

Original Paper

The AR/VR-Driven Reinvention of Children's Books through Immersive Technology: Real-World Drivers, Industry Challenges, and "New-Quality Production"

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Abstract

Against the backdrop of developing new productive forces and upgrading the publishing industry, AR/VR-led immersive technologies have gained considerable traction in children's book publishing. This paper investigates the real-world drivers propelling the adoption of immersive technologies in this sector, examining both technology-push factors and industry-pull dynamics. It also analyses the challenges that have emerged during implementation. By identifying new technologies, new products, new business formats, and new models as the four critical levers of "new-quality production" in children's book publishing, the study unpacks the pathway through which immersive technologies can drive this transformation. The findings offer practical guidance and methodological alternatives for achieving industrial upgrading and long-term sustainability.

Keywords

Immersive Technology, AR/VR, Children's Book Publishing, Digital Reading, New-Quality Productive Forces

1. Introduction

Children's books have long commanded a significant share of the book retail market, but the ground beneath the sector has shifted. A confluence of pressures—technological disruption, a shrinking demographic dividend, channel fragmentation, and fiercer rivalry—has pushed it from high-speed expansion into a period of structural reconfiguration. Since 2016, AR and VR have made inroads into publishing, opening up novel production pathways and commercial possibilities for children's books.

What does immersive technology actually do in a publishing context? It embeds digital content within particular settings using spatial computing, immersive interaction, and virtual-real blending mechanisms; flat symbols are thus converted into spatial, interactive forms. Crucially, the emphasis falls on reconstructing how content is expressed, not simply upgrading hardware.

These technological gains have not come without cost, however. Industrial practice has exposed problems such as inflated production expenses and product homogenization—problems that now constrain the market’s technological transition. What is needed, and urgently, is the cultivation of “new-quality production” (a mode of production driven by new-quality productive forces; hereafter) to propel structural optimization and upgrading across the publishing industry.

2. Real-World Drivers Behind the Technological Reinvention of Children’s Books

2.1 Driven by Technical Requirements

Children’s reading is in the midst of a significant technological shift. Smartphones and tablets have penetrated younger age groups, reshaping reading environments and habits and generating robust demand for digital content. Short videos, audiobooks, and AR/VR children’s books are increasingly becoming children’s preferred reading formats. The 22nd National Reading Survey provides striking evidence: in 2024, the digital reading exposure rate among Chinese minors aged 0-17 reached 75.1%. Children’s reading habits, in other words, are migrating from print toward interactive, multimedia digital forms.

VR technology was first deployed in book publishing in 2016 and rapidly demonstrated its commercial viability. Over time, a mutually reinforcing dynamic has developed between immersive technology innovation (AR, VR, and related tools) and children’s book content creation—a dynamic that supplies both a practical entry point and ongoing momentum for immersive children’s books. Of the four immersive technologies in common use, AR and VR have moved into real-world application; the remaining two have yet to reach full maturity.

Powered by AR, VR, and kindred technologies, the reinvention of children’s books and the emergence of new production modes have not only accommodated children’s evolving digital reading preferences but also deepened the immersive, contextual quality of the reading experience—outcomes well matched to the needs of children in the current era.

2.2 Driven by Industry Demand

The waning demographic dividend has pushed children’s book publishers into what might be called “involutionary” competition. The turning point came in 2023: declining birth rates drove the children’s book retail market into negative territory for the first time, with a year-on-year drop of 10% (Li, 2024). Short-video e-commerce platforms and nonspecialist children’s publishers have intensified the squeeze, and the industry now finds itself in a phase of full-chain ecological competition where success hinges on genuine innovation in technology, content, and products.

A second pressure comes from consumers themselves. Family and child demand has grown more varied and discerning. Parents increasingly view reading education less as a vehicle for knowledge transmission and more as a means of competency development—one that nurtures cognitive understanding, emotional engagement, recreational enjoyment, and creative thinking (Gudinavičius & Markelevičiūtė, 2020).

Brick-and-mortar bookstores, meanwhile, have transformed themselves from straightforward book retailers into comprehensive cultural consumption service providers. Their remit now extends well beyond book selling into “Reading+” and “Culture+” offerings. Coffee corners, cultural-creative merchandise, children’s play areas, parent-child programmes, and business seminars sit alongside shelves where books once stood alone. These spaces have effectively become family centres, reading centres, experience centres, and cultural centres—comprehensive cultural-commercial venues that have erased the old boundaries of book retail.

3. Industrial Challenges in the Technological Reinvention of Immersive Children’s Books

3.1 Supply Side: Cost Constraints and Price Barriers

Of the 48 AR/VR children’s book sets identified across Dangdang and JD Books—China’s two largest online book retailers—over 60 percent cluster within just three price brackets. The search, conducted using the keywords “AR or VR children’s books” and covering publications from 2016 to 2026, lays bare a market where cost, not demand, sets the price. The 150-200 yuan bracket alone captures 13 sets (27.1%); another 9 (18.75%) sit between 50 and 100 yuan, and 7 (14.58%) between 100 and 150 yuan. Taken together, these three brackets account for 60.41% of all products. Early R&D and content-production outlays may be recovered through such pricing, but the strategy erects a forbidding consumer entry barrier and caps the market’s growth ceiling.

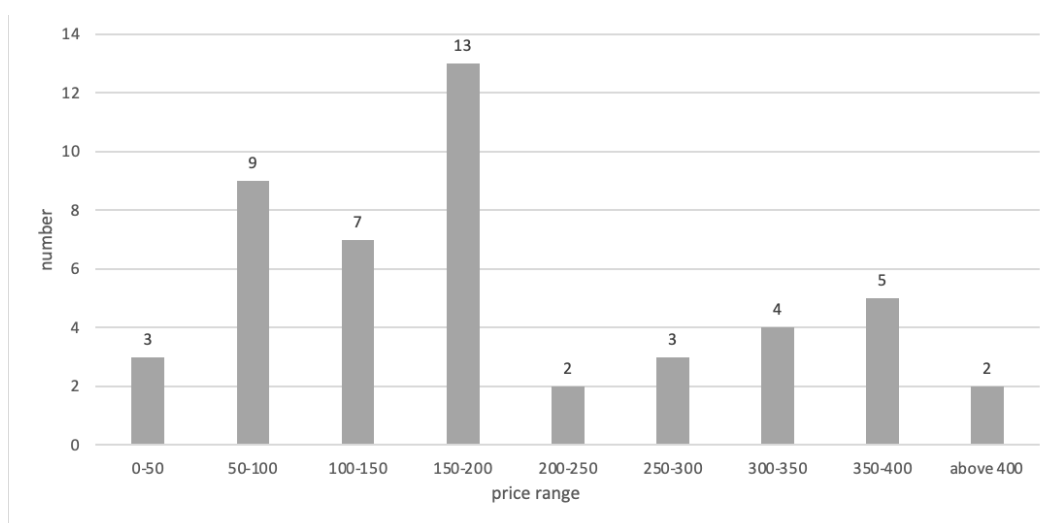


Figure 1. Book Price Range (Units: Sets and CNY)

Two cost drivers stand out. Producing AR/VR children's books demands intricate 3D modelling, scene rendering, and interactive programming—work that calls for technically skilled, cross-disciplinary teams. Such professionals are in short supply, which lengthens R&D timelines and inflates labour costs. Beyond production, the digital component requires dedicated applications, multi-device compatibility, and ongoing system iteration and device optimisation; software maintenance is not a one-off expense but a recurring investment. The physical books themselves add another layer of cost: hardcover binding, premium paper, full-colour illustrations, and occasionally gift-box packaging all drive up material expenditure. And then there are the head-mounted displays that frequently accompany these products—devices ranging from roughly 100-yuan entry-level models to mainstream units priced in the thousands—objectively raising the total cost of ownership.

3.2 Demand Side: Homogeneous Supply and an Imbalance in Customer Experience

A scan of the 48 sampled products betrays a market short on originality. Roughly 40 percent gravitate toward popular science themes, and template-like structural patterns recur across titles—near-identical content architectures, near-identical interaction formats. AR/VR, in most cases, functions as little more than a visual gloss applied to selected scenes; it is rarely woven into the narrative fabric itself. The room for genuine innovation narrows with each templated release.

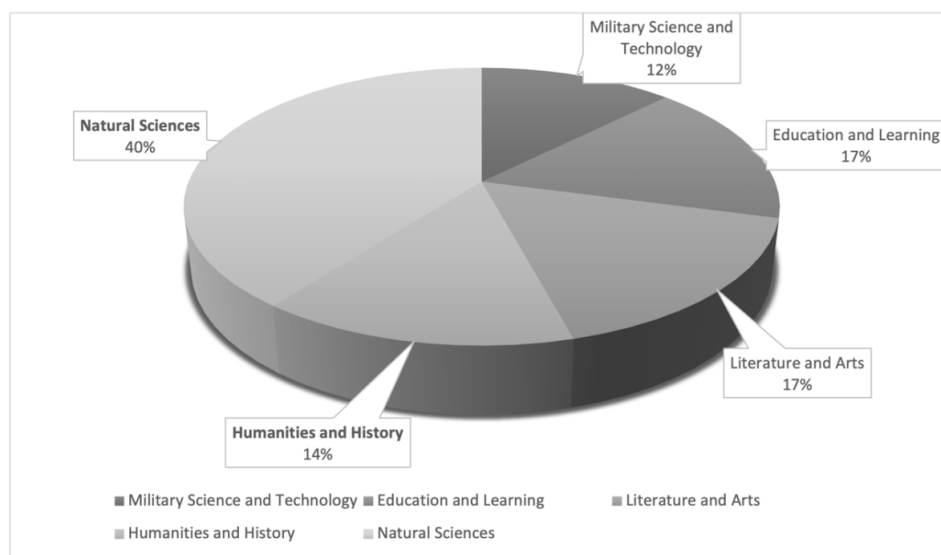


Figure 2. Distribution of Topic Content in AR/VR Children's Books

Hardware limitations compound the problem. Computing power, display resolution, and interaction precision remain inadequate across current AR/VR devices, yielding inconsistent content rendering and weakening the very immersion the technology promises. Some books bundle devices of decidedly mediocre quality—hardware that simply cannot deliver the advertised interactive experience, opening a conspicuous gap between expectation and reality (Qin, 2021). Worse still are the products that invest

minimally in the underlying technology: a mere handful of AR/VR interactive pages, immersive features treated as a marketing hook. Such practices erode user trust and dampen long-term engagement.

4. A Path to “New-Quality Production” for AR/VR Children’s Books

4.1 Empowered by New Technologies: Underlying Production Conditions

4.1.1 From Static Text to Smart Interaction

What a child encounters in an AR/VR book is not merely text on a page but a narrative space that responds—3D models, spatial computing, and real-time rendering overlay content across virtual and physical environments, producing interactive, three-dimensional reading settings that lift stories off the page (Yan & Ma, 2023). The system does more than display; it reorganises content dynamically according to the reader’s path and cognitive level, making the experience simultaneously more immersive and more individually calibrated.

No less consequential is what happens behind the screen. The traditional model—an essentially one-way pipeline controlled by authors and editors—gives way to a data-driven loop: AR/VR children’s books capture and analyse user behaviour data, channelling reading feedback directly back into content generation. With AI integration, narrative pace, knowledge delivery, and interaction difficulty can all be modulated in response to each child’s cognitive profile and interests, enabling genuinely personalised content (Shen, 2019). Readers, once passive recipients, now participate to a meaningful degree in content generation itself. The result is a decisive shift—away from an author-centred paradigm and toward a data-driven one (Yuan, 2023).

4.1.2 Designing an Immersive Experience

From purely visual reading, AR/VR opens a route toward something multisensory and collaborative (Alhamad et al., 2024). Sensory fusion and interactive mechanisms together reconfigure the child’s reading environment.

Consider the perceptual palette. Text, images, sound, and dynamic effects are layered together; in selected scenes, haptic feedback and ambient audio join the mix. Children engage multiple senses at once, which deepens their grasp of plot and reinforces associative memory (Danaei et al., 2020).

Then there is the multiplication of story-world presentation. AR punctures the two-dimensional constraints of the printed page—image recognition and 3D modelling project book content onto the physical world, turning flat reading into something volumetric. VR goes further still, constructing fully immersive virtual environments that readers inhabit as if physically present. Speech recognition and natural language processing add another dimension: children can read, ask, and receive answers all at once. One-way reception becomes two-way dialogue; engagement and immersion deepen in tandem (Wu & Ma, 2025).

Multisensory coordination and virtual-real fusion, taken together, shift story presentation from “reproduction” to “experience”—offering children a more immersive, participatory cognitive pathway.

4.2 New Product Upgrades

4.2.1 From Selecting Individual Titles to Systematising Content Resources

A traditional children’s book ends at publication; it is a self-contained title, its production cycle closed. AR/VR children’s books operate on an entirely different principle. They form an integrated “content–scenario–interaction” architecture in which material decomposes into elemental units—knowledge points, contexts, narratives—and reassembles across different product formats. Production, rather than terminating at a single release, becomes resource-based and cyclical. Here lies the core foundation of “new-quality production” within the new product ecosystem.

What accumulates across titles, then, is not just a backlist but a deployable asset base. Market-proven texts convert into scenario modules and knowledge nodes, usable at varying levels of granularity across age groups and product lines. Content lifecycles extend; the uncertainty and cost risk inherent in original content development diminish (Yang & Zou, 2025). Topic selection expands in two directions at once—horizontally across subject areas, vertically through layered content structures (Luo & Shang, 2024). The old linear, title-by-title logic yields to a systematic, resource-pool organisation that supports coordinated multi-product development and long-tail content supply while reducing dependence on any single blockbuster.

4.2.2 From Content Production Logic to Technical Platform Logic

The cost problems plaguing AR/VR children’s books trace to a deeper structural issue: traditional publishing still operates under content-driven bookmaking logic. Each title is treated as a standalone project around which technology, content, and design are temporarily assembled. The result is highly fragmented production relationships—technical investments cannot carry over from one product to the next, and costs accumulate in linear fashion.

Rarely does a single title recoup these costs on its own. The new product ecosystem, infused with immersive technology, is migrating toward a technology-platform production logic. What accumulates across titles, instead, is a technical substrate—AR recognition engines, interaction scaffolds, rendering pipelines, animation libraries—that no single project has to rebuild from scratch; subsequent titles need only fill in content and configure scenarios within that framework. It is the platform layer, not individual works, that absorbs the bulk of technical investment and transforms it into systematic, ecosystem-wide value (Yang & Zhuang, 2024). As the product catalogue grows, the shared technical investment is amortized across an increasing number of titles, and per-unit development costs decline accordingly—a platform-level economy of scale.

4.3 Expansion into New Business Formats

4.3.1 From Activating Offline Traffic to Building an Online Content Marketing Ecosystem

Physical and digital are not separate channels for AR/VR children's books; the two operate in tandem, and that simultaneity is precisely what activates offline footfall. Walk into a brick-and-mortar store and the familiar reading environment overlays with AR/VR digital settings, virtual-real interaction producing an immersive experience that neither channel could generate alone. Dwell time rises, conversion follows—but the more significant payoff lies further out, in the long-term commercial possibilities this arrangement opens up (Wang & Zhao, 2024).

Traffic, in this model, circulates in both directions rather than flowing one way. “Offline experiences” feed “online extensions,” and the reverse holds as well: certain AR book apps invite children to scan QR codes while still in a physical store, then scan again at home to unlock additional learning resources (Cheng & Tsai, 2014). Each touchpoint lengthens the digital engagement journey. Behavioural data captured along the way fuels targeted marketing and content refinement, so the old dynamic—readers searching for books—inverts into one where books find readers. Tie offline devices to online applications, and the transition from physical purchase to digital subscription becomes nearly seamless; retention and brand loyalty both gain as a result.

4.3.2 The Shift from a Model Dominated by Professional Publishers to One Where Platform Users Participate in Publishing

Under the old model, a book followed a straightforward cycle—completion, launch, sales—within a relatively closed, fixed lifecycle. Reader feedback seldom fed back continuously into production; even after digital tools arrived, market interaction stayed intermittent and piecemeal. AR/VR has changed that. The industry has gradually moved from title-centred project operations toward platform-based community management.

Digital platforms and online communities now host AR/VR children's books within persistently active environments. User feedback, interactions, and derivative creations are captured by platform mechanisms and converted into inputs for content optimisation and feature iteration. Low-threshold authoring tools, introduced alongside these platforms, permit ongoing content expansion and scene updates. The product itself is no longer a static publication but a living system—one that can be refreshed and extended over time.

Value realisation follows the same logic. Rather than relying on one-time sales revenue, AR/VR children's books generate value through a cyclical mechanism fuelled by content updates, community interaction, and scenario expansion. Publishers take on the roles of platform integrator and operations manager, steering a new cyclical model: content production → user participation → continuous optimisation.

4.3.3 The Transition from Commercial Consumption to Social Function

The technology's declining price of entry has carried these books across a threshold—from commodities whose primary justification was commercial return into something stranger and more consequential, hybrid media in which educational service and cultural transmission are braided together almost inextricably.

Consider what immersive presentation makes possible. Intangible heritage, historical episodes, folk narratives—material that conventional formats render at a distance—acquire in AR/VR a concrete, sensory immediacy. A child does not merely read about a traditional craft or a regional legend; the craft unfolds in three dimensions on the kitchen table; the legend populates the bedroom wall. Cultural identity, under these conditions, is not transmitted through exposition so much as inhabited. And the intergenerational transfer of memory, that fragile process, gains a medium it has never before possessed.

Yet the social function does not stop at culture. Cognitive development—the format's capacity to engage multiple perceptual channels simultaneously—has already attracted attention in public education circles. More striking still is the equity dimension: deployed in under-resourced schools, immersive books become a digital instrument for narrowing, however modestly, the urban-rural education gap. Here the commercial and the social do not merely coexist; the first, having matured, creates the material conditions for the second.

4.4 A New Model: Cross-Industry Collaboration

Publishers, technology platforms, users—these are not separate actors whose interests happen to align. In the AR/VR children's book space, they are entangled from the outset, and their entanglement betrays a deeper structural shift. The linear “creator–editor–reader” pipeline, long the backbone of publishing, has not simply been updated; it has been displaced by a networked ecosystem that traverses technology, education, culture, and consumption simultaneously (Alhumaidan et al., 2018). Cross-industry collaboration, under these conditions, is less a strategy than a condition of survival—the mechanism through which industrial expansion occurs and value spills across sectoral boundaries (Arellano-Yanguas, 2025).

Gaming offers one point of entry. Through IP licensing or joint development, publishers convert book content into interactive game products; narrative texts, once confined to the page, find extended expression within gamified mechanics, and engagement rises alongside content reach. The educational channel operates on a different logic. Partnerships with schools and early-childhood institutions carry AR/VR books out of consumer retail and into B2B procurement; embedded in kindergartens and classrooms, the titles fuse learning with play, and knowledge acquisition acquires an intuitive, embodied dimension that conventional textbooks struggle to match.

These two pathways—gaming and education—unfold within the publishing sector’s expanded boundaries. Beyond them lies a different order of convergence. Cultural tourism organisations and cultural IP operators bring to the table something publishers lack: physical spaces and place-based narratives. Cultural heritage digitisation projects are especially revealing in this regard, for they couple the reading experience with actual cultural sites, generating synergies that neither partner could achieve alone. The result is not merely a broader commercial footprint. Children’s books, in these collaborations, come to function as gateway media—entry points through which young readers encounter cultural transmission and heritage revitalisation in forms that feel immediate rather than instructional (Chu & Li, 2022).

5. Conclusion

AR/VR children’s books have progressed well beyond a simple digital-tool upgrade. What is underway is a structural reconfiguration of cultural production: technology is being woven into the logic of content generation; the book as a form is mutating from a single medium into a software-hardware composite; and publishing activity is shifting from a linear pipeline to a networked, multi-stakeholder process. These changes signal a systemic realignment in how production factors are allocated and value is realised—a genuine paradigm shift in the sense intended by “new-quality production.”

That said, the transformation remains unfinished. No stable equilibrium has yet been reached among technological capability, cost structures, and industrial collaboration; real-world operations continue to suffer efficiency losses and value deviations. Progress will depend not only on refining the technology itself but also on adapting institutional arrangements and rebuilding collaborative mechanisms. Only when immersive technology is fully internalised within the logic of publishing production can the educational and cultural-dissemination value of AR/VR children’s books transition from exploratory development into sustained growth.

As a revealing window onto the transformation of cultural production under digital technology, the practice of AR/VR children’s books illuminates the structural adjustment pathways available to the publishing industry as it absorbs new technologies. It also supplies concrete evidence of how “new-quality production” takes shape within the publishing sector specifically.

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