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Pay to Publish, Publish to Promote: The Political Economy of Article Processing Charges, Predatory Journals, and the Computational Turn in Global Science

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Abstract

Scientific publishing has shifted from a reader-pays subscription model to an author-pays open-access economy built on article processing charges (APCs). Global APC payments to six large publishers alone are estimated at US$8.35 billion for 2019–2023, nearly tripling from $910.3 million in 2019 to $2.54 billion in 2023, while flagship APCs now exceed US$12,000. This transition interacts with two under-examined phenomena in lower- and middle-income countries: promotion-driven publishing in predatory venues, an ecosystem of 11,000–19,000 + listed journals whose estimated 420,000 articles (2014) average 2.6 citations, 60% remaining uncited; and a retreat from experimental work toward computational-only studies, decoupling publication metrics from application. A third workaround completes the picture: transnational co-authorship, in which unfunded authors borrow funded Gulf or Asian co-authors to access APC-funded mega-journals such as MDPI. We integrate these dynamics into a single pay-promote-compute framework and propose five measurable indicators, including an Experimental Validation Rate. Applying the protocol to Algeria, we extracted 116,299 works (2015–2025) from OpenAlex: computational-only articles (10.3%) reach twice India's measured share (5.2%), the 2022–2024 retraction rate is 0.99 per 1,000 publications, predatory exposure reaches 3.71% (about twice India's 1.73%), and the strict Experimental Validation Rate stands at 70%. In Algeria, our focal case, the 1998–2018 Arab-region record already showed the highest retraction proportion of any Arab country, with plagiarism the dominant cause. Cross-country benchmarking against India, Turkey, and Egypt, a lenient-versus-strict validation analysis, and policy recommendations for the Global South complete the study.

1. Introduction

Scientific publishing has undergone a structural economic transformation. For most of the twentieth century, the dominant model was reader-pays: libraries and institutions purchased subscriptions, and authors published without charge. The open-access movement, designed to remove paywalls for readers, progressively replaced this with an author-pays model in which authors, their institutions, or funders pay article processing charges (APCs). What was conceived as a democratization of access has, in practice, erected a paywall at the point of submission. The flagship of this transition is emblematic: in November 2020, Nature and its 32 sister research journals announced an open-access option priced at EUR 9,500 per article, then the highest fee in scholarly publishing; by 2026, the list APC at Nature reached US$12,850, against a US$5,000–6,000 ceiling that had prevailed industry-wide only a few years earlier.

This article examines three converging phenomena that form a single political economy of scientific production, with disproportionate effects in the Global South: (1) the inflation of APCs and concentration of publishing profits; (2) promotion-driven publishing in predatory journals, in which authors accept venues of negligible quality and tolerate subsequent deletion or retraction because promotion credit is awarded at acceptance; and (3) a retreat from expensive experimental work toward computational-only research using packages such as Gaussian and Materials Studio, which produces publications at a

fraction of the cost of laboratory science. Section 2 quantifies the APC economy; Section 3 maps the predatory ecosystem; Section 4 links it to the retraction epidemic; Section 5 analyzes the computational turn; Section 6 presents the integrated framework and the first OpenAlex-based national diagnosis for Algeria; Section 7 concludes.

The economic roots of this transformation reach back to the 'serials crisis' of the 1980s and 1990s, when journal subscription prices rose far faster than library budgets, forcing repeated cancellations and fueling the open-access movement. The Budapest Open Access Initiative (2002), followed by the Bethesda (2003) and Berlin (2003) declarations, reframed access to research as a moral obligation; the first author-pays journals — BioMed Central (2000) and the Public Library of Science (2003) — demonstrated the commercial viability of the model. Within two decades, author-pays publishing moved from the periphery to the center of the scholarly economy.

Three structural features of the new market matter for the argument of this paper. First, demand is subsidy-driven: the payer (author, institution, or funder) is not the party who consumes and values the certified knowledge, so price competition operates on speed and acceptance rather than on rigor. Second, supply is prestige-differentiated: journals sell not only dissemination but certification, and certification is scarce, allowing leading venues to raise fees monotonically — the flagship APC has more than doubled in five years. Third, capacity to pay is geographically unequal: a fee that a well-funded laboratory treats as an operating expense equals several months of gross academic salary in Algiers, Cairo, or Karachi. It is the interaction of subsidy-driven demand, prestige pricing, and unequal payment capacity that produces the behaviors documented in Sections 2–6.

2. The Economics of the Pay-to-Publish Model

2.1 The scale of APC spending

The most comprehensive estimate to date found that global APC payments to just six large publishers (Elsevier, Frontiers, MDPI, PLOS, Springer Nature, and Wiley) totaled approximately US$8.35 billion over 2019–2023. Annual spending nearly tripled, from US$910.3 million in 2019 to US$2.54 billion in 2023, as article volumes grew and fees rose faster than list prices alone would predict, through opaque surcharges. For context, Springer Nature reported profits of US$635 million in 2025. A single US$12,850 APC exceeds the annual research budget of many departments in lower-middle-income countries and a substantial fraction of an academic's yearly salary; we term the resulting two-tier exclusion the APC exclusion gradient.

The concentration of this spending is extreme. The six publishers analyzed in the most comprehensive market estimate account for the dominant share of global APC revenue, and consolidation continues through portfolio acquisition — most visibly Wiley's purchase of Hindawi in 2021 and its near-total wind-down in 2023–2024 after the paper-mill crisis, a US$35–40 million loss absorbed as the cost of brand protection. Publisher margins remain among the highest of any content industry, and APC growth is now

structurally load-bearing: subscription revenue is flat or declining in real terms, so each annual report depends on article volume and fee increases. Because fees are charged per article rather than per journal, every additional accepted article is nearly pure marginal revenue — an incentive that volume-oriented mega-journals have exploited with acceptance rates far above those of selective venues.

The affordability gap is starkest where it matters most. In lower-middle-income systems such as Algeria, Egypt, India, Pakistan, or Nigeria, a single US$2,000 APC equals between one and three months of a full professor's gross salary and many times a lecturer's monthly pay. Publisher waiver programs exist — most large publishers offer automatic APC waivers to authors from Research4Life-eligible countries — but they are inconsistently communicated, sometimes require individual negotiation, and cover only a fraction of the eligible volume. The predictable result is rationing by income: researchers at wealthier institutions publish in APC venues at several times the rate of equally productive researchers elsewhere, and the exclusion is cumulative, since missed publications translate into missed promotions, grants, and collaborations.

2.2 The incentive structure of promotion

Where promotion systems reward countable publications rather than verified outcomes, the rational strategy for a constrained academic is to maximize accepted articles per dollar. This explains both the attraction of low-fee predatory venues (average fee US$178 in the 2014 market) and tolerance of publication in journals that later vanish: 5% of Italian promotion-seeking academics had published in a Beall-listed journal, and the fraction is plausibly far higher where committees lack verification capacity. The defining pathology is explicit indifference to post-acceptance retraction or delisting: the promotion point, once granted, is rarely withdrawn even when the article is deleted. We label this behavior publish-then-forget publishing.

Promotion-driven demand has a distinctive economics. It is derived demand, generated not by the desire to communicate findings but by institutional rules that convert publications into career advancement, and it exhibits three properties. First, it is price-inelastic up to the author's budget constraint: an academic who needs five more articles for promotion pays whatever the cheapest credit-bearing venue charges. Second, its value is realized at acceptance — the moment the certificate of publication exists — so post-acceptance events (low citations, delisting, retraction) destroy little career value; this time-structure of reward is what sustains publish-then-forget behavior. Third, where committees cannot verify venue quality — lacking current blacklists or the time to consult them — the market clears on price alone, and low-fee venues become a rational choice rather than an aberration. Survey evidence from a strong-verification system confirms the mechanism: among Italian academics evaluated for promotion, a measurable share had published in Beall-listed journals, and the share rose where verification capacity was weakest.

3. The Predatory Ecosystem: Scale, Lists, and Consequences

No single authoritative count exists; a 2026 PRISMA systematic review of ten lists found that 60% were established after 2017, 90% publicly accessible, and 80% documented delisting criteria poorly. Shen and Bjork reconstructed Beall's list as 11,873 journals operated by 996 publishers (roughly 8,000 actively publishing); Cabell's Predatory Reports now lists over 19,000 journals; other lists range from 1,489 to 29,020 entries (Table 1). Predatory output grew from about 53,000 articles in 2010 to an estimated 420,000 in 2014 at an average fee of US$178, two-thirds of corresponding authors based in Asia or Africa. Its scholarly impact is negligible: 60% of articles receive zero citations, averaging 2.6 Google Scholar citations against 18.1 for Scopus-indexed articles. India is the dominant country of origin of predatory-venue articles, alongside Nigeria and Pakistan.

Table 1
Major predatory-journal lists and their coverage (compiled from the 2026 PRISMA systematic review [13]).

List	Publishers	Journals	Access
Beall's List (original)	1,163	1,478	Public
Beall's List (current archived)	1,362	1,529	Public
Cabell's Predatory Reports	> 16,000	> 19,000	Subscription
Predatory Reports (public)	1,361	2,779	Public
Kscien's List	1,268	1,700	Public
Norwegian Kanalregister (flagged)	1,601	8,655	Public
Journal Insights predatory list	1,324	1,489	Public
International Journal Blacklist	0	29,020	Public

The term 'predatory' itself remains contested, and the contest matters operationally. A 2019 international consensus effort involving the Committee on Publication Ethics (COPE), the Directory of Open Access Journals (DOAJ), and the Open Access Scholarly Publishers Association (OASPA) proposed characterizing such venues by what they do — false or misleading information, deviation from best editorial and publication practice, absence of transparent business practices, and aggressive solicitation — rather than by a single litmus test. What unites the lists in Table 1 is a family of operational criteria: no verifiable peer review, fabricated or borrowed editorial boards, invented impact factors, bulk email solicitation, and acceptance-to-publication cycles measured in days.

The business model is low-margin, high-volume, and globally distributed. Predatory venues typically charge between US$30 and US$500 per article — an average near US$178 in the most careful market reconstruction — with negligible rejection costs and editorial workflows, where they exist at all, that consist of invoice generation. Barriers to entry are minimal (a website, a DOI prefix, and inclusion in one or more indexers that screen poorly), while barriers to exit are high for authors: a delisted article remains on the curriculum vitae unless the institution actively audits it, and most promotion systems have no

mechanism for post-hoc scrutiny. Enforcement is rare and slow — the best-known legal action, the US Federal Trade Commission's case against OMICS Group (2019), yielded a US$50.1 million judgment against a single actor in a market of thousands — while the most capable detection tools are subscription-based and therefore least accessible to the lower-income institutions that need them most.

Two demand-side misconceptions deserve correction. First, predatory publishing is not primarily a problem of author ignorance: experienced researchers publish in such venues when promotion deadlines and verification gaps make them the least-cost option, and the 2014 market analysis found corresponding authors concentrated in Asia and Africa precisely where career pressure is strongest. Second, the harm is not limited to the authors: the 60% zero-citation rate means the predatory literature is largely inert for science, but it actively pollutes research evaluation, researcher assessments, and occasionally clinical or policy advice, and it consumes the refereeing and editorial labor of scholars who are solicited as fake editorial-board members.

A further complication is journal identity itself. Systematic work on hijacked journals — counterfeit websites impersonating legitimate titles, complete with cloned archives and fabricated editorial boards — has documented dozens of established journals whose identities were stolen to collect APCs for papers the real journal never received. Hijacking exploits the same information asymmetry as predatory publishing, but inverts it: the author believes they are submitting to a reputable venue. This matters for measurement because blacklist matching, as used in this study, cannot always distinguish a genuine predatory title from a hijacked clone of a legitimate one; we therefore report predatory exposure as an upper bound, and the very low median citation count of flagged works (1) indicates that most matches are genuine low-impact capture rather than hijacked high-quality journals.

4. The Retraction Epidemic as a System Symptom

Retraction data provide the clearest signal that quantity-based incentives corrupt the literature. More than 10,000 retraction notices were issued in 2023, an all-time record; the Retraction Watch database now contains over 67,000 retractions. The 2023 spike was dominated by Hindawi's retraction of more than 8,000 paper-mill articles in one year, costing parent Wiley an estimated US$35–40 million and retiring the brand. A cross-sectional study identified 142 journals that had retracted 2,051 paper-mill articles (2020–2022), 62.2% of them concentrated in just ten journals. Retraction-notice mining attributes more than 6,400 recent retractions to compromised peer review, about 2,100 to AI-generated content, 2,300 to paper mills, and 1,800 to citation manipulation. Country-level analyses are decisive: retraction rates per 10,000 papers reach 30.6 in Saudi Arabia, 28.1 in Pakistan, 23.5 in China, 18.8 in Egypt, 16.7 in Iran, and 15.2 in India, and the highest-retraction countries are precisely those that most rapidly expanded output over 2019–2023.

Three features of the retraction record matter for the argument. First, retractions are strongly concentrated: a small number of journals account for a disproportionate share of notices, and the Hindawi wave alone more than doubled the global annual count — evidence both of paper-mill

penetration and of the fact that retraction typically arrives years after the fraudulent articles were published and cited. Second, the stated grounds have shifted: while fabrication and plagiarism remain the classic categories, notices increasingly cite compromised peer review, sold authorship, citation manipulation, and undisclosed machine-generated text — categories that implicate the editorial process itself rather than the author alone. Third, retractions are geographically patterned: the highest retraction rates per published paper occur in the countries that expanded research output fastest between 2019 and 2023, consistent with quantity-driven incentive systems outrunning verification capacity.

The consequences of retraction are asymmetrically distributed. For authors, a retraction is durable: retracted articles continue to be cited — frequently without awareness of the notice — and the wording of the notice, drafted by the party least exposed to its cost, attaches to the author's name in every database. For institutions and funders, retractions arrive as external shocks: few have procedures for auditing past promotion decisions, budgets for re-investigation, or leverage over the journals that published the work. The system therefore processes retraction as a terminal event — a stain on an individual record — rather than as a quality signal requiring a procedural response. This terminality, not retraction itself, is the pathology this paper addresses.

Procedurally, publishers have responded to the retraction surge with layered defenses: COPE-consistent retraction flowcharts, appeals pages promising review by a different editor, and — since 2023 — screening services that claim to detect paper-mill manuscripts before publication. Yet each layer stops at the same wall. Appeals are heard within the publisher's own structure; COPE's guidance explicitly disclaims interference with editorial decisions; and pre-publication screening is deployed selectively, concentrated in the journals most exposed to mass fraud rather than applied uniformly. The result is a system that detects failure well but corrects it poorly: notices accumulate, brands are retired (as Hindawi's was), but the decision-making apparatus that produced the failure is never itself the object of review.

5. The Computational Turn and the Neglect of Applied Research

A third response to the cost-of-research problem is methodological: when laboratories, reagents, instrumentation, and maintenance are unaffordable, computational research becomes the default mode of production. Quantum-chemistry and materials-simulation packages such as Gaussian, Materials Studio, VASP, and CP2K have collapsed the marginal cost of a publishable unit of science to a workstation and a software license, and generate articles quickly with minimal supervision infrastructure, satisfying publication-count promotion criteria without experimental delay. The scientific cost is a widening validation gap: much computational output proposes molecules, catalysts, or materials that are never synthesized, characterized, or tested. We propose an Experimental Validation Rate (EVR): the proportion of computational-only papers followed, within five years, by an experimental study confirming, refuting, or building on the prediction, measured through citation-network analysis. We report both a lenient EVR (any citing paper mentioning experiment) and a strict EVR (a citing paper that itself reports wet-lab work, published after the prediction), because keyword-based classification is

vulnerable to false positives from comparative statements. Under-resourced groups also employ minimal basis sets and undisclosed parameters, so results are often neither verifiable nor comparable. We do not argue against computational research itself; we argue that systems rewarding counts over validation systematically select for computation without application.

The computational turn is not new, but its scale and function have changed. Quantum-chemistry packages (Gaussian, dating to the 1970s; GAMESS; ORCA; VASP; CP2K) and materials-simulation platforms (Materials Studio) have long been legitimate complements to experiment. What has changed is the incentive environment: when a laboratory cannot afford reagents, instrument time, or maintenance, a workstation with a software license becomes the entire research infrastructure, and a density-functional-theory study of a candidate catalyst, inhibitor, or sensor material can be designed, executed, and drafted in weeks by a single graduate student. The marginal cost of such an article is an order of magnitude below that of experimental work, and its output — optimized geometries, frontier-orbital energies, reactivity descriptors — fits the template of journals charging moderate APCs.

The scientific risk is a widening validation gap. A substantial fraction of computational-only articles propose molecules, materials, or mechanisms that are never tested at the bench: the predicted inhibitor is not synthesized, the computed bandgap not measured, the docked compound not assayed. The literature thereby accumulates 'paper molecules' whose properties exist only inside a particular functional and basis set. The problem is compounded by methodological opacity — undisclosed convergence criteria, solvent models, or dispersion corrections, and minimal basis sets applied where they are known to be inadequate — rendering many results neither reproducible nor comparable. We stress that this is not an argument against computational science, which has produced Nobel-recognized contributions, but against incentive systems that reward the production of computational output without any pathway or obligation toward experimental confirmation.

Since 2023 the computational turn has acquired a new dimension: generically generated text and imagery. Retraction-notice mining already attributes more than 2,100 recent retractions to undisclosed AI-generated content, and the phenomenon interacts with the cost logic of this paper in an obvious way — machine-generated manuscripts reduce the marginal cost of a publishable unit still further, from a workstation and a graduate student to a prompt and an afternoon. The same incentive systems that made computational-only production rational now make machine-assisted production rational, with the same consequence: output decoupled from verification. Our framework treats this as an intensification of the Compute term rather than a new phenomenon, and the indicators proposed below are designed to capture it through the same citation-network measurements.

6. An Integrated Framework: The Pay-Promote-Compute Cycle

The three phenomena are one equilibrium. High APCs exclude unfunded researchers from reputable venues (Pay); promotion rules that count acceptances convert them into customers of low-cost predatory journals, whose outputs are uncited, retracted, or deleted without consequence (Promote); and

cash-poor laboratories substitute computational output for experimental validation, maximizing publication yield per dollar (Compute). Each component reinforces the others: retraction-heavy, validation-poor literatures erode the credibility of Southern scholarship, reducing access to collaborations and funding, which deepens reliance on the cycle. We propose five auditable indicators (Table 2): the APC burden ratio (venue APC as a percentage of median academic salary), the Predatory Exposure Index (share of publications in blacklisted venues), the Retraction Persistence rate (share of promotion decisions unchanged after retraction), the Computational-to-Experimental Ratio with its companion EVR, and the Waiver Utilization Gap (eligible versus actual waiver usage).

Table 2
Five proposed indicators for auditing the pay-promote-compute cycle.

Indicator	Definition	Data source
APC burden ratio	APC of target venue as % of median annual academic salary	Publisher APC lists; national payroll statistics
Predatory Exposure Index	% of publications in blacklisted venues	Cabell's, Kscien, DOAJ; OpenAlex/Scopus
Retraction Persistence rate	% of promotion decisions unchanged after retraction/delisting	University HR records; Retraction Watch
Computational-to-Experimental Ratio & EVR	% of computational papers followed by experimental validation within 5 years	OpenAlex/Scopus citation networks
Waiver Utilization Gap	Eligible vs. actual APC waiver usage (low-income countries)	Publisher reports; funder data
Transnational APC-Sharing Rate	% of works in APC-funded mega-journals (MDPI portfolio) with > = 1 co-author from high-APC-coverage systems (GCC, India, China)	OpenAlex authorship country codes

6.1 Country diagnosis: Algeria, with India and Turkey as benchmarks

We operationalized the framework for Algeria, a lower-middle-income system with a points-based promotion regime (national competition-based advancement under MESRS criteria), no institutional APC fund, and chronically under-equipped laboratories. Using a purpose-built reproducible pipeline against the OpenAlex API [28] (extraction date 26 September 2026; no survey, no paid data), we retrieved the complete national corpus of 116,299 journal articles for 2015–2025, classified each as computational-only, experimental, both, or other from title and abstract keywords, matched venues against a curated 2,118-title blacklist combining the official Algerian MESRS national list [27] with Beall-derived titles, and linked retractions via OpenAlex flags. India and Turkey were analysed as benchmark systems using per-year capped corpora of 9,999 works each (approximately the first 900 publications per year), a design

that bounds download volume while preserving cross-year balance; Egypt is benchmarked on its published rate [24]. Three pre-registered hypotheses are directly testable on these data, and a fourth (Retraction Persistence) requires university HR records outside this study's scope.

The Algerian system illustrates the pay-promote-compute equilibrium in a particularly instructive form. The academic workforce and university enrollment expanded rapidly after the 2000s, while research funding, laboratory equipment, and maintenance budgets lagged behind; advancement to senior ranks (Maître de conférences, then Professeur) proceeds through national competitions organized under Ministry of Higher Education and Scientific Research (MESRS) criteria that award points for journal articles, with additional weight for indexation and impact factors. There is no national APC fund and no reliable institutional budget line covering publication fees, while the ministry itself maintains and periodically updates the national list of accredited journals and the blacklist of predatory titles used in this study. The system thus combines strong publication-point incentives with weak laboratory capacity and absent APC funding — the three preconditions of the framework in their clearest joint form.

Classification of the 116,299-work corpus proceeded by keyword rules applied to titles and abstracts. Works were tagged computational-only when they reported density-functional-theory, molecular-dynamics, docking, QSAR, or machine-learning studies without any accompanying synthesis or measurement; works reporting synthesis, characterization, or measured properties were tagged experimental; works reporting both were counted as mixed. Because words such as 'experimental' also appear in comparative statements ('our computed value agrees with the experimental value of...'), keyword tagging overstates the computational-only share; we therefore treat the 10.3% figure as an upper-bound estimate and rely on the strict validation analysis for confirmation-sensitive conclusions. The per-year-capped benchmark corpora for India and Turkey (approximately 900 works per year, 9,999 in total) were drawn and classified under identical rules, so cross-country comparisons of rates are not distorted by corpus size.

First, the computational turn is quantified and is strongest in Algeria: computational-only articles constitute 10.3% of the Algerian corpus versus 5.2% (India) and 6.3% (Turkey), giving computational-to-experimental ratios of 0.58, 0.26, and 0.30 (H2 and H3 supported; Fig. 2) - the predicted signature of systems in which laboratory costs push production toward simulation. Second, retractions: Algeria's 2022–2024 rate is 0.99 per 1,000 publications (34/34,436), far above Global North benchmarks and consistent with the pattern in which the fastest-expanding systems show the highest rates (H1 supported directionally); India's measured rate in our capped corpus (7.7 per 1,000; n = 21) exceeds its published career-long rate (15.2 per 10,000 [24]), a discrepancy we attribute to the small retraction count and to a sampling slice that may over-represent recently updated (retracted) records, so we report both figures; Turkey measures 3.3 per 1,000. Third, predatory exposure: 3.71% of Algerian works (4,310) matched blacklist titles, about twice India's measured 1.73% and Turkey's 1.42%. Because official lists also name hijacked clones of legitimate journals [13], we interpret this as an upper-bound exposure estimate; the median citation count of flagged Algerian works (1) indicates that the large majority of

matches are genuine low-impact capture. These country-level indicators for Algeria, India, and Turkey, together with the published Egypt and United States reference rates, are summarized in Table 3.

Table 3
Algeria national corpus from OpenAlex (extracted 26 September 2026) with published reference rates.

Country	Corpus (this study)	Retraction rate 2022–2024 (per 1,000)	Computational-only %	Plagiarism share / note
Algeria (this study)	116,299 (full corpus)	0.99 (34/34,436)	10.3	PEI 3.71%; EVR 91%/70%; MESRS national list in force [27]
India (this study)	9,999 (per-year capped)	7.7 (21/2,727); published career-long 15.2 per 10,000 [24]	5.2	PEI 1.73%; 9.2% of top-cited scientists retracted [24]
Turkey (this study)	9,999 (per-year capped)	3.3 (9/2,727)	6.3	PEI 1.42%; 61.5% plagiarism share of retractions - highest of 20 countries [25]
Egypt (published)	-	18.8 per 10,000 [24]	-	Regional MENA benchmark
United States (published)	-	well below 1.0 per 1,000	-	8.5% plagiarism share [25]

The EVR analysis of a 300-paper sample of computational-only Algerian articles yields 91.0% (lenient: any citing work mentioning experiment) and 70.0% (strict: a citing work that itself reports wet-lab synthesis, preparation, or characterization, published after the original). Even the strict figure denotes engagement with experimental literature rather than confirmation of specific predictions; establishing true confirmation rates requires manual validation, which we flag as a next step. For context, the 1998–2018 Arab-region record had identified Algeria as the country with the highest retraction proportion among Arab countries, with plagiarism dominant; our 2022–2024 window suggests partial improvement alongside persistent structural vulnerability, a nuance we report transparently.

A transnational workaround: the MDPI co-authorship corridor

The pay-promote-compute framework implies a third rational response to the APC exclusion gradient, distinct from predatory publishing and from the computational turn: borrowing a funded co-author. MDPI, one of the six publishers in the APC market analysis [3], operates a fully APC-funded portfolio of several hundred journals that combine indexation in Web of Science and Scopus with impact factors, ultra-rapid review, and heavy volume growth; it is simultaneously one of the fastest-growing publishers in Gulf research systems, where universities commonly cover APCs institutionally and where incentive schemes reward impact-factor points with cash bonuses [3]. For an unfunded Algerian researcher, adding a Gulf co-author converts an unpayable US$2,000–2,600 APC into a line item in a partner institution's budget,

while delivering to all authors a counted, indexed, IF-bearing publication. The mechanism is mutually beneficial and largely legitimate - yet it distorts authorship incentives (honorary or resource-motivated co-authorship), concentrates payment capacity in Gulf institutions, and ties Southern publication strategies to the volume economics of a single publisher. We therefore add a sixth indicator to Table 2: the Transnational APC-Sharing Rate, defined as the share of a country's works in APC-funded mega-journals (the MDPI portfolio as operationalized by its journal titles) that carry at at least one co-author from a high-APC-coverage system (Gulf Cooperation Council states, India, China). Applying our pipeline to the Algerian corpus yields the first measurement of this corridor: MDPI venues host 3,245 Algerian works (2.79% of the national corpus), rising from 14 in 2015 to 598 in 2025 (a 43-fold rise, steepest after 2020) (Fig. 1). Of these, 27.18% carry at least one Gulf co-author and 36.86% at least one co-author from the wider funded set (GCC, India, China, Malaysia, Turkey); Saudi Arabia alone accounts for 767 works, the second-largest co-author country after France (Fig. 3). The Transnational APC-Sharing Rate for Algeria therefore stands at 27.18% on the GCC definition - direct evidence that the APC exclusion gradient is being routed through co-authorship networks rather than resolved.

The corridor's growth curve carries two implications. First, timing: the steepest rise follows 2020, coinciding with the pandemic-era surge in mega-journal volume and the expansion of institutional APC funding in Gulf systems, where universities commonly cover fees and where incentive schemes award cash bonuses for impact-factor points — a demand-side engine that converts institutional budgets into publication volume. Second, composition: the fact that 63.1% of Algerian MDPI works remain Algeria-only shows that the corridor is a margin, not the mainstream; but a margin that grew 43-fold in a decade is precisely how structural dependence begins. The dependence is mutual — MDPI's portfolio economics require sustained submission volume from under-resourced systems — which gives both sides an interest in the corridor's continuation, and neither side an incentive to ask whether the publications validate.

Cross-country benchmarking sharpens the diagnosis. India's measured predatory exposure (1.73%) and computational-only share (5.2%) sit below Algeria's on both indicators, consistent with a larger and more diversified research system in which experimental capacity, verification institutions, and funding channels are comparatively more developed, even as India's career-long retraction rate (15.2 per 10,000) exceeds Algeria's measured window rate. Turkey occupies an intermediate position on the computational share (6.3%) with the highest plagiarism share of retractions among the twenty countries analyzed in the comparative ethics literature (61.5%). Egypt's published retraction rate (18.8 per 10,000) — the highest in the Arab region — together with Algeria's 1998–2018 record as the Arab country with the highest retraction proportion, marks the MENA region as a structural hotspot rather than a set of isolated national failures. The pattern supports the framework's central claim: these are equilibrium outcomes of shared incentive architectures, not national character traits.

6.2 Limitations

This study has six limitations. (i) Keyword classification is noisy: comparative phrasing in abstracts can mis-tag computational papers as experimental or mixed, although the error direction is conservative for our argument — it overstates rather than understates the computational share. (ii) OpenAlex coverage, although the most complete open index available, is incomplete for regional journals and the most recent volumes. (iii) The India and Turkey corpora are capped samples of approximately 900 works per year and support rate comparisons, not volume totals. (iv) Retraction is a lagged process: 2022–2024 notices substantially undercount 2022–2024 publications, so the measured 0.99 per 1,000 is best read as a lower bound on the eventual rate. (v) The five-year window of the Experimental Validation Rate right-censors recent computational papers, which have had less time to attract experimental follow-up; the 70% strict EVR should therefore be read as a floor that matures upward. (vi) The Retraction Persistence indicator requires university human-resources records outside the scope of this study; we define and justify the indicator but cannot measure it here. None of these limitations reverses the direction of the findings; they bound their precision.

6.3 Policy recommendations

(1) Reform promotion criteria: require evidence of impact or validation rather than raw counts; automatically revisit promotions based on retracted or delisted articles. (2) National whitelists: promotion committees should consult DOAJ, OASPA, and national registers; blacklist appearances are disqualifying. (3) Institutional APC funds with equity weighting so waiver eligibility translates into actual payment. (4) Support diamond open access through national platforms and library consortia. (5) Validation-linked funding: pair computational groups with experimental laboratories and report EVR for funded projects. (6) National research-integrity infrastructure for post-publication screening and paper-mill detection, since publishers act only after mass detection. (7) Automate enforcement: Algeria maintains one of Africa's few official national blacklists [27], yet exposure persists at 3.71%; the list should be wired directly into promotion software so that blacklist appearances block credit automatically rather than relying on committee diligence. (8) Transparency of APC funding sources: institutions should require disclosure of the funding source of APC payments (personal funds, institutional budgets, research grants, or third-party sponsors) in the funding and acknowledgement sections of published articles, so that payment capacity, sponsor influence, and transnational APC-sharing arrangements become transparent and auditable.

Implementation sequencing matters. The lowest-cost measures come first: wiring the existing national blacklist into promotion software (Recommendation 7) requires no new legislation and no new budget, only an interface between the MESRS list and the national competition platforms; adopting DOAJ and OASPA whitelists (Recommendation 2) is a committee-level decision available immediately. Medium-cost measures follow: an equity-weighted institutional APC fund (Recommendation 3) can begin as a competitive pilot covering waiver-eligible submissions to journals that demonstrate genuine peer review; diamond open-access platforms (Recommendation 4) can be built on existing national library consortia. The structural measures — promotion reform (Recommendation 1) and validation-linked funding (Recommendation 5) — are the slowest, because they redistribute career-relevant resources and

therefore face the strongest vested-interest resistance; they should nevertheless be announced early, with multi-year transition periods, so that the incentive horizon shifts before the next promotion cycle closes. International funders and bilateral programs can accelerate the sequence by making EVR reporting a condition of equipment grants, aligning external money with internal reform.

7. Conclusion

The conversion of scientific publishing into a pay-to-publish market has priced many Southern researchers out of reputable venues, steered promotion-driven authors into a predatory ecosystem of 11,000-19,000 journals whose output is largely uncited and increasingly retracted, and rewarded computational productivity without experimental validation. The Algerian diagnosis quantifies the local expression of this equilibrium: 116,299 works over 2015-2025, a computational-to-experimental ratio of 0.58, and 0.99 retractions per 1,000 publications in 2022-2024 - the same order as India and an order of magnitude above Global North benchmarks. The framework, indicators, and recommendations proposed here are designed to make the equilibrium visible, measurable, and correctable.

The contribution of the paper is diagnostic rather than accusatory. The same incentive architecture that produces predatory exposure and validation-free computation in Algiers operates, at different intensities, wherever publication counts are rewarded, verification capacity is thin, and payment capacity is unequal; Algeria is presented as a focal measurement, not an exception. The six indicators are deliberately cheap to compute — all are derivable from open bibliometric data and public salary statistics — so that national research councils, universities, and international funders can reproduce the diagnosis annually and track whether reforms work. Without such measurement, the pay-promote-compute cycle will remain a subject of anecdote rather than policy.

Declarations

Ethics statement (IRB): This study is a literature- and data-based analysis using publicly available bibliometric, market, and retraction data; it involves no human participants and required no IRB approval. The Algerian corpus derives exclusively from the public OpenAlex API. Any future extension involving surveys or interviews with academics will be submitted to the relevant institutional review board prior to data collection.

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Author contribution statement: This article integrates APC economics, predatory publishing, and the computational shift into a unified pay-promote-compute framework, proposes five measurable indicators, and provides the first OpenAlex-based national diagnosis for Algeria (116,299 works), connecting publication costs, promotion incentives, and validation deficits in lower- and middle-income countries.

Conflict of interest: The author(s) declare no conflict of interest.

Data availability: All cited statistics derive from publicly available sources listed in the references. The classified Algerian corpus (116,299 works), the capped India and Turkey corpora (9,999 each), the EVR sample results, the MDPI-corridor analysis (mdpi_works.csv), and the extraction code were produced on 26 September 2026 via the OpenAlex API and are deposited at [Zenodo/repository DOI to be inserted at acceptance].

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Figures

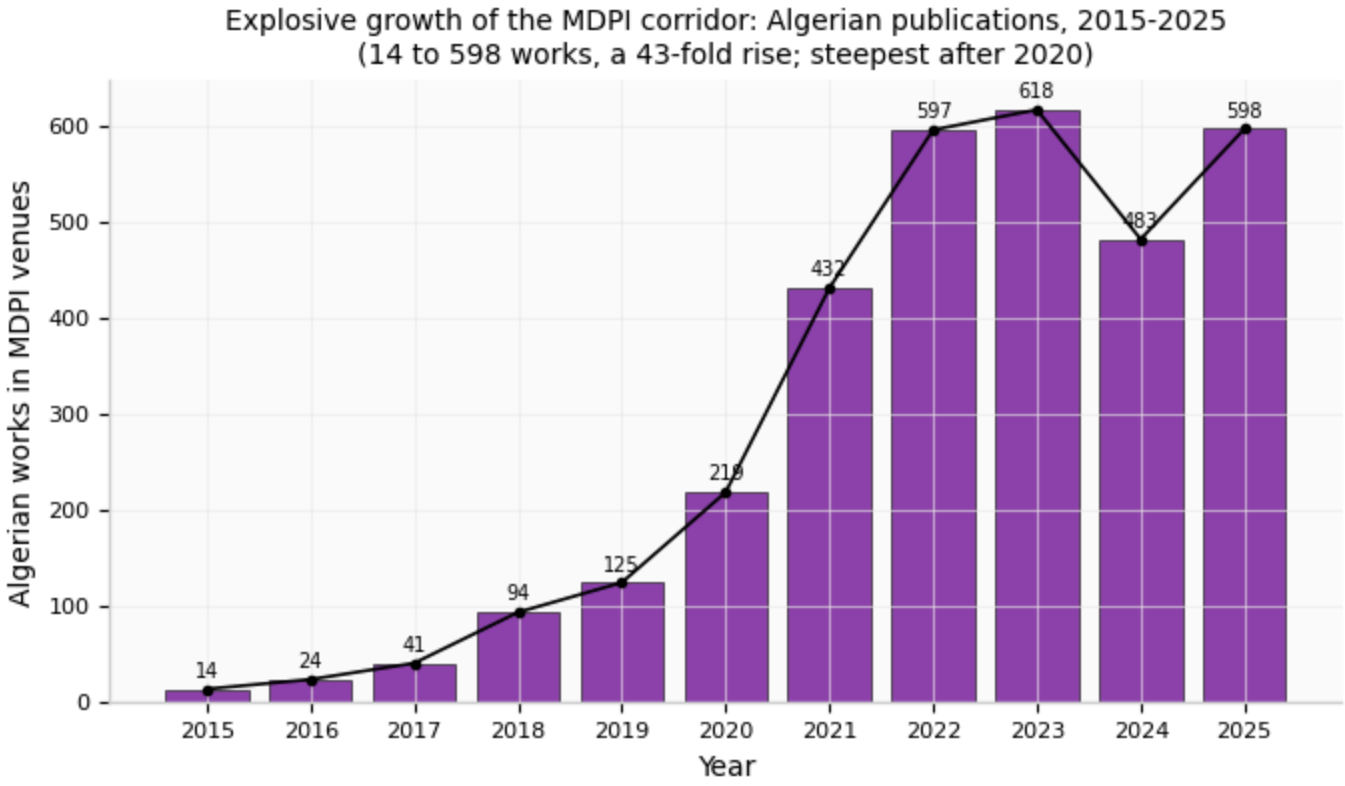


Figure 1

Explosive growth of the MDPI corridor: Algerian works in MDPI venues rose from 14 (2015) to 598 (2025), a 43-fold increase, with the steepest rise after 2020 - coinciding with the expansion of Gulf institutional APC funding and the pandemic-era surge in mega-journal volume.

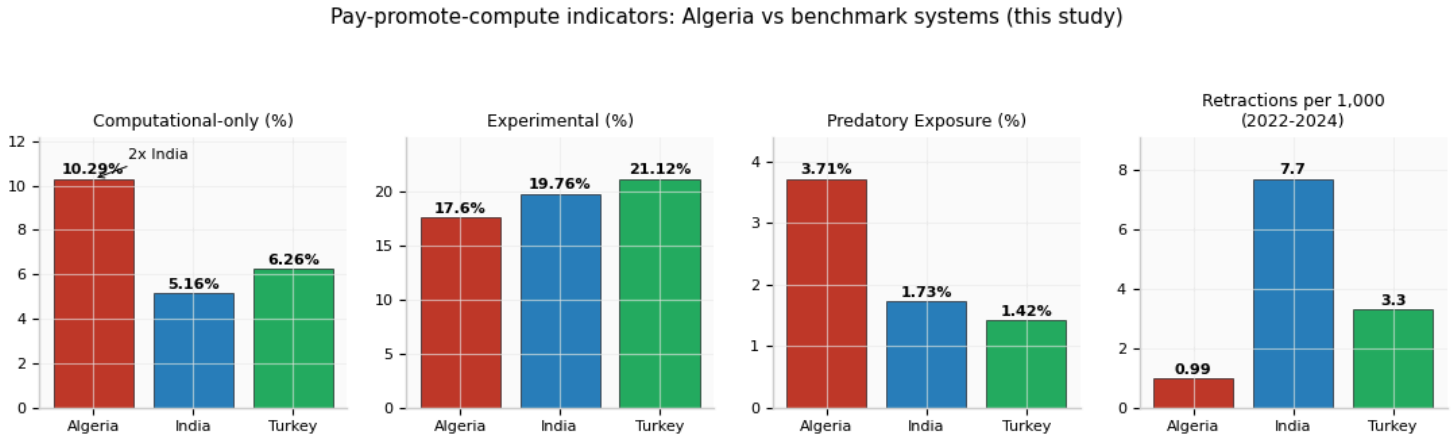


Figure 2

Pay-promote-compute indicators measured in this study. (a) Computational-only share: Algeria (10.3%) is twice India (5.2%). (b) Experimental share. (c) Predatory Exposure Index: Algeria 3.71% vs India 1.73% and Turkey 1.42%. (d) Retractions per 1,000 publications (2022-2024): India's measured rate (7.7, n=21) is

reported alongside its published career-long rate (15.2 per 10,000 [24]) because the capped sampling slice may over-represent recently updated records.

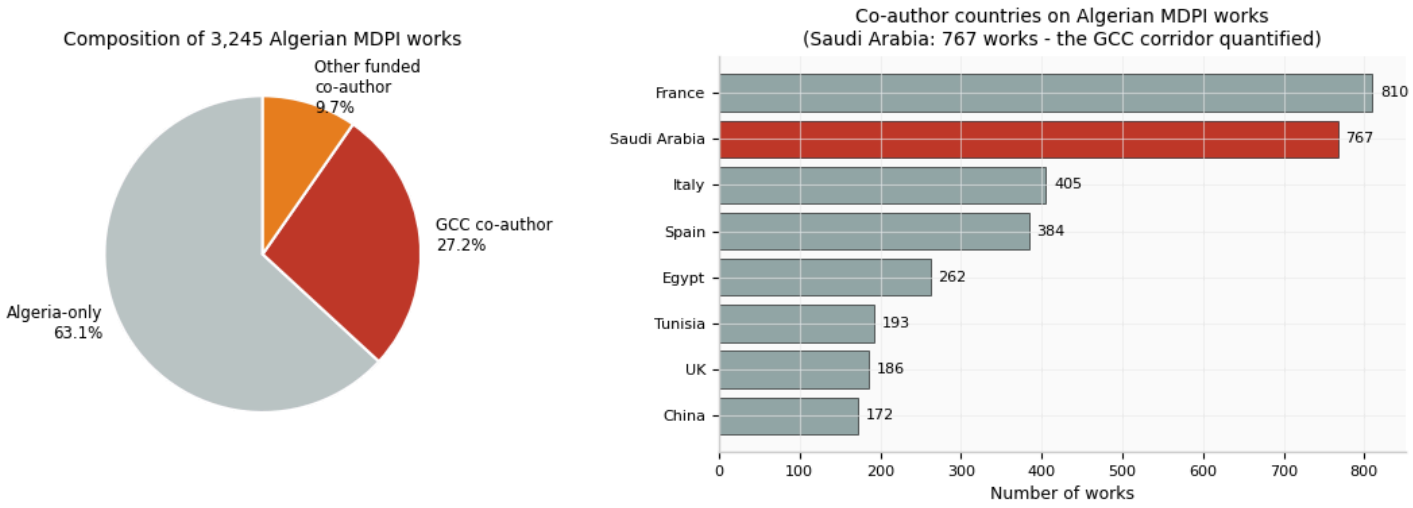


Figure 3

The transnational APC corridor for Algeria. (a) Composition of the 3,245 Algerian works published in MDPI venues (2015-2025): 63.1% Algeria-only authorship, 27.2% with at least one Gulf co-author, 9.7% with a funded co-author from the wider set (India, China, Malaysia, Turkey). (b) Co-author countries on those works; Saudi Arabia (767 works) is the second-largest partner after France - the quantitative signature of the GCC-MDPI corridor.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- mdpiworks.csv
- mdpireport.txt
- summaryreport.txt
- comparisontable.csv
- evrsampleDZ.csv
- worksDZ20152025.csv
- worksIN20152025.csv
- worksTR20152025.csv