Post-print: Changes in the Scholarly Communication Field and Value Chain Reconstruction in the Open Access Context

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Abstract

[Purpose/Significance] This study examines the field changes and value chain reconstruction of academic information exchange in the open access context, aiming to optimize the ecosystem of academic information exchange and improve its efficiency. [Method/Process] Using field theory, it analyzes the evolving relationships among actors in academic information exchange under open access, and explores the impact of these changes on the academic information exchange value chain. [Results/Conclusions] In the open access context, the field of academic information exchange exhibits a multi-actor trend. Based on the space for mutual integration and coordination, this paper proposes and constructs two reconstruction models for the academic information exchange value chain: single-actor value chain integration and multi-actor value chain collaboration.

Full Text

Field Changes and Value Chain Reconstruction of Academic Information Exchange in the Open Access Context

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Abstract: *[Purpose/Significance]* This study examines the field changes and value chain reconstruction of academic information exchange in the open access context to optimize the academic information exchange ecology and improve its efficiency. *[Method/Process]* Using field theory, we analyze the evolving relationships among actors in academic information exchange under open access and discuss how these changes affect the academic information exchange value chain. *[Result/Conclusion]* In the open access context, the field of academic information exchange exhibits a multi-actor trend. Based on their integrated

collaborative space, we propose and construct two reconstruction models for the academic information exchange value chain: single-actor value chain integration and multi-actor value chain collaboration.

Keywords: open access; academic information exchange; field theory; value chain reconstruction

2. Academic Information Exchange Value Chain and Field Theory

2.1 Research on the Academic Information Exchange Value Chain

Value chain theory, proposed by Michael Porter, is a tool for discovering and evaluating competitive advantages by analyzing value-added activities within or between enterprises, representing a combination of interrelated value activities in an industry [1]. Due to its strengths in analyzing value flow and division-of-labor relationships, the theory has been extended to numerous research domains, including academic information exchange. Constructing an academic information exchange value chain can more clearly describe the interactive relationships among various actors in the process and their resource allocation, thereby providing more reasonable directions and strategies for resource distribution and division of labor for specific academic actors or the entire exchange ecology.

The academic information exchange value chain primarily comprises several stages: research funding, scientific research, paper writing, publication, dissemination and usage, and impact assessment. Through these stages, authors provide academic capital in exchange for symbolic capital; publishers provide platform capital in exchange for economic capital; academic institutions and their libraries, along with users, provide economic capital in exchange for academic capital; and governments and research funding agencies provide political or economic capital in exchange for research output or to guide research directions. Domestic research on the academic information exchange value chain has focused on two aspects: first, studies on the value chain itself. Song Dongying analyzed the composition of traditional and internet-era academic journal industry value chains, discussing key priorities for value chain reconstruction in the network era [2]; Yang Zhihua defined the academic journal value chain and analyzed the positioning of various roles within it [3]; Yu Chunsheng identified problems in the internal associations and operation of the digital journal industry value chain, actively seeking optimization principles, paths, and strategies [4]. These studies have essentially established that the core product of academic information exchange value chains is new ideas or methods, and identified the actors as individuals and institutions involved in publishing, distribution, reading, and reviewing academic texts, along with their demands and positions. With rapid digital technology development, mobile terminals and distributed connectivity are profoundly influencing academic information exchange, continuously

extending the value chain' s connotation—for instance, Wang Pengtao proposed value chain reconstruction for mobile reading platforms [5].

Second, research on value chain extension primarily contains two directions: Extension from traditional academic publishing value chain links to other academic information exchange value chain links. Yan Lingyan et al. argue that academic social platforms can extend the academic publishing value chain upstream and downstream, providing research assistance services upstream and outcome dissemination and evaluation downstream to ultimately establish a comprehensive academic exchange ecology [6]; Peng Yan and Yang Miao believe that information technology has broken the licensing system barriers in the publishing industry, necessitating enhanced knowledge service added value in other value chain links such as processing, personalized services, and R&D to overcome profit dilemmas [7,8]; Lian Xiaochuan systematically discussed the concept of "academic exchange value chain" and "value chain extension" theory, analyzing Elsevier' s value chain extension reasons and its academic platform construction and strategic deployment covering the entire research value chain [9]. Value chain extension combining academic publishing with other industries, primarily focusing on cultural creativity, film/television, IP, exhibitions, healthcare, and other fields [10-13]. Traditional academic information exchange involves numerous value activities being replaced by machines and digital dissemination; personalized knowledge services will gradually become the main value-added activities and core competitiveness for service-oriented actors such as publishers, libraries, and digital academic exchange platforms; digital academic community platforms will gradually become the "publish-consume" centers of value-added activities.

Overall, domestic research on the academic information exchange value chain exhibits three characteristics: Publishing-centric focus; Emphasis on the internet' s impact on the value chain; and Focus on value chain extension. Apart from value chain extension combining with other industries, research on the internal academic information exchange value chain has remained centered on the publishing value chain, focusing on publishers' acquisitions and platform construction while neglecting value chain integration behaviors by libraries, universities, emerging research service institutions, and research funding agencies. It has also overlooked multi-actor value chain collaboration possibilities beyond single-actor value chain extension models. In the digital era, as publishers' monopoly in academic information exchange continuously weakens, relationships with other actors are no longer simple binary oppositions but form interconnected multi-actor networks—making field theory particularly suitable for explaining such multi-actor network relationships.

2.2 Field Theory and Its Applicability to Academic Information Exchange Value Chains

Bourdieu' s field theory posits that human society comprises numerous power relationship networks—fields—in which individuals or groups, possessing capital,

engage in power competition through capital interactions, forming dynamically stable social orders. Field theory emphasizes multiple actors, dynamism, and capital relationships, and can be described by three elements: actor positions, capital and habitus, and field logic (rules) [19]. Scholars have continuously affirmed and supplemented field theory' s applicability to digital academic information exchange systems [20,21]. All actors in academic information exchange (publishers, digital academic exchange platforms, governments and academic alliances, academic institutions and their libraries, etc.) exercise power based on their possessed capital, making the academic information exchange system essentially a game among holders of different power capitals. Research on academic information exchange value chains centered on publishing has been limited to publishers' acquisitions and platform construction, neglecting value chain integration by libraries, universities, emerging research service institutions, and research funding agencies, as well as multi-actor collaboration possibilities beyond single-actor extension models. In the digital era, as publishers' monopoly continuously declines, relationships among actors form interconnected multi-actor networks rather than simple binary oppositions—precisely what field theory excels at explaining.

3. Changes in the Academic Information Exchange Field Under Open Access

Open access rules optimize field logic by adjusting actors' relative positions in the academic exchange field, preventing academic publishers from monopolizing literature resources to hinder academic information exchange, thereby causing changes in the academic information exchange ecology.

3.1 Changes in Academic Information Exchange Actors

Open access broadens academic information exchange channels, enhances the central position of user communities, and transforms the fields of journal publishers, digital academic exchange platforms, governments and academic alliances, and academic institutions and their libraries. Figure 1 [Figure 1: see original paper] illustrates these actors' changing relative positions and functions.

(1) Journal Publishers. Traditional literature access based on journal subscription models made research output a bargaining chip for publishers to raise prices, constituting the primary cause of the "academic journal crisis." In the open access environment, publishers no longer occupy the central position in academic information exchange. Knowledge service-based charging models establish equal relationships between publishers and other academic service actors, forcing publishers to strategically adjust by expanding open access businesses, extending platform value chains (e.g., providing open science services, establishing open data standards, offering open platforms) to stabilize revenue. Taking Elsevier as an example, it provides professional peer review for its open access journals, signs open agreements with some institutions, and supports research

teams in sharing and opening research data [22].

(2) Digital Academic Exchange Platforms. Emerging internet-based academic information service platforms participate in the open access movement in diverse ways, becoming the most powerful competitors to traditional academic journal publishers. However, not all are profit-driven—some are established by charitable or public organizations. These actors are at the forefront of academic knowledge service innovation but face issues such as insufficient funding and chaotic management. In the open access journal field, platforms like BioMed Central and the Public Library of Science (PLOS) sustain operations through publication service fees and social funding [23]. For users, these OA pathways offer price advantages over traditional publishers' hybrid open access journals without significant differences in journal impact [24]. In self-archiving, besides preprint servers like arXiv, academic social network platforms such as ResearchGate have emerged, combining preprint archiving with academic exchange functions to provide greater literature impact and more feedback [25]. These new academic exchange fields have also given rise to evaluation metrics like Altmetrics [26], which incorporate academic behaviors on social platforms, breaking through the influence evaluation system traditionally set by journal publishers.

(3) Academic Institutions and Their Libraries. Academic institutions and libraries are closest to authors and users in academic information transmission, facilitating small-scale open access, but this also limits their knowledge services to institutional users. Their non-economic capital orientation makes them less sensitive to market demands and slower in service transformation. Previously, they purchased academic resources from publishers uniformly for user access within certain scopes. Now, increasing numbers of institutions attempt to reduce publisher dependence by building their own open access databases or indexing open access resources [27]. In the open access era, both publishers and libraries can serve as intermediaries for research data access, leading to some convergence. Consequently, some universities are exploring open cooperation models between their libraries and presses or forming academic institution resource alliances. For example, University College London (UCL) has integrated its library (UCL Library), publishing platform (UCL Press), and discovery platform (UCL Discovery) to provide an integrated service system for open publishing, review, retrieval, and access for its researchers [28].

(4) Governments and Academic Alliances. In the early stages of the open access movement, when relationships among actors remained unclear, governments and academic alliances utilized their political and economic capital to promote inter-actor negotiations and field rule formation. Regional governments and academic alliances have significantly guided local open access movements [29]. European countries have explored this most extensively in recent years. Eleven nations and the European Research Council jointly proposed Plan S [30], which prohibits hybrid publishing models and mandates immediate open access for publicly funded papers. Since 2019, through negotiations between European countries and major publishers, Plan S has evolved into transformative

open access transition agreements [31], which eliminate traditional subscription and open service fees but allow publishers to negotiate diverse charging models with European countries individually to maintain profits.

Overall, open access has changed academic information exchange and utilization patterns from linear, single-channel to distributed network-based development [32], breaking fixed correspondences between actors and functions, making journal publishers no longer the absolute exchange center [33], while rendering the academic information exchange field more service-oriented [34]. Consequently, all relevant actors face transformation and service changes.

3.2 Changes in the Academic Information Exchange Ecosystem

Under the traditional academic information exchange field, actors' demands and relationships functioned as follows: To produce academic outcomes, governments and academic organizations (as research funding agencies) possess various types of political or economic capital, guiding academic research directions and research output through policy or economic means; researchers possess academic capital, using political and economic support from funding agencies to produce academic outcomes, submit to publishers, and expect to gain or increase symbolic capital such as reputation and position through academic dissemination; publishers possess platform capital, providing review, publication, and promotion services, converting platform capital into economic capital by charging downstream fees; downstream academic institutions, libraries, and users pay for academic papers, obtaining knowledge information by surrendering economic capital to enhance their own academic capital or value. In this traditional system, publishers only transferred platform capital yet simultaneously acquired both academic outcomes and downstream economic capital. Transferring platform capital to excellent papers further enhanced publishers' discourse power. Publishers' capital thus continuously accumulated, their discourse power continuously increased, ultimately causing the "academic journal crisis." Under such field inertia, power relationships between publishers and other actors were unequal.

To overcome the "academic journal crisis," transformative open access agreements emerged—contracts negotiated between publishers and various institutions (national or regional research alliances, libraries, etc.) that aim to shift from subscription-based commercial pricing models to more reasonable pricing systems based on open access service fees [35]. In negotiating these transformative agreements, governments and academic alliances play crucial roles by concentrating economic and political capital to propose unified industry rules, representing industry interests in negotiations with traditional commercial publisher groups to force concessions. Based on this field logic, publishers can negotiate individually with downstream libraries and academic institutions to make rules more feasible.

Specifically, open access rules generally include several principles: Ensuring

immediate open access to journals. Eliminating publishers' dual charging systems that bundle subscription fees with open access fees, adopting a more reasonable "publish-and-read fee" model [36]. This reformatively distinguishes journal subscription fees from publication fees—authors pay article processing charges based on the number of published papers to cover publishing costs while canceling subscription fees to provide open access to users. Adopting an author-pays model where authors bear platform publishing and reading fees but increase their articles' copyright and economic revenue shares.

When academic information exchange actors jointly comply with transformative open access agreements, new cooperative relationships form. Authors create works and, with research funding agency support, pay service fees; all service intermediaries, including publishers, exchange economic capital based on provided service value; academic institutions, libraries, and readers access literature for free; authors gain symbolic capital through literature usage by readers and institutions; research funding agencies guide academic research through economic capital support. This both satisfies each actor' s interests in academic information exchange and ensures maximum conversion of all capital inputs into academic outcomes, creating value addition for academic user groups. Currently, publishers and downstream knowledge service entities such as libraries must conduct differentiated negotiations under these open access transformative agreements and provide diversified services. The academic information exchange ecosystem based on transformative open access agreements is illustrated in Figure 2 [Figure 2: see original paper].

4. Value Chain Reconstruction Under Academic Information Exchange Field Changes

In the open access context, a user- and service-oriented academic information exchange field is gradually forming. Value chain actors both possess objective conditions for aggregating academic information exchange functions and services and face market competition and open access alliance inducements. Therefore, we can explore the aggregated reconstruction of the academic information exchange value chain from two aspects: single-actor internal academic resource coordination through value chain integration, and multi-actor academic resource sharing and cooperation through value chain collaboration.

4.1 Single-Actor Reconstruction: Value Chain Integration

Field logic refers to objectively existing relationships (domination, subordination, correspondence) and operational rules within a field space. Each field' s logic gradually forms through internal capital interactions while also being influenced by other fields (political, religious, cultural, etc.). For academic information exchange, field logic can be understood as established processes, regulations, rules, laws, and ethical guidelines that change both through internal factors such as shifting power relationships between publishers and authors and

intervention by emerging digital academic exchange platforms, and through external factors like national policies and users' academic information usage habits. Therefore, academic information exchange actors can expand their own capital through value chain integration, thereby increasing their influence in the field and making field logic more favorable to themselves. Value chain integration requires actors in the value network to be user-demand-oriented, exert synergistic effects, and utilize complementary resources and capabilities within actors to enhance value-added benefits [37].

Although various links in the academic information exchange value chain (funding, data collection, experimental analysis, publication, dissemination and expansion, impact assessment, etc.) are not managed by unified actors, all research activities are implemented through capital exchanges between research teams and the field—that is, the entire research process and user demands are coherent. Therefore, through sharing and integrating academic resources, service content, and community platforms, unifying various academic exchange links can satisfy researchers' needs for coherent knowledge information and improve academic information exchange efficiency. For example, international publishing giant Elsevier, leveraging its accumulated capital, literature, and channel advantages, has actively expanded its business scope and acquired upstream and downstream academic exchange service enterprises, attempting to provide comprehensive knowledge service solutions for the entire academic information exchange process around user needs [38].

4.2 Multi-Actor Reconstruction: Value Chain Collaboration

Beyond single-actor academic information exchange value chain integration, different actors can also collaborate on value chain reconstruction based on field theory. First, actors possess certain upstream-downstream positional relationships in the academic information exchange field value chain, laying the foundation for vertical collaboration; moreover, traditional publishers, open access platforms, and academic institutions with their libraries all attempt to extend along the value chain when adapting to open access, causing overlapping knowledge service businesses among different actors and creating horizontal collaboration spaces. Second, actors' capital and habitus differ. Upstream value chain actors centered on publishers are primarily market-capital-oriented, with advantages in market demand sensitivity and technology/funding aggregation capabilities, but this also leads to monopolies over core competitive elements—academic resources and services—making upstream actors reluctant to share and collaborate. Downstream value chain actors centered on libraries are knowledge-sharing and service-oriented, with advantages in academic information resource sharing and integration, but lagging in digital technology and personalized services with fragmented service communities.

Therefore, publishers and open access platforms need collaboration with downstream libraries and information service institutions to enhance their platforms' service value and market competitiveness; academic institutions and libraries

need upstream actors to provide high-quality, reasonably priced academic resources and digital technology services to facilitate academic knowledge mining, utilization, and dissemination; and network-based academic social platforms that provide direct author-reader communication services have just emerged, holding enormous collaborative value for integrating community resources with other actors' academic and service integration. Since academic information exchange value chain collaboration involves multi-actor resource sharing and cooperation, actors such as universities and public research institutions have achieved better collaborative results. For example, the "Zhongguancun Regional Bibliographic Literature Information Sharing System" led by the Documentation and Information Center of the Chinese Academy of Sciences, together with over 20 institutes and information centers in Zhongguancun, Shanghai, and Wuhan, as well as university libraries including Peking University and Tsinghua University connected through NCFC (The National Computing and Networking Facility of China), actively conducts literature procurement coordination, online cataloging, public retrieval, and interlibrary loan services [39].

4.3 Impact of Value Chain Reconstruction on Academic Information Exchange

The essence of academic information exchange value chain reconstruction is the more rational allocation of academic information exchange resources. First, value chain integration and collaboration can further reduce functional and resource fragmentation for users across different academic exchange links and platforms, thereby improving user experience and academic exchange efficiency. Second, new cooperation rules and resource allocation methods in the reconstruction process form a virtuous cycle with open access movement advancement. Open access is an inevitable trend—only by relying on their own advantages to provide personalized knowledge services, embracing open access, and complementing upstream and downstream platforms can traditional publishers and libraries gain competitive advantages and find new value-added space in the increasingly fierce academic exchange service market. Finally, academic exchange value chain reconstruction based on integration and collaboration forms the foundation for new academic information exchange evaluation systems. The Ministry of Education and Ministry of Science and Technology jointly issued the "Opinions on Regulating the Use of SCI Paper-Related Indicators in Higher Education Institutions to Establish Correct Evaluation Orientations" [40], explicitly proposing to eliminate "SCI supremacy" and explore scientific evaluation systems. This foundation lies in actors jointly entering alternative metrics and open peer review under open access. Emerging digital academic exchange platforms have limited user numbers and fixed communities, largely restricting alternative metrics' application in academic evaluation. This requires publishers, libraries, universities, and other actors to work together to embrace open peer review, jointly establish recognized alternative metrics standards and indicators, and fully recognize authors' academic achievements on open access platforms.

An emerging academic information exchange field centered on communities has appeared in the open access context. Compelled by competitive pressures, actors should conduct intricate, parallel internal and external value chain integration and collaboration to achieve more efficient aggregation of academic information exchange resources. Value chain integration, where single actors aggregate different links of their own academic exchange value chains, is more thorough in integration degree but lacks complete resources or markets. Value chain collaboration requires multi-actor resource sharing, being relatively looser in integration degree but more comprehensive in resources. In actual academic exchange fields, horizontal and vertical integration and collaboration coexist, ultimately leading to academic information exchange value chain reconstruction. Leveraging the mechanism advantages of value chain integration and the resource advantages of value chain collaboration, value chain reconstruction will bring higher efficiency, deeper knowledge services, and better user experience to the academic information exchange ecology.

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Tang Sijia: Participated in paper revision.

Note: Figure translations are in progress. See original paper for figures.