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RESEARCH ARTICLE

Game-Theoretic Analysis of Stakeholder Interests in Open Access Ecosystem

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Abstract:

Since the 21st century, the rapid development of digital, network, and intelligent technologies has fostered a global consensus on open science. As a core component of open science, open access (OA) is widely regarded as the mainstream for academic information sharing in the future. In recent years, OA has developed rapidly, gradually challenging and partially surpassing the traditional subscription-based publishing model, while simultaneously sparking ongoing debates regarding its advantages, disadvantages, and sustainability. The healthy development of OA depends not only on technological and policy support but also on closely tied to the interplay among various stakeholders. According to stakeholder theory and game theory, this paper analyzes the behavioral patterns and strategies of stakeholders within the OA ecosystem, providing theoretical foundations and practical references for establishing a fair and sustainable OA system.

1 | Global OA Status and Stakeholders

1.1 | Global OA Development Status

The emergence of preprint platforms in the 1990s marked the germination of the OA concept, while the release of the "3B" (Budapest Open Access Initiative, Bethesda Statement on Open Access Publishing, Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities) in the early 21st century secured OA's international recognition. The quantity of OA journals or OA papers published in hybrid journals have continued to grow: as of January 2026, the Directory of Open Access Journals (DOAJ) has indexed nearly 23,000 journals, including 14,000 diamond OA journals. In contrast, Web of Science (WoS) data shows that OA papers have accounted for over 50% of publications since 2022, most of which are gold OA. Traditional publishers have shifted from resisting OA to actively adapting through transformation strategies, in order to secure the market influence by signing transformative agreements with universities and purchasing emerging OA platforms. For stakeholders in the OA ecosystem, reaching a game-theoretic equilibrium while at least satisfying their minimum interests constitutes the prerequisite for participation. The controversies and debates surrounding the fairness, sustainability, quality, and credibility of OA ultimately stem from the existence of imbalanced games among these entities.

1.2 | Key Stakeholders

The primary stakeholders in the OA ecosystem include: the public (including enterprises, etc.), governments, academic institutions (universities and research institutes), publishers, libraries, professional societies and associations, funding agencies, and researchers (who hold dual identities as both authors and readers). Information, capital, and knowledge flow among these stakeholders, forming inherent game-theoretic relationships. Figure 1 illustrates this logical relationship and the pathways of these flows.

FIGURE 1 | Logical relationship diagram between various stakeholders in open access

2 | Horizontal Game Strategy

Horizontal rivalry refers to non-cooperative competitive behavior among peer stakeholders within the same category.

(1) National or regional level. Countries compete for dominance in OA through policy frameworks and infrastructure investment. The United States, for instance, has mandated via OSTP policy full public access implementation by 2025. India pursues its "One Nation, One Subscription" initiative. Europe strengthened regional competitiveness through "Horizon 2020" and open research platforms construction. The UK prioritizes Knowledge base storage, while France sticks to the diamond OA model under its *Second French Plan for Open Science*. Japan strengthens its OA infrastructure through the J-STAGE platform, and the Netherlands' *Open Science 2030* aims to dismantle barriers to scholarly communication by 2030 through a tripartite approach encompassing green, diamond, and gold OA. Although regional coalitions have made strides in developing OA infrastructure, considerable divergence still persists in the enforceability.

(2) Academic institutions and funding agencies. Academic institutions develop Knowledge base storage and green OA archiving platforms, formulate funding and evaluation policies, and enhance their research impact and scholarly reputation. Funding agencies, such as NIH, the Bill & Melinda Gates Foundation, and domestic counterparts such as the NSFC and CAS enforce mandatory OA policies for grant-supported outputs. Prestigious institutions, leveraging their superior financial resources and research capacity, enhancing their initiative in the development.

(3) Publishers. Commercial publishers and emerging OA platforms compete on brand recognition, market share, APC pricing, and value-added services. The three major publishing groups—MDPI, Springer Nature, and Frontiers—collectively account for approximately 52% of global OA article output (OASPA data). Predatory journals jeopardize the OA ecosystem, therefore, regulation and quality enhancement is of great necessity for OA publishing. Journals such as *eLife* have pioneered transformative peer review models in exploring novel publishing paradigms.

(4) Researchers. The focus of the debate is on whether to embrace OA models or not, in order to cost-effectively publish high-quality papers. National and institutional capacity determines the discourse power of researchers in the OA game theory. Certain scholars have explicitly refused to review for APC charging journals, giving support to non-APC models such as diamond OA.

3 | Vertical Game Strategies

Vertical games strategies constitute cooperation behaviors among different roles within the OA ecosystem. Governments and academic institutions/publishers engage in policy-making, funding allocation, and infrastructure development to maximize research output and public scientific services. Academic institutions and researchers collaborate through education, incentives, and funding mechanisms to OAize of research outputs while enhancing institutional scholarly impact. Publishers and researchers/institutions achieve interest equilibrium through publishing platforms, peer review systems, and marketization; a specific example is the multi-year OA agreement negotiation between the University of California and Elsevier, where both parties have repeatedly negotiated to break the traditional

subscription model and to bargain APC fees, ultimately reaching a 4-year dynamic equilibrium agreement, reflecting the collision of economic interests, discourse power, and ideas. Libraries, funding agencies, and societies facilitate OA implementation and maintain OA ecosystem stability through resource sharing, standard-setting, educational publicity, and funding grant support. The German DEAL Consortium's negotiations with Elsevier represent another significant case of vertical game strategies. Previously, certain Chinese academic institutions have blacklisted journals under OA publishers such as Frontiers, MDPI, and Hindawi (a brand by Wiley discontinued in December 2023), reflecting game-theoretical behaviors centered on publication quality and academic integrity. The core of vertical game strategies lies in cooperative selection and interest maximization, while concurrently safeguarding quality, integrity, and academic reputation.

4 | Dynamic Equilibrium and Healthy Sustainable Development

The healthy development of OA depends on stakeholders achieving interest equilibrium through dynamic games, ensuring that all parties gain benefits while bearing corresponding responsibilities. Current OA practice still faces various challenges: imbalanced international voice, together with predatory journals and commercial low-quality publications undermining the ecosystem; significant risks to publication quality and integrity; and uneven distribution of academic resources caused by insufficient funding or high APC. It is recommended that all stakeholders participate in games rationally and responsibly, embodying principles of fairness, inclusiveness, and cooperation. The "scholar-led publishing model" should be explored to enhance scholars' bargaining power and reduce costs, while addressing funding challenges. At present, Chinese authors' OA publications are concentrated in a handful of international publishing groups, leading to increasingly prominent issues such as "knowledge export," "outflow of research funding," and "journal impact factor obsession."

5 | Conclusion

To reach a strategic equilibrium for OA games is based on the recognition of the OA concept, on which a global consensus has already been formed; however, divergences persist regarding specific models and publishing behavior. Stakeholders need to continuously adjust their strategies through cooperation and innovation to achieve dynamic equilibrium. A healthy and sustainable OA ecosystem can not only enhance the efficiency of scholarly communication but also promote global research equity and knowledge sharing, thereby supporting the attainment of the United Nations Sustainable Development Goals.

Reference

[1] Zhang TM, Zhang X, Ren S L, et al. Game analysis of interests of open access stakeholders [M]. *Academic Publishing Research,* Central South University Press, Changsha, Hunan, China, 2023.