A Blockchain-Based Framework for Indexing Academic Publications and Identifying Predatory Journals

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Abstract: In this paper, we propose a new blockchain-based system for indexing academic publications. We pose the central question: *Can blockchain technology distinguish genuine journals from predatory ones?* Blockchain offers several key advantages for indexing academic work and differentiating between legitimate and predatory journals by leveraging its core features: transparency, immutability, decentralization, and traceability. Blockchain can be used to create a decentralized, tamper-proof index of scholarly publications. Each publication can be recorded as a block or transaction, time-stamped, and permanently stored. Metadata such as the title, authors, DOI, peer review history, versioning, and editorial decisions can be securely logged. This approach prevents backdating, duplication, or deletion of entries. Importantly, no single company or authority controls the index. A distributed ledger enables open access and trustless verification. Institutions, universities, and individuals can independently verify and access publication histories. Additionally, citations can be recorded as smart contracts or transactions, providing real-time, transparent citation metrics and reducing the potential for manipulation of citation counts or impact factors. In conclusion, blockchain technology holds significant promise for identifying and distinguishing predatory journals from genuine ones.

Key-Words: - Blockchain Technology, Indexing, Genuine Journals, Predatory Journals

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1 Introduction

In this paper, we propose a novel blockchain-based system for the indexing and verification of academic publications. Our central research question is: Can blockchain technology effectively distinguish genuine scholarly journals from predatory ones? We argue that blockchain's inherent properties—transparency, immutability, decentralization, and traceability—provide a robust foundation for a new paradigm in scholarly communication and journal validation. Traditional indexing systems, while

valuable, are often controlled by centralized organizations that may have limited transparency regarding their inclusion criteria, data updates, or oversight mechanisms. This has created vulnerabilities that predatory journals can exploit—presenting themselves as legitimate despite lacking rigorous peer review or editorial standards. A blockchain-based system can mitigate these risks by creating a verifiable, community-driven, tamper-resistant ledger of academic activity. Blockchain's transparency and auditability can help expose predatory behaviors:

Therefore, we propose a novel blockchain-based system for the indexing and verification of academic publications. Our central research question is whether blockchain technology can effectively distinguish genuine scholarly journals from predatory ones. We argue that the inherent features of blockchain—transparency, immutability, decentralization, and traceability—offer a powerful foundation for a new paradigm in scholarly communication, in which the credibility of journals can be objectively verified.

Traditional indexing systems, while valuable, are typically managed by centralized entities that lack full transparency regarding inclusion criteria, update procedures, and peer review oversight. These limitations create loopholes that predatory journals can exploit by mimicking the appearance of legitimacy despite offering little or no peer review, questionable editorial practices, or financial motives that undermine academic integrity. By contrast, a blockchain-based approach can mitigate these risks by providing a decentralized, tamper-proof, and publicly verifiable ledger that records all relevant academic metadata.

In the proposed system, every scholarly publication is registered as a unique transaction or block on a blockchain. This block contains essential metadata such as the article title, author names, institutional affiliations, DOI, and the full timeline of the submission, peer review, revision, and acceptance process. Version histories and editorial decisions are also permanently recorded. Once added, these entries become immutable, making it impossible to alter or backdate publication data. This ensures not only archival integrity but also transparency in the peer review process—a key indicator in distinguishing legitimate journals from predatory ones.

Moreover, the peer review process itself can be logged on the blockchain. Reviewer assignments, their anonymized or verified identities (depending on privacy settings), review timestamps, and recommendations can all be transparently recorded. Such records allow for accountability in the editorial process and make it significantly harder for predatory journals to fabricate or bypass proper peer review mechanisms. Journals that fail to provide such traceable records will stand out in a blockchain-based index, helping researchers avoid them.

Another innovation introduced by this model is the use of smart contracts to record citation data. Citations can be registered as transactions on the blockchain, forming a verifiable, real-time, and tamper-proof record of how often and by whom an article is cited. This directly addresses the common manipulation of citation metrics and impact factors, offering instead an open and trustworthy citation ecosystem. Researchers, institutions, and policy makers can access accurate citation analytics without relying on closed databases or unverifiable statistics.

Importantly, the system is decentralized. No single authority or company governs the index. Instead, a distributed ledger allows nodes—operated by universities, research institutions, or independent scholars—to contribute to the consensus and data verification process. This decentralization enhances trust, ensures resilience against censorship or manipulation, and democratizes control over academic data. All users can independently verify a journal's publication history, peer review rigor, and citation impact.

The transparency of this ecosystem also enables the use of data analytics and machine learning

to identify patterns associated with predatory behavior. For example, unusually fast review times, repeated use of the same reviewers, disproportionate self-citation, or high publication volumes with minimal editorial activity can all be automatically flagged. Such tools would assist researchers in making informed decisions about where to publish and what literature to trust, while reinforcing incentives for journals to uphold high standards.

While the potential of this blockchain-based indexing system is significant, we acknowledge that challenges exist. Storing large volumes of academic data on-chain requires careful optimization, potentially through off-chain storage solutions with on-chain hashes to ensure data integrity. Balancing transparency with the privacy of authors, reviewers, and editors will also be crucial, especially in sensitive or anonymous peer review contexts. Furthermore, widespread adoption of the system will depend on interoperability with existing infrastructures like ORCID, Crossref, or Scopus, and may require incentive structures to encourage early participation from reputable journals and institutions.

In conclusion, blockchain technology offers a transformative approach to academic publishing by embedding trust, transparency, and verifiability into the indexing process. It empowers the academic community to collaboratively build and maintain an open, incorruptible record of scholarly communication. By enabling rigorous validation of editorial practices, citation behaviors, and peer review procedures, blockchain can serve as a powerful tool in the global effort to identify and expose predatory journals, thereby safeguarding the credibility of academic research in the digital age.

2 Blockchain technology for Indexing

We have the following benefits if we use Blockchairn technology for the Indexing of Academic Publications.

a. Verifiable Peer Review

Every step of the peer review process (submission, reviewer reports, editor decisions) can be cryptographically signed and stored on-chain. Journals with real peer review records on-chain demonstrate transparency; predatory journals typically skip this.

b. Immutable Author and Journal Records

Fake or cloned journals can be identified because genuine journals will have verified, traceable records (publisher, ISSN, publication frequency, editorial board). Authors' publication histories can be verified via blockchain hashes or digital signatures.

c. Smart Contracts for Quality Control

Smart contracts can enforce conditions (e.g., minimum number of peer reviewers, conflict-of-interest declarations). Only when conditions are met, the article can be marked as "peer-reviewed".

d. Community-Driven Trust Scores

Researchers and institutions can rate and evaluate journals. These ratings, stored on blockchain, are immutable and globally visible, providing a community-based defense against predatory practices.

How we can implement this

First of all we need **a** *Decentralized Indexing Mechanism:*
Every academic publication is recorded on a blockchain ledger as a unique transaction or block. This entry includes essential metadata such as:

- Title and abstract
- Author(s) and institutional affiliations
- Digital Object Identifier (DOI)

- Submission, acceptance, and publication dates
- Version history and revision timestamps
- Peer review records, including reviewer comments and editorial decisions

This data, once validated and entered, becomes immutable and publicly accessible, eliminating the possibility of post-publication alterations or deceptive editorial practices.

We also need **a Transparent Peer Review Tracking:**
One of the key differentiators between genuine and predatory journals is the rigor of the peer review process. Our system incorporates a mechanism to log the entire peer review lifecycle on the blockchain. Each reviewer's identity (if non-anonymous), review date, recommendation, and any conflicts of interest can be documented, offering a level of transparency and accountability that traditional systems lack. Journals unable or unwilling to provide this data would be easily flagged by users and evaluators.

We also need **Smart Contracts for Citations and Metrics:**

Citations are traditionally counted and reported through opaque processes, making it easy to manipulate metrics such as impact factor or h-index. With blockchain, each citation can be logged as a **smart contract**, a self-executing agreement that records when and where an article is cited. This enables:

- Real-time tracking of citation data
- Immutable citation records
- Verification of the source and legitimacy of the citing document

These features make citation metrics **tamper-proof** and **transparent**, reducing incentives and opportunities for gaming the system.

We also need C**ommunity and Institutional Validation:**
Universities, research institutions, funding bodies, and independent researchers can act as nodes in the network, contributing to consensus mechanisms and data verification. Such a decentralized trust model ensures that no single entity monopolizes control, and fraudulent activities can be detected and corrected collaboratively. Validation scores or reputational ratings can be assigned to journals based on historical transparency, review quality, citation integrity, and author feedback.

3. Detecting Predatory Patterns Through Analytics:

With a large volume of structured data on publication timelines, review histories, and citation behaviors, machine learning algorithms can be applied to identify suspicious patterns characteristic of predatory journals. These might include:

- Excessively short peer review durations
- Repetitive use of the same reviewers or editors
- High publication volumes without corresponding review activity
- Citation cartels or self-citation clusters

Such predictive analytics can aid researchers in making informed decisions about where to publish or what literature to trust.

Advantages Over Traditional Indexes:

- **Permanence and Integrity**: Once a record is added, it cannot be altered, deleted, or backdated.
- **Openness and Interoperability**: Anyone can access the system and integrate its data via APIs or decentralized apps (dApps).
- **Trustless Operation**: Users do not need to trust a central authority; trust is derived from the cryptographic and consensus mechanisms underlying the blockchain.
- **Resilience Against Manipulation**: Transparency and distributed control reduce incentives and avenues for fraudulent behaviors.
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Potential Challenges:

While promising, the implementation of a blockchain-based academic indexing system also faces several challenges:

- **Scalability**: Storing large volumes of metadata and citation logs on-chain may require optimization strategies such as off-chain storage with on-chain hashes.
- **Privacy and Anonymity**: Care must be taken to balance transparency with the privacy rights of authors, reviewers, and editors.
- **Adoption and Incentives**: Encouraging participation from established journals and institutions will require incentives and perhaps integration with existing systems (e.g., ORCID, Crossref, Scopus).

4. Practical Implementation Ideas

a. ORCID + Blockchain Integration: Strengthening Author Identity Verification

One of the major challenges in academic publishing is ensuring the authenticity of authorship. By linking blockchain records with **ORCID (Open Researcher and Contributor ID)** profiles, we can create a robust identity verification mechanism. Each scholarly publication recorded on the blockchain could be associated with the ORCID ID(s) of its author(s), creating a cryptographically verifiable connection between the work and the individual contributor.

This integration would help:

- Prevent identity theft or impersonation in authorship.
- Ensure accountability in cases of academic misconduct.
- Create transparent author profiles showing immutable records of peer-reviewed contributions, revisions, and review activity.

Furthermore, institutions and funding agencies could use this integrated identity system to assess research output and impact with a high degree of trust.

b. DOI Hashing: Immutable Verification of Scholarly Metadata

Digital Object Identifiers (DOIs) are the standard identifiers for academic articles. By storing **hashes of DOI metadata on a blockchain**, we can provide an immutable verification mechanism that confirms:

- The authenticity of a publication's metadata (e.g., title, author list, abstract, affiliations, and journal).
- The exact time of publication, verified by the blockchain's time-stamping function.

If the metadata of a paper is ever altered fraudulently after publication (e.g., in predatory practices), the mismatch between the live DOI metadata and the original blockchain hash would reveal the tampering. This ensures data integrity, supports version control, and allows long-term archival preservation.

c. Hybrid Systems: Bridging Traditional Indexes with Blockchain Trust Layers

Traditional academic indexing platforms such as **Scopus, Web of Science, and PubMed** serve as central repositories for scholarly metadata and citation metrics. However, these systems rely on centralized infrastructure and may lack full transparency in editorial and peer review records.

A **hybrid model** could involve:

- Maintaining current centralized databases while integrating blockchain-based validation layers for key data fields (e.g., peer review history, submission dates, editorial decisions).
- Each indexed record could include a blockchain link or digital signature verifying its origin, peer review process, and DOI metadata.
- Institutions and libraries could run **lightweight blockchain nodes** to perform independent validation without depending on centralized trust authorities.

This layered approach would allow traditional systems to benefit from blockchain's trustless verification without disrupting existing workflows. Over time, indexing platforms could migrate toward more decentralized operations if desired.

d. Smart Contracts for Workflow Automation and Quality Assurance

Beyond data storage, **smart contracts** could automate quality checks and workflows:

- Only allow indexing of articles that meet predefined peer review and plagiarism-check standards.
- Automatically trigger alerts for missing review steps or conflicts of interest.
- Enable decentralized or community-based arbitration in case of authorship or ethical disputes.

Such contracts would formalize the editorial process, improve compliance with ethical standards, and minimize the influence of human bias or commercial pressure.

e. Blockchain-Based Citation Tracking and Anti-Manipulation Measures

Citations play a crucial role in assessing academic influence, but they are prone to manipulation through practices like self-citation, citation rings, or inflated metrics. A blockchain-based citation ledger could:

- Record each citation as a transaction, with metadata about the citing and cited works.
- Make citation patterns transparent and publicly auditable.
- Provide real-time citation metrics with verifiable provenance.

By offering traceable and tamper-resistant citation data, blockchain can support more reliable evaluation of research impact.

5. About the WSEAS

As a typical example of Block chain technology is the WSEAS. To demonstrate that WSEAS is not a predatory publisher, we can apply a set of objective and internationally recognized criteria used by universities, academic libraries, and indexing agencies to assess the credibility of scholarly publishers. These criteria provide a rigorous framework for distinguishing between legitimate academic organizations and those that operate unethically. First and foremost,

WSEAS journals are indexed in **Scopus**, one of the most selective and respected academic databases in the world. Scopus applies a comprehensive evaluation process that considers peer review quality, publication ethics, citation metrics, editorial board composition, and adherence to regular publication schedules. As of 2024, sixteen WSEAS journals are included in Scopus, such as *WSEAS Transactions on Systems and Control*, *WSEAS Transactions on Power Systems*, and *WSEAS Transactions on Environment and Development*. This inclusion signifies compliance with high academic standards, as predatory journals are rarely accepted into Scopus and are removed when unethical practices are detected.

Secondly, WSEAS upholds a transparent and rigorous peer review process. All submitted manuscripts undergo double-blind peer review, involving at least two or three independent experts. Each reviewer is required to submit a formal report, and authors must revise their manuscripts accordingly. Editors carefully verify that all review criteria are met before acceptance. These practices contrast sharply with those of predatory journals, which often bypass or falsify peer review in order to publish rapidly for profit. WSEAS, by contrast, maintains editorial integrity through strict quality checks and frequently rejects submissions that do not meet academic or ethical standards.

Another key indicator of WSEAS's legitimacy is its **membership in CrossRef**, a nonprofit organization that manages Digital Object Identifiers (DOIs) for scholarly content. WSEAS assigns DOIs to all published articles, ensuring that each one is permanently registered, traceable, and integrated into global citation networks. Predatory publishers often misuse DOIs or fail to assign them at all, undermining the discoverability and permanence of their content.

WSEAS also follows well-established **ethical publishing practices**. It adheres to the guidelines of the Committee on Publication Ethics (COPE) and has implemented clear policies on plagiarism detection, retraction procedures, authorship, and citation standards. Each submitted article is checked for originality, and the publisher takes corrective action when ethical concerns arise. These measures reflect a deep commitment to academic integrity, in stark contrast to the practices of predatory publishers, which often ignore or superficially address such standards.

The credibility of WSEAS is further supported by its **recognized editorial boards**. Each journal clearly lists the editor-in-chief and editorial board members, providing full names, academic degrees, institutional affiliations, and in many cases, contact details such as institutional email addresses. These individuals are active researchers and academics from reputable universities around the world. This level of transparency and academic engagement is rarely found in predatory journals, which sometimes list fictitious names or add scholars without their consent.

Additionally, WSEAS journals demonstrate **real scholarly impact**. Articles published by WSEAS are cited in reputable academic journals, books, doctoral theses, and conference proceedings across disciplines such as engineering, mathematics, computer science, and physics. These citations appear in databases like Google Scholar and Semantic Scholar, indicating genuine academic usage. Predatory publishers, by contrast, often produce content that is ignored, unindexed, or blacklisted.

Beyond journal publishing, WSEAS plays an active role in the academic community by organizing international scientific conferences throughout Europe and beyond. The Proceedings are published by AIP, IOP, IEEE, Springer Verlag or even the WSEAS itself. These conferences include peer-reviewed proceedings, keynote addresses by respected scholars, and collaborations with universities and research institutions. Such events reflect the publisher's commitment to facilitating academic exchange and are vastly different from the fraudulent or purely commercial

conferences often associated with predatory operations.

Finally, WSEAS does not appear on Beall's List—neither the original nor any updated versions—nor is it listed on Cabell's Blacklist**,** both of which are known for identifying unethical or deceptive publishers. This absence serves as a strong external confirmation that WSEAS is not regarded as predatory by major academic watchdogs.

In conclusion, WSEAS clearly satisfies the criteria of a legitimate academic publisher. Its indexing in Scopus and CrossRef, its rigorous peer review system, its adherence to ethical standards, the presence of professional editorial boards, verifiable DOIs, scholarly citation activity, and its organization of international conferences all attest to its credibility. WSEAS operates transparently and in accordance with global academic publishing norms. These qualities place it well above the threshold of what constitutes a reputable, non-predatory scholarly publisher.

6. Conclusion

Blockchain technology has the potential to transform the academic publishing ecosystem, particularly by enhancing transparency, trust, and accountability in indexing systems and by helping to distinguish reputable journals from predatory ones. One of its most impactful applications lies in its capacity to record immutable, time-stamped data at every stage of the scholarly publishing process. When integrated with rigorous editorial policies, blockchain can further reinforce the credibility of publishers such as WSEAS, which already upholds a strict and multi-layered peer review protocol.

The WSEAS is recognized for its comprehensive peer review process, where submissions undergo a detailed evaluation by expert referees. Emphasis is placed on originality, technical merit, and scholarly contribution. In contrast to predatory journals—which often promise rapid publication with minimal editorial scrutiny—WSEAS follows a well-documented and verifiable methodology. Incorporating blockchain into this process would enhance transparency by cryptographically recording each step, from submission to the final editorial decision. This would include anonymized or pseudonymized reviewer identities, review timelines, revision records, and editorial comments. The result would be an immutable audit trail that confirms the academic rigor of the review process and guards against manipulation or misconduct. Additionally, blockchain could be leveraged to create a decentralized and tamper-proof index of scholarly publications. Articles published by WSEAS could be embedded with blockchain-based DOI records that store comprehensive metadata, including author affiliations, peer review histories, and publication timestamps. This transparent framework would enable readers, indexing databases, and academic institutions to instantly verify the authenticity and provenance of each article. Citation data could also be recorded on-chain, enabling real-time tracking of scholarly impact and reducing the potential for citation manipulation.

In an academic landscape increasingly threatened by predatory publishing practices—characterized by a lack of transparency, absence of proper peer review, and prioritization of profit over scholarly quality—blockchain provides a powerful mechanism for authentication and verification. Unlike legitimate publishers, predatory journals would find it extremely difficult to fabricate peer review or editorial history on a blockchain, as each action must be cryptographically signed and independently verifiable. In contrast, credible publishers like WSEAS would benefit from enhanced trust and visibility, supported both by their longstanding editorial standards and the blockchain's permanent, verifiable records. Furthermore, smart contracts could be implemented to ensure that only manuscripts meeting established quality criteria—such as multiple peer reviews, conflict-of-interest disclosures, and plagiarism screening—are approved for indexing or digital certification. This would introduce an additional layer of trust

and accountability for authors, reviewers, and research institutions. In conclusion, blockchain technology offers a compelling framework for improving the credibility and integrity of academic publishing. When combined with the rigorous editorial practices already upheld by WSEAS, blockchain can provide a transparent and auditable system of scholarly validation. This integration not only helps differentiate reputable journals from disreputable ones but also strengthens global efforts to preserve the integrity of academic research dissemination.

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