times 100$ transforms discrete rank positions into a continuous 0–100 distribution. Because rank proportion (Z) increases with descending rank position, quartile boundaries inversely correspond to percentile thresholds. Third, the June 2025 Clarivate policy excludes citations to and from retracted articles from JIF numerators while retaining retracted articles in denominators. This represents the first formal encoding of integrity considerations into JIF methodology. The policy applies exclusively to JIF calculation and does not affect CiteScore, h-index, or other researcher-level metrics. Approximately 1% of JCR-indexed journals are expected to experience measurable JIF changes with minimal anticipated rank displacement. A potential unintended

consequence—that increasing the negative JIF impact of retractions may inadvertently disincentivize retractions—is balanced against Clarivate's stated position that failure to retract compromised content risks journal delisting.

Conclusion: This study provides the first methodological synthesis in the peer-reviewed scientometrics literature of JCR quartile mathematics, JIF Percentile calculation, and the 2025 integrity reform. Quartile assignment follows a precise rank proportion specification (Z = X/Y) that can be explicitly articulated and applied across all category sizes. JIF Percentile provides continuous cross-categorically comparable information that quartile classification necessarily discards; researchers and evaluators should consult percentiles, not merely quartiles, when fine-grained differentiation is required. The 2025 integrity reform represents one of the most consequential methodological changes in the Journal Impact Factor's history, formally acknowledging that how citations are accumulated matters as much as how many. This work provides researchers, evaluators, librarians, and bibliometricians with an authoritative technical reference for understanding both established JCR metrics and transformative policy changes.

1. INTRODUCTION

Since 1975, the Journal Citation Reports (JCR) has provided an institutional framework for evaluating scholarly journals through citation-based metrics (Clarivate, 2022). Published annually by Clarivate Analytics, the JCR aggregates citation data from the Web of Science Core Collection—encompassing over 21,500 journals across 254 research categories in the sciences, social sciences, arts, and humanities (Clarivate, 2023). The Journal Impact Factor (JIF), calculated as the ratio of citations received in a given year to citable items published in the preceding two years, remains the most widely recognized journal-level metric despite sustained critiques regarding its appropriate application (University of the Sunshine Coast, 2025).

Absolute JIF values acquire interpretive significance only through comparative contextualization. A JIF of 9.052, for example, acquires meaning through rank position—the British Medical Journal's ranking of sixth among 105 journals in general and internal medicine—or through comparison to the aggregate impact factor of 4.326 for its field (Queensland University of Technology, 2025). This recognition has elevated quartile classification and percentile ranking to primary status in research evaluation protocols internationally (Bar-Ilan University Library, 2025).

Despite substantial institutional reliance on JCR quartile metrics, significant gaps persist in the accessible literature. First, existing guidance materials—predominantly library research guides and vendor documentation—present quartile definitions descriptively rather than mathematically, obscuring the precise rank proportion calculation that determines category placement (Universiti Teknologi PETRONAS, 2016; Universiti Teknologi Malaysia, n.d.). Second, the relationship between quartile classification (four discrete categories) and JIF Percentile (a continuous 0–100 distribution) remains underspecified; many investigators remain unaware that JIF Percentile permits cross-category comparison while quartiles do not (Clarivate, 2022). Third, derived quantile rankings (terciles, quintiles,

deciles) that institutions frequently employ for research evaluation are not officially published by Clarivate, yet no consolidated guidance exists regarding their mathematically consistent derivation from the rank proportion convention.

The existing literature has not substantively addressed the most consequential methodological reform to JIF calculation in recent decades. In June 2025, Clarivate announced that citations to and from retracted or withdrawn articles would be excluded from JIF numerators, while retracted articles themselves would remain in denominators to preserve transparency (Murphy et al., 2025). This policy—implemented in the 2025 JCR release—represents a formal integration of integrity considerations into journal impact metrics. To the author's knowledge, no methodological analysis of this reform has yet appeared in the scientometrics or bibliometrics literature.

The central research problem addressed by this study is the absence of a consolidated methodological synthesis that: (a) articulates the precise mathematical specification of JCR quartile assignment; (b) systematically distinguishes between quartile classification and JIF Percentile calculation; and (c) analyzes the technical specifications, estimated effects, and implications of the June 2025 Clarivate retraction citation policy.

2. RESEARCH QUESTIONS

This study addresses three research questions:

1. What is the precise mathematical specification of JCR quartile assignment, and how can derived quantile rankings (terciles, quintiles, deciles) be consistently generated from this specification?
2. How do quartile classification and JIF Percentile differ mathematically, and what are the implications of these differences for research evaluation practice?
3. What are the technical specifications, estimated effects, and potential implications of the June 2025 Clarivate policy excluding retracted citations from JIF numerators?

3. METHODOLOGY

3.1 Research Design

This study employed a documentary research design, comprising systematic collection, critical evaluation, and synthetic analysis of primary and secondary sources pertaining to JCR metric calculations and the 2025 retraction citation policy. This approach was selected because the research questions concern technical specifications of proprietary metric calculations and analysis of a recent policy implementation for which empirical citation data are not yet publicly accessible.

3.2 Source Identification and Selection

Source Identification: A systematic search of Clarivate documentation, institutional research guides, and peer-reviewed literature was conducted in March 2025. Primary sources were identified through the Clarivate Scientific and Academic Research support portal. Secondary sources were identified through Google Scholar and PubMed using search terms: "Journal Citation Reports," "JCR quartile," "JIF percentile," "journal metrics," "retraction policy," "Clarivate integrity," and "percentile bibliometrics."

Inclusion Criteria: Sources were included if they: (a) provided direct technical specification of JCR quartile or percentile calculation methodology; (b) provided official documentation of the 2025 retraction citation policy; or (c) constituted editorial commentary or independent analysis of either JCR methodology or the 2025 policy reform.

Exclusion Criteria: Sources were excluded if they: (a) discussed journal metrics without specific reference to JCR calculation methodology; (b) discussed retraction practices without reference to the 2025 Clarivate policy; or (c) constituted non-authoritative third-party descriptions lacking citation of primary sources.

Final Source Set: Primary sources comprised Clarivate (2022) technical documentation and Clarivate (2023) statistical infographic. Secondary sources comprised five institutional research guides (University of the Sunshine Coast, 2025; Queensland University of Technology, 2025; Universiti Teknologi PETRONAS, 2016; Universiti Teknologi Malaysia, n.d.; Bar-Ilan University Library, 2025), editorial commentary (Murphy et al., 2025), independent bibliometric analysis (Journalology, 2025), and foundational scientometrics literature (Garfield, 1972; Hicks et al., 2015; DORA, 2012; Waltman & Schreiber, 2013).

3.3 Analytical Strategy

Analyses proceeded in three stages corresponding to the study's research questions.

Stage 1: Technical Exposition of Quartile Mathematics. The rank proportion formula ($Z = X/Y$) and quartile boundary definitions were extracted and verified from Clarivate (2022) documentation. Borderline case classification was verified through provided examples. Mathematically consistent specifications for terciles, quintiles, and deciles were derived using the identical rank proportion convention.

Stage 2: Distinction Between Quartile and Percentile Metrics. The JIF Percentile formula $(N - R + 0.5)/N \times 100$ was extracted from Clarivate (2022) and verified through provided examples. The mathematical relationship between quartile classification and JIF Percentile was analyzed, demonstrating the inverse correspondence between rank proportion and percentile thresholds.

Stage 3: Analysis of the 2025 Integrity Reform. Primary announcements from Clarivate (Murphy et al., 2025), editorial analysis (Murphy et al., 2025), and independent bibliometric commentary (Journalology,

2025) were synthesized to construct a comprehensive account of the policy's technical specifications, rationale, estimated effects, and potential implications.

3.4 Limitations

This study is subject to several limitations. First, analysis of the 2025 retraction policy relies on Clarivate's published specifications and independent commentary; empirical analysis of actual JIF changes must await release of full 2025 JCR data and subsequent bibliometric investigation. Second, technical exposition of quartile and percentile mathematics is derived from official Clarivate documentation but has not been independently validated against proprietary JCR calculation algorithms. Third, this study is restricted to JCR metrics and does not provide comparable technical exposition of Scopus-based metrics (CiteScore, SJR, SNIP). Fourth, the 2025 policy applies exclusively to JIF calculation; researcher-level metrics (h-index, citation counts) and other journal metrics (CiteScore) continue to include retracted papers and citations to them.

4. RESULTS

4.1 JCR Quartile Assignment Specification

4.1.1 Rank Proportion Calculation

Official Clarivate documentation establishes that quartile rankings in Journal Citation Reports are determined through a two-step procedure (Clarivate, 2022). First, journals within each subject category are sorted in descending order by Journal Impact Factor. Second, each journal receives a rank proportion calculated as:

Rank Proportion (Z) = X / Y

Where:

- *X = journal rank position within category (descending order by JIF; 1 = highest JIF)*
- Y = total number of journals in category

This rank proportion (Z) is a descriptive positional measure, not a statistical Z-score. Clarivate documentation employs "Z" as a variable designation without implying standardization to mean zero or unit variance.

4.1.2 Quartile Boundary Definitions

Quartile assignment follows strict boundary definitions invariant across categories and publication years (Clarivate, 2022). As shown in Table 1, the quartile boundaries are defined by specific rank proportion ranges, with corresponding JIF Percentile thresholds and category positions.

Table 1
JCR quartile boundary definitions and rank proportion ranges

Quartile	Rank Proportion (Z) Range	JIF Percentile Range	Category Position
Q1	0.0 < Z ≤ 0.25	> 75.0	Top 25%
Q2	0.25 < Z ≤ 0.5	> 50.0 to ≤ 75.0	25–50%
Q3	0.5 < Z ≤ 0.75	> 25.0 to ≤ 50.0	50–75%
Q4	0.75 < Z	≤ 25.0	Bottom 25%

Note: Z = X/Y where X = journal rank position, Y = total journals in category. This is a descriptive rank proportion, not a statistical Z-score. Source: Derived from Clarivate official documentation (Clarivate, 2022).

4.1.3 Borderline Case Classification

Boundary definitions establish that Z = 0.25 and Z = 0.50 are classified as Q1 and Q2 respectively. Official examples confirm this interpretation (Clarivate, 2022):

- Rank 78 of 314: Z = 78/314 = 0.248 → Q1 journal
- Rank 102 of 204: Z = 102/204 = 0.5 → Q2 journal

4.1.4 Derived Quantile Rankings

Clarivate documentation explicitly states that "Journal Citation Reports does not provide any other official quantile rankings" while authorizing that "using the same convention, other quantile rankings such as terciles, quintiles, and deciles can be derived as follows" (Clarivate, 2022). Table 2 presents these mathematically consistent derived rankings. These are theoretical derivations; Clarivate does not officially publish or endorse these classifications.

Table 2
Derived quantile rankings from JCR rank proportion convention

Quantile	Ranking	Rank Proportion Range	Cumulative Percentage
Terciles	T1	$0.0 < Z \leq 0.3333$	Top 33.33%
	T2	$0.3333 < Z \leq 0.6667$	33.33–66.67%
	T3	$0.6667 < Z$	Bottom 33.33%
Quintiles	QU1	$0.0 < Z \leq 0.2$	Top 20%
	QU2	$0.2 < Z \leq 0.4$	20–40%
	QU3	$0.4 < Z \leq 0.6$	40–60%
	QU4	$0.6 < Z \leq 0.8$	60–80%
	QU5	$0.8 < Z$	Bottom 20%
Deciles	D1	$0.0 < Z \leq 0.1$	Top 10%
	D2	$0.1 < Z \leq 0.2$	10–20%
	D3	$0.2 < Z \leq 0.3$	20–30%
	D4	$0.3 < Z \leq 0.4$	30–40%
	D5	$0.4 < Z \leq 0.5$	40–50%
	D6	$0.5 < Z \leq 0.6$	50–60%
	D7	$0.6 < Z \leq 0.7$	60–70%
	D8	$0.7 < Z \leq 0.8$	70–80%
	D9	$0.8 < Z \leq 0.9$	80–90%
	D10	$0.9 < Z$	Bottom 10%

Note: Derived from Clarivate official documentation (Clarivate, 2022) using the identical rank proportion convention. These quantile rankings are not officially published or endorsed by Clarivate. Decimal values are exact boundary thresholds.

4.2 Quartile and Percentile Distinction

4.2.1 JIF Percentile Calculation

The Journal Impact Factor Percentile transforms a journal's rank position into a continuous percentile value, permitting more meaningful comparison across different categories (Clarivate, 2022). The formula is:

$$\text{JIF Percentile} = (N - R + 0.5) / N \times 100$$

Where:

- N = number of journals in category
- *R = descending rank position (1 = highest JIF)*

For the JIF Percentile, higher values indicate higher JIF relative to category peers. The + 0.5 adjustment prevents the top-ranked journal from receiving a percentile of 100% (which would imply performance exceeding all journals, including itself). Waltman and Schreiber (2013) provide comprehensive methodological analysis of such percentile-based indicators, noting that the + 0.5 adjustment is one of several possible approaches to handling the top-ranked case.

Official examples confirm the calculation (Clarivate, 2022):

- Rank 104 of 177: (177–104 + 0.5)/177 × 100 = 73.5/177 × 100 = 41.5 → 41.5 Percentile
- Rank 27 of 30: (30–27 + 0.5)/30 × 100 = 3.5/30 × 100 = 11.7 → 11.7 Percentile

4.2.2 Relationship Between Quartile and Percentile

Quartile classification represents a categorical compression of the continuous JIF Percentile distribution. Because rank proportion (Z) increases with descending rank position (higher Z = lower JIF), quartile boundaries inversely correspond to percentile thresholds. Table 3 provides a systematic comparison of the mathematical and practical distinctions between quartile classification and JIF Percentile.

Table 3
Comparative analysis: Quartile classification vs. JIF Percentile

Feature	Quartile Classification	JIF Percentile
Mathematical definition	Categorical assignment based on Z = X/Y	Continuous value: (N − R + 0.5)/N × 100
Range	4 discrete categories (Q1–Q4)	0–100 continuous scale
Cross-category comparability	Not valid — category-specific	Valid — normalized to percentile
Information retention	Low — compresses rank order	High — preserves rank differentiation
Borderline resolution	Discontinuous at Z = 0.25, 0.5, 0.75	Continuous across entire range
Example: Z = 0.10 (90.5%)	Q1	90.5
Example: Z = 0.24 (75.5%)	Q1	75.5
Example: Z = 0.26 (74.5%)	Q2	74.5
Example: Z = 0.49 (51.0%)	Q2	51.0
Example: Z = 0.51 (49.0%)	Q3	49.0
Example: Z = 0.74 (26.0%)	Q3	26.0
Example: Z = 0.76 (24.0%)	Q4	24.0
Primary use case	Rapid screening, broad categorization	Fine-grained differentiation, cross-field comparison

Note: Z = X/Y (rank proportion); N = category size; R = descending rank position. JIF Percentile values rounded to one decimal. Derived from Clarivate (2022) formulas.

4.2.3 Average JIF Percentile

For journals indexed in multiple JCR categories, the Average Journal Impact Factor Percentile provides a single metric supporting cross-category comparison (Clarivate, 2022). The formula is:

Average JIF Percentile = (JIF Percentile$_1$ + JIF Percentile$_2$ + ... + JIF Percentile$_N$) / N

Where N = number of categories in which journal is indexed

Official example (Clarivate, 2022):

- Category 1: Rank 12/177 → JIF Percentile = (177–12 + 0.5)/177 × 100 = 165.5/177 × 100 = 93.5
- Category 2: Rank 9/103 → JIF Percentile = (103–9 + 0.5)/103 × 100 = 94.5/103 × 100 = 91.7
- Category 3: Rank 16/314 → JIF Percentile = (314–16 + 0.5)/314 × 100 = 298.5/314 × 100 = 95.1
- Average JIF Percentile = (93.5 + 91.7 + 95.1)/3 = 93.4

The Average JIF Percentile facilitates approximate cross-category comparison, although discipline-specific citation norms, category size variation, and distributional characteristics constrain interpretability.

4.3 The 2025 Integrity Reform

4.3.1 Policy Specification

Effective with the 2025 Journal Citation Reports release, Clarivate implemented the following methodological changes to JIF calculation (Murphy et al., 2025; Journalology, 2025):

1. Citations to retracted articles are excluded from JIF numerator
2. Citations from retracted articles are excluded from JIF numerator
3. Retracted articles themselves remain in JIF denominator (count of citable items)
4. Policy applies to all retracted or withdrawn articles indexed in Web of Science Core Collection

4.3.2 Scope of Application

This policy applies exclusively to Journal Impact Factor calculation. It does not apply to:

- CiteScore (Elsevier) or other Scopus-based metrics
- Researcher-level metrics including h-index and total citation counts
- Web of Science Core Collection citation counts for individual articles or researchers
- Previous JCR annual releases prior to 2025

4.3.3 Rationale and Objectives

Clarivate articulated two primary policy objectives (Murphy et al., 2025):

Objective 1: Preemptive Distortion Prevention. Citing increasing retraction rates and decreasing intervals between publication and retraction decisions, Clarivate sought to preemptively guard against potential widespread JIF distortions from accumulated citations to retracted content.

Objective 2: Metric Evolution. The policy explicitly aims to evolve the Journal Impact Factor "from a journal-level marker of scholarly impact to an indicator of both impact and trustworthiness" (Murphy et al., 2025).

4.3.4 Estimated Scope and Impact

Data presented by Clarivate and analyzed in editorial commentary indicate (Murphy et al., 2025; Journalology, 2025):

- Retracted papers constitute approximately 0.04% of Web of Science Core Collection
- Annual retraction rate reached record 0.02% in 2023 (exceeding 10,000 articles)
- Approximately 1% of JCR-indexed journals expected to experience measurable JIF changes
- Most affected journals expected to experience minimal rank displacement

4.3.5 Relationship to Broader Integrity Infrastructure

The 2025 policy reform represents integration of journal-level metrics with established research integrity infrastructure (Murphy et al., 2025; Journalology, 2025). Table 4 summarizes the key infrastructure components and their integration with the 2025 policy.

Table 4
Research integrity infrastructure and integration with 2025 JCR policy

Infrastructure Component	Function	Integration with 2025 Policy
COPE Retraction Guidelines	Standardized retraction processes	Provides consistent retraction classification
Retraction Watch Database	Centralized retraction repository	Source for identifying retracted articles
Crossref Crossmark	Communicates current publication status	Enables automated status verification
iThenticate, image forensics	Pre-publication integrity screening	Reduces retraction risk pre-emptively
PubPeer	Post-publication open commentary	Catalyzes retraction identification
Research Integrity Risk Index (RI²)	Institutional-level integrity metrics	Complements journal-level metrics

Sources: Synthesized from Murphy et al. (2025) and Journalology (2025).

4.3.6 Technical Specifications of the 2025 Integrity Reform

Table 5 provides a comprehensive technical specification of the 2025 JCR Integrity Reform, comparing pre-2025 and 2025 policies across all affected components.

Table 5
The 2025 JCR integrity reform: Technical specifications

Component	Pre-2025 Policy	2025 Policy	Effect
Citations *to* retracted articles	Included in JIF numerator	Excluded from JIF numerator	Negative JIF adjustment
Citations *from* retracted articles	Included in JIF numerator	Excluded from JIF numerator	Negative JIF adjustment
Retracted articles in denominator	Included	Included (unchanged)	No change; preserves transparency
Journals failing to retract	Subject to re-evaluation	Elevated delisting risk	Incentive to retract
Application to CiteScore	Not applicable	Not applicable	Policy JIF-exclusive
Application to h-index	Not applicable	Not applicable	Policy JIF-exclusive
Application to WoS citation counts	Not applicable	Not applicable	Policy JIF-exclusive
Proportion of journals affected	—	~ 1% (estimated)	Minimal; primarily symbolic

Note: This policy applies exclusively to Journal Impact Factor calculation and does not affect CiteScore, Scopus-based metrics, researcher-level metrics (h-index, total citations), or Web of Science Core Collection citation counts for individual articles or researchers. Sources: Synthesized from Murphy et al. (2025) and Journalology (2025).

4.3.7 Illustrative Examples of Rank Proportion, JIF Percentile, and Quartile Assignment

Table 6 provides illustrative examples of journals at different rank positions, demonstrating the relationship between rank proportion, JIF Percentile, and quartile assignment. These examples highlight the discontinuity at quartile boundaries and the loss of granular information in quartile classification.

Table 6
Illustrative examples: Rank proportion, JIF Percentile, and quartile assignment

Journal	Rank (X)	Category Size (Y/N)	Rank Proportion (Z = X/Y)	JIF Percentile	Quartile
Top-ranked	1	100	0.010	99.5	**Q1**
Journal A	12	177	0.068	93.5	**Q1**
Example C	10	100	0.100	90.5	**Q1**
Example D	24	100	0.240	75.5	**Q1**
Journal B	78	314	0.248	75.3	**Q1**
Borderline	**79**	**314**	**0.252**	**74.8**	**Q2**
Journal E	80	314	0.255	74.7	**Q2**
Journal F	102	204	0.500	50.1	**Q2**
Borderline	**103**	**204**	**0.505**	**49.8**	**Q3**
Journal G	104	177	0.588	41.5	**Q3**
Journal H	27	30	0.900	11.7	**Q4**

Note: JIF Percentile calculated as (N – R + 0.5)/N × 100. Values rounded to one decimal. Borderline cases illustrate discontinuity at quartile thresholds. Z = 0.25 and Z = 0.50 are classified as Q1 and Q2 respectively per Clarivate (2022).

4.3.8 Potential Unintended Consequences and Safeguards

Independent bibliometric commentators have identified a potential unintended consequence: by increasing the negative JIF impact of retractions (articles remain in denominator, citations removed from numerator), the policy may inadvertently disincentivize retractions among journals prioritizing metric preservation over integrity (Journalology, 2025).

Clarivate has addressed this concern through two mechanisms. First, the policy statement emphasizes that "journals indexed in Web of Science Core Collection are subject to periodic re-evaluation and those that no longer meet our 24 quality criteria are delisted. A journal risks being delisted if they do not retract compromised content" (Murphy et al., 2025). Second, the 2023 expansion of JIF indexing to all Web of Science Core Collection journals—including ESCI—means delisting carries substantial visibility consequences (Clarivate, 2023).

5. DISCUSSION

5.1 Summary of Principal Findings

This study provides a methodological synthesis of JCR quartile ranking methodology, JIF Percentile calculation, and the 2025 retraction citation exclusion policy. Three principal findings emerge.

First, JCR quartile assignment follows a precise mathematical specification (rank proportion Z = X/Y) with strict boundary definitions invariant across categories and publication years (see Table 1). Borderline cases at Z = 0.25 and Z = 0.50 are classified as Q1 and Q2 respectively, confirmed by official examples (Clarivate, 2022). Derived quantile rankings—terciles, quintiles, and deciles—can be mathematically consistently generated using the identical rank proportion convention (see Table 2), although these are not officially published by Clarivate and should be employed with appropriate caveats regarding their non-official status.

Second, JIF Percentile provides granular, cross-categorically comparable information that quartile classification necessarily discards (see Table 3). The formula (N – R + 0.5)/N × 100 transforms discrete rank positions into a continuous 0–100 distribution, with higher values indicating superior JIF performance. The Average JIF Percentile facilitates approximate comparison of journals indexed in multiple categories. The inverse relationship between rank proportion and JIF Percentile—because Z increases with descending rank position—must be explicitly understood to correctly interpret the correspondence between quartile boundaries and percentile thresholds. Table 6 demonstrates that journals at substantially different rank positions (Z = 0.10, 90.5 percentile; Z = 0.24, 75.5 percentile) receive identical quartile classification (Q1), illustrating the substantial information loss inherent in categorical compression.

Third, the 2025 retraction citation exclusion policy represents a consequential methodological reform (see Tables 4 and 5). For the first time in the Journal Impact Factor's five-decade history, integrity considerations have been formally encoded into JIF methodology. Citations to and from retracted articles are excluded from numerators while retracted articles remain in denominators, ensuring compromised content no longer contributes positively to journal citation counts while preserving transparency regarding publication history. This policy applies exclusively to JIF calculation, affects approximately 1% of JCR journals with minimal anticipated rank displacement, and carries substantive symbolic importance for the relationship between bibliometric evaluation and research integrity (Murphy et al., 2025; Journalology, 2025).

5.2 Contribution to the Literature

Contribution 1: Methodological Synthesis of Quartile Mathematics. This study provides one of the first methodological syntheses of official JCR quartile calculation specifications. Prior guidance materials describe quartile rankings descriptively without articulating the precise rank proportion mathematics that operationalize these categories (Universiti Teknologi PETRONAS, 2016; Universiti Teknologi Malaysia, n.d.). This synthesis enables researchers and evaluators to calculate exact quartile boundaries for any category size, assess stability of borderline journals, and understand the mathematical relationship between rank position and quartile classification. Tables 1, 2, and 3 provide comprehensive reference data for these calculations.

Contribution 2: Systematic Distinction Between Quartile and Percentile Metrics. This study clarifies a persistent source of confusion in research evaluation practice. Quartile classification and JIF Percentile serve distinct purposes with distinct mathematical properties. Quartiles provide intuitive categorical classification suitable for rapid screening and broad categorization. JIF Percentile provides continuous, cross-categorically comparable information essential for fine-grained differentiation, particularly for journals near quartile boundaries or competing across disciplines. Table 3 provides a systematic comparative framework for selecting appropriate metrics for specific evaluation contexts.

Contribution 3: Analysis of the 2025 Integrity Reform. This study provides, to the author's knowledge, one of the first analyses of the June 2025 Clarivate policy change. By synthesizing official announcements, editorial commentary, and independent bibliometric analysis, this study constructs an account of the policy's technical specifications, rationale, estimated effects, and potential implications (see Tables 4 and 5). This analysis situates the policy within broader integrity infrastructure developed over the past decade.

5.3 Implications for Research Evaluation Practice

For Researchers and Evaluators:

- Consult JIF Percentile, not merely quartile, when differentiating among journals within the same quartile (see Table 6 for illustrative comparisons)
- Recognize borderline journals (Z near 0.25 or 0.5) face elevated reclassification risk across annual releases
- For interdisciplinary work, evaluate journals using Average JIF Percentile while acknowledging cross-category comparison constraints
- Note that the 2025 integrity reform applies only to JIF, creating potential divergence between journal-level and researcher-level integrity incentives

For Bibliometricians and Metric Developers:

- The widespread institutional use of derived quantile rankings that are not officially validated by Clarivate (see Table 2) suggests a gap between proprietary metric provision and research evaluation practice
- The 2025 reform raises questions regarding which integrity considerations should be encoded into quantitative metrics and through what governance processes
- The divergence between JIF and other metrics regarding retracted citation treatment creates natural experiments for studying the behavioral effects of metric design

For Publishers and Editors:

- Ensure robust retraction policies aligned with COPE guidelines
- Integrate Crossref Crossmark functionality to communicate retraction status transparently

- Recognize the tension between JIF preservation incentive and delisting risk—and the expectation that integrity should take precedence

5.4 Policy Implications

The 2025 integrity reform raises broader questions regarding appropriate use of journal metrics in research assessment.

First, metric misuse risks persist despite methodological refinement. The Leiden Manifesto (Hicks et al., 2015) and DORA (2012) articulated longstanding concerns regarding inappropriate substitution of journal metrics for qualitative assessment of individual research contributions. The JIF remains a journal-level metric; its application to individual articles or researchers constitutes misuse regardless of methodological refinements.

Second, integrity metrics are not value-neutral. Encoding integrity considerations into JIF methodology represents a normative judgment regarding what constitutes meritorious scholarly contribution. While reducing citation benefit from retracted content aligns with widely shared norms, future policy decisions regarding which integrity considerations to encode—and how—will require transparent governance and broad stakeholder input.

Third, metric divergence creates new complexities for research assessment. The 2025 policy applies exclusively to JIF; researcher metrics and competing journal metrics continue to include retracted citations. This creates potential divergence between journal-level and researcher-level integrity incentives that researchers, evaluators, and institutions must navigate.

Fourth, the relationship between retraction disincentives and editorial behavior requires empirical investigation. The potential unintended consequence identified by Journalology (2025) highlights the importance of studying the behavioral effects of metric design.

5.5 Future Research Directions

Several avenues for subsequent investigation are identified:

- Empirical bibliometric analysis of JIF changes attributable to the 2025 retraction citation exclusion policy, examining magnitude and distribution of effects across disciplines, journal sizes, and retraction frequencies
- Investigation of whether the 2025 policy affects retraction timing or frequency, testing the hypothesis of potential unintended disincentive effects
- Comparative analysis of how different metric providers (Clarivate, Elsevier/Scopus) address retracted citations in their respective journal metrics
- Parallel methodological expositions of Scopus-based metrics (CiteScore, SJR, SNIP) to enable informed cross-platform comparisons

- Examination of the divergence between journal-level and researcher-level integrity incentives created by the JIF-exclusive application of the 2025 policy
- Longitudinal analysis of the stability of borderline journals (Z near 0.25 or 0.5) across annual JCR releases

6. CONCLUSION

Journal Citation Reports quartile rankings, JIF Percentile calculations, and the 2025 retraction citation exclusion policy together constitute the contemporary technical architecture of journal-level research evaluation. This study has demonstrated that quartile assignment follows a precise mathematical specification (rank proportion Z = X/Y) that can be explicitly articulated (see Tables 1 and 2); that JIF Percentile provides granular cross-categorically comparable information that quartile classification necessarily discards (see Tables 3 and 6); and that the 2025 integrity reform represents one of the most consequential methodological changes in the Journal Impact Factor's five-decade history (see Tables 4 and 5).

By synthesizing these three elements into a single consolidated technical reference with comprehensive tables—all explicitly cited throughout the manuscript—this work addresses gaps in the literature that have left researchers, evaluators, and bibliometricians without an authoritative source for understanding both established JCR metrics and recent transformative policy changes. As the scholarly publishing landscape continues to evolve—with expanding journal coverage, emerging AI-based integrity tools, and increasing integration of quality considerations into quantitative metrics—methodologically rigorous, technically precise, and critically balanced analysis will remain essential.

The 2025 reform makes explicit what scientometrics scholars have long argued: journal metrics are social and political instruments, encoding particular values and incentivizing particular behaviors. By formally encoding integrity considerations into JIF methodology, Clarivate has acknowledged that how citations are accumulated matters as much as how many. This evolution from impact as mere frequency toward impact as trustworthy contribution represents a maturation of the bibliometric enterprise.

Declarations

Author Contribution

M.M.: Conceptualization, Methodology, Formal Analysis, Investigation, Writing – Original Draft Preparation, Writing – Review & Editing, Visualization. All work was completed solely by the author. The author read and approved the final manuscript.

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