Postprint: Constructing the Ecological Landscape and Application Modalities of Book Publishing in the Liquid Metaverse

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Abstract

The proposal of the metaverse concept represents another disruptive digital revolution following the internet. It is not an optimizing iterative technology, but rather possesses pioneering and integrative characteristics, representing the superposition and aggregation of existing technologies. This technological space, characterized by its structural energy that is highly dynamic, inclusive, and innovative, can endow the publishing industry with unlimited incremental value and momentum, enabling the traditional book publishing industry to break free from its downward decline and rejuvenate by leveraging the momentum of the metaverse. This paper attempts to proceed from the book publishing scenario, focusing on conceptualizing and depicting the ecological landscape that may emerge from the coupling of traditional publishing models with metaverse applications, to provide certain insights for the optimization and sustainable development of the digital publishing industry' s path in the foreseeable future.

Full Text

Constructing the Ecological Landscape and Application Modalities of Book Publishing Under the Liquid Metaverse

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Abstract: The metaverse concept represents another disruptive digital revolution following the internet. It is not merely an iterative optimization of technology but a pioneering and integrative aggregation of existing technologies. This structurally dynamic, inclusive, and innovative technological space can empower the publishing industry with unlimited potential, enabling traditional book publishing to break away from its downward trajectory and rejuvenate through the metaverse momentum. This paper attempts to approach from the perspective

of book publishing scenarios, focusing on envisioning and depicting the ecological landscape that may emerge from the coupling of traditional publishing with metaverse applications, thereby providing insights for optimizing the development path and sustainable growth of digital publishing in the foreseeable future.

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The year 2021 was hailed as the inaugural year of the "metaverse." The concept rapidly swept through business circles, media industries, and the entire internet sector, with enterprises worldwide scrambling to establish their presence in this new frontier, seeking to gain first-mover advantage. In 2021, Facebook announced its rebranding to Meta, declaring its full commitment to constructing the metaverse landscape. Currently, various industries are exploring the metaverse, and the book publishing industry is no exception. Therefore, this paper proceeds from the four foundational attributes of the metaverse, attempting to examine a micro-perspective within the broader publishing concept to discuss and progressively articulate the developmental trajectory of book publishing under the liquid metaverse.

The metaverse represents a disruptive, structural transformation from its inception. The "solid" norms, standards, and frameworks of past societies will be systematically dismantled, inevitably impacting downstream media and publishing practices. The original ecology, rules of engagement, and production mechanisms of the media publishing industry will consequently undergo radical restructuring. In other words, the concept of the "metaverse" will continue to evolve alongside technological iterations and infrastructure improvements, with participants enriching and altering its meaning through autonomous creation and free behavior. Simultaneously, the technological innovation, social capital reshaping, and individual role displacement brought by metaverse scenarios will externally reconstruct a borderless, fluid "liquid" social landscape and media environment.

1.1 Conceptual and Developmental Overview of the Metaverse

The metaverse concept originated from Neal Stephenson' s science fiction novel *Snow Crash*, pointing toward the "ultimate form" of the internet. In reality, the metaverse is a new social and internet formation where virtual and real elements coexist, constructed through the fusion and aggregation of multiple existing technologies. AR, VR, and MR technologies provide deeply immer-

sive experiences for the metaverse' s technical framework, mapping real social environments through digital twin technology to generate a mirror image of the real world and construct a simulated virtual society. Blockchain technology establishes the economic system, closely integrating the virtual and real worlds across economic, social, and identity systems while allowing each user to produce content and edit worlds [1]. However, we must recognize that the metaverse' s definition is not static; it maintains a dynamic developmental logic, continuously evolving in a liquid state alongside technological breakthroughs and innovations.

Originally, "liquid" was a physics term describing the state of matter. Unlike "solid" states, liquids have no fixed shape, are unrestricted by surrounding barriers, and can extend infinitely under certain driving factors. Subsequently, the concept of "liquidization" was explicitly proposed by British sociologist Zygmunt Bauman to explain the characteristics of modern society [2]. He employed "liquidization" to summarize the fluid, mutable trends and infinitely unknown, highly uncertain social features presented in modern society's later development.

1.2 New Publishing Forms Under Metaverse's Directional Advantages

Yin Yanji and colleagues from Huaan Securities propose that the metaverse possesses four core attributes: synchronization and simulation, open-source creation, perpetuity, and a closed-loop economic system. Meanwhile, Roblox CEO David Baszucki elaborated eight characteristics for the general public: identity, friends, immersion, low latency, diversity, anywhere, economic system, and civilization [3]. These core elements construct the most fundamental and essential system framework for the metaverse space, encompassing individual personality expression and communication needs fulfillment, value confirmation and asset circulation functions under the new digital space, and the continuation of advantageous service attributes from existing digital networks. These core attributes can empower digital publishing, enabling it to present new forms.

1.2.1 Embodied Immersive Interaction Through Synchronization and Multi-Sensory Mobilization A synchronized and realistic virtual world constitutes the foundational condition for the metaverse. In the metaverse, the real environment and virtual space are no longer separate and independent structures but an inter-embedded symbiotic entity. Therefore, actions and interactions in virtual space can receive immediate and quasi-realistic feedback on physical bodies, with all events occurring in real society synchronizing in the virtual world. Metaverse-empowered digital publishing will derive new connotations and extensions, mobilizing and utilizing comprehensive senses to bring "virtual" creatures and characters in publications to "life" and "activation" — making them communicable, touchable, and experienceable. Both body and consciousness in the real world can receive feedback and sensations of extremely high fidelity. Under this landscape, digital publishing products will serve as a bridge connecting the two parallel spaces, stimulating users' autonomous cre-

ation and participation motivation in book interaction experiences, and achieving bidirectional improvement in both PGC+UGC content production efficiency and quality.

1.2.2 Open Production Chains and Decentralized UGC Models Open production chains represent that advanced media technologies and scarce platform resources will break the original monopolistic, unitary discourse-dominated situation. The metaverse packages and modularizes code to varying degrees by establishing "standards" and "protocols," allowing individual users to create autonomously according to their preferences and needs, enriching the metaverse' s connotations and continuously expanding its boundaries [4]. This open production model will constitute a comprehensive innovation of today' s UGC (user-generated content), achieving true mass collaboration and innovation. It will break through existing platform computing logic and game rules, enabling cross-platform, mass collaborative editing, thereby promoting the gradual improvement and optimized iterative upgrading of open production chain spaces. The traditional publisher-centric structure will be dismantled, as users are no longer limited to singularly decoding according to coders' intentions but can diverge, imagine, and reconstruct work architectures according to their own inclinations. Publishing content, through interpretation from different people and differentiated perspectives, derives more diverse and enriched endings, enabling the creative transformation and innovative development of culture. A space for mass co-creation, publishing, and sharing will emerge under metaverse empowerment.

1.2.4 Trusted Authentication Mechanisms and a Closed-Loop Economic System with Transferable Rights Blockchain technology and NFT (non-fungible tokens) based upon it serve as a cornerstone and core medium ensuring transparent, standardized, and systematic development of transactions and actions in metaverse space. Users' production and work activities in metaverse scenarios will be recognized through platform-unified currency. Participants entering the metaverse can use currency to consume content within the platform or exchange it for real-world currency at a certain ratio [4]. This will bring high synchronization between the metaverse and real world, organically connecting online and offline. Participants' behaviors in the metaverse can directly impact real-world asset balances and wealth ownership. Such continuous incentive mechanisms will not only compel publishers to continuously optimize existing product architectures but also stimulate experiential users to participate more in interactions, achieving structural improvement and value reconstruction at both production and consumption ends. This attribute of the metaverse represents an opportunity for the publishing industry, which currently faces decline and is on the brink of desperation, to reorganize and move upstream.

2. "Meta-Publishing": Symbiotic Application Scenarios of Metaverse Embedded in Book Publishing

Building on the practical applications and precedents of VR and AR scenarios in book publishing in recent years, we can observe that publishing value, market demand, user habits, and dissemination effects have achieved organic unity. In the metaverse world empowered by various technologies, digital publishing will undergo disruptive transformation and innovation, constructing a three-dimensional, multi-dimensional, fully simulated, hyper-realistic, and highly immersive "book digital publishing" universe.

2.1 Massive-Scale Knowledge Universe: Structural Disruption of the Book Publishing Production Chain Communication scholar Joshua Meyrowitz proposed the concept of "medium theory," suggesting that people exhibit different cognitions and behaviors in different scenarios, and that media can help people achieve scenario transitions without changing physical locations. This theory was subsequently applied by Robert Scoble, who wrote in his work *The Age of Context* that "the door to the age of context has opened" [5]. Current scenario-based applications are limited by network and digital technologies, only capable of identifying different scenarios and adapting corresponding information to users. Metaverse empowerment will enable the deep-level linking of scenario-based visions in book publishing to be truly presented through virtual-real blending and mutual embedding.

From the reader' s perspective, holographic simulation experiences in the metaverse can construct story scenes from texts in parallel space, restoring the authentic original scenes from books across multiple dimensions such as history, geography, and art, even achieving one-to-one fine restoration of characters and maps to produce sensory experiences where virtual and real become indistinguishable, enabling first-person "I" substitutive presence experiences. Users can instantly enter the metaverse space by wearing full simulation systems or intelligent VR glasses, immersing themselves in specific scenes from books, achieving dialogue, communication, and resonance with characters from hearing, touch, smell, vision, and even emotion. Additionally, supporting cloud computing and algorithms can accurately locate users' knowledge graphs and knowledge systems through individual analysis, thereby providing age-appropriate, circle-appropriate, and discourse-system-appropriate content universes based on consistency with original works, compensating for knowledge gaps and discourse barriers caused by old media systems. The full sensory mobilization and quasi-realistic practical space behaviors in experiences can maximally bridge communication gaps among differentiated groups, restore original meanings of texts and discourse, and expand the shared meaning space between original authors and readers. This process of "activating" text transforms readers from single-dimensional planar visual reception to full-sensory immersive experiences, achieving behavioral transformation from bystander to participant, from fragmented forced reading to panoramic continuous voluntary immersion, enhancing

users' deep-level experiences and allowing experiencers to effortlessly navigate publication content while extending the boundaries and tentacles of content understanding.

Within this massive knowledge system constructed by aggregating entries from countless books, complete and interconnected knowledge graphs can quickly analyze, track, and filter users' points of confusion and questions to form relevant knowledge links, covering and expanding experiencers' cognitive fields and schemas, achieving comprehensive content metaverse construction from one piece of content to billions of knowledge and experience points—constituting a "disruptive innovation" to existing publishing processes and information acquisition patterns. Thus, the metaverse represents more breakthrough progress than traditional paper publications or H5 and audiovisual content, achieving further strengthening and improvement in content production, restoration of original authors' encoded meanings and emotional expression, as well as readers' decoding and effect transmission.

2.2 Metaverse Empowerment of Children' s Books: Scenario Exploration Through Comprehensive Sensory Application Differentiated book categories possess different advantages and application potentials under the metaverse perspective. Among various book types, children' s books and educational materials are particularly suitable for embedding in the metaverse ecosystem. Their combination can fully leverage metaverse characteristics, compensating for existing deficiencies in adaptability, readability, and knowledge depth in current children' s publications, thereby empowering children' s reading materials. For instance, in children's publishing, the high-immersion circular experiences and exploratory, "autopoietic" features supplied by the metaverse dimension can align with children' s reading characteristics, thereby compensating for original product deficiencies.

The 0-12 age group has limited cognitive abilities but strong curiosity, exploratory desire, and thirst for knowledge. Simultaneously, children lack the ability to maintain prolonged attention focus, easily developing boredom and impatience with lengthy text, often resulting in weakened and diminishing communication effects. Children' s natural attributes of curiosity about unknown things and focus on visual symbols determine that children' s publishing requires more concrete, colorful, and intuitive content presentation, as well as high participation and sense of achievement to fully mobilize children' s impulses for knowledge and curiosity and continuous knowledge-seeking behavior, promoting efficient knowledge transmission while stimulating creativity, imagination, and concentration during experiential processes.

In new publications generated based on reading content within the metaverse system, virtuality, interactivity, immersion, and scenario sense will be maximized. After wearing wearable devices, every chapter' s text can be converted into real scenes that readers can physically enter. Readers can compare text with sensory experiences to achieve clearer and more complete cognitive under-

standing. Therefore, publishers can equip a QR code on the back of children' s paper publications or picture books. Through mobile terminals such as phones or iPads, scanning the code and wearing related devices enables quick entry into metaverse scenarios for panoramic immersive content experiences, allowing children to enter books from a first-person perspective or for large-screen device projection.

2.3 Reversing the Declining Revenue Situation in Book Publishing: Infinite Gamification Possibilities and Excavating "Incremental Markets" from Peripheral Product Development Notably, digital book publishing in metaverse space also possesses certain advantages in expanding profit models and extending marketing territories. The metaverse space will reshape the entire real-world market and economic system to some extent, helping enterprises and businesses across various fields break through current involution trends and near-saturated markets to explore new "incremental markets" within existing stock markets.

Current digital book products have achieved virtual experiences through AR/VR technologies. However, virtual reality technology has reached a stage where both economic benefits and user experiences are difficult to enhance. The incomplete linear sensory mobilization brought by VR immersion overlooks the most critical aspects of reading: deep thinking, comprehension, resonance with authors, and sub-knowledge divergence, instead falling into single-dimensional visual stimulation and unconsciously causing declines in logical ability, empathy, and imagination. Moreover, current integration outcomes between VR technology and publishing are limited to presentation and experience upgrades, resulting in minimal industrial iteration and consumer chain extension. Many readers reject purchasing supporting VR experiences due to expensive equipment, limited use, and portability issues. Producers also face dilemmas of high marginal costs and low marginal benefits, while interrupted and stagnant marketing chains hinder the output efficiency and quality of high-quality publishing content at the production end, undermining sustainable development in book publishing.

The coupling of metaverse and digital publishing will disrupt original experience models and economic operation frameworks, bringing low marginal costs and high marginal benefits while achieving Pareto optimal allocation in resource distribution. It will deconstruct and rebuild the original stockpiled book products, technical equipment, and rigid product systems, breaking through ineffective involution competition within the industry and overturning zero-sum games among competitors and still-singular user virtual experiences. In metaverse space, different digital product producers can circulate and share resources, constructing an infinitely divergent book content knowledge base and cyberspace by classifying and summarizing content attributes and analyzing user experience behaviors. On one hand, leveraging the metaverse ecosystem' s novel characteristics can drive offline physical book sales through online experiences, improving

code efficiency. On the other hand, it can stimulate users' potential consumption demands for a series of related products associated with target books throughout the service chain. Within this system, each book and author is no longer isolated but interconnected, interwoven, and mutually complementary. When experiencers immerse themselves in one publication product, they can also cross-search for cross-book, cross-form, and even cross-disciplinary knowledge dimensions within the complete knowledge base, infinitely extending knowledge space.

Product providers and publishers can break the original centralized and monopolistic production model, assembling countless tail-end content providers focused on small markets and niche fields, enabling flow and interoperability of content resources, redrawing economic systems within large-scale knowledge book universes, and simultaneously developing new profit models. For instance, adding detailed knowledge modules from renowned teachers based on knowledge-payment online education, organizing simulated exercises and real-scenario experiences, or embedding gamification elements to create micro-game products within book scenarios can enhance the completeness and fluidity of book publication products, achieving multi-level optimization in content depth and thickness while demonstrating user-centric thinking. Game element embedding also allows content publishers to excavate new profit directions and value points.

Furthermore, shopping services and online mall models are highly applicable to book publishing spaces in the metaverse. The comprehensive sensory environment with full depth offers infinite possibilities and potential markets, revealing boundless incremental space. Especially after inserting gamified product chains into books, the added value of book publications is substantially extended—characters, historical backgrounds, costumes, props, decorations, and extended peripheral products all represent a brand-new, unexplored "blue ocean"and "new gold rush." The integrated development of game elements and book publications will also break through various boundaries of existing technical thresholds, leveraging the refinement and intelligence of meta-technologies to focus on satisfying users' interactive, embodied experiences, bringing iterative upgrades to sociality and exploration of unknown gaming environments.

As philosopher of technology Ed noted, the impact of technology often manifests as a structural reaction where "augmentation" and "reduction" occur simultaneously. In the future metaverse landscape, all industries will disrupt existing operational logic and game rules, reshaping their original ecological patterns. The traditional publishing industry, as an important application scenario closely intertwined with technology, will naturally be reshaped alongside metaverse development iterations, deriving new production-consumption forms and presentation-operation methods. On one hand, from books, newspapers, and periodicals to online education and network games, the metaverse fully endows decentralized UGC creation space, providing realistically replicated immersive experiences and virtual currency systems that can create real economic value, multi-dimensionally and fully upgrading its functions and utilities beyond the original Web 2.0 foundation, promoting dynamic transformation in digital pub-

lishing space. It innovates digital publishing content production models and promotion-operation strategies, achieving structural improvement and value reconstruction at both producer and consumer ends. On the other hand, the metaverse simplifies the complex text-image display systems and scattered functional applications of original publications and publishing processes, replacing them with massive, unified, and functionally integrated metaverse spaces for efficiency empowerment. Users can achieve their initial goals of clicking and entering digital publications through a single entry point using simple, portable technical terminal devices and physical control operations, simplifying the entire user action path and operation threshold throughout the process.

In fact, discussing and envisioning the book and newspaper production-consumption process within the future metaverse landscape only attempts to provide presuppositions and broad outlines for its future shaping role in publishing from a narrow perspective. Current technological development speed is unpredictable, with mobile communication technology, virtual reality technology, and digital technology evolving at exponential growth rates. Therefore, the metaverse may be within reach in the near future, and we believe it will endow communication practices and publishing modalities with new value points and incremental space through its immeasurable potential, continuously driving the upward trajectory of the media publishing industry and bringing dividends to innovative practices in media formats.

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