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Developing a Foresight Framework for the Publishing Industry Based on a Hybrid Approach

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ABSTRACT

The purpose of this study is to delineate the future prospects of Iran's publishing industry by the horizon of 2035 and to propose an operational framework for decision-making under conditions of high uncertainty. To achieve this, a multi-stage process in the field of qualitative foresight research was employed. First, horizon scanning and the identification of weak signals of change were conducted using the STEEP approach. Then, an initial list of drivers and uncertainties was extracted and refined through a two-round Delphi method with the participation of experts. The findings indicated that "digitalization of the value chain," "governance of intellectual property rights in the digital environment," "data-driven consumer behavior," "economic resilience of publishing," and "governmental supportive and regulatory policies" are among the key drivers. In addition, two fundamental uncertainties—"the trajectory of enabling technology transformation (such as artificial intelligence, augmented reality, and digital platforms)" and "the state of the macroeconomy and consumers' purchasing power"—were identified as the most critical variables shaping the future structure of the publishing industry. The main contribution of this research is the development of an integrated framework for qualitative foresight in the publishing industry (a combination of STEEP–Delphi–MICMAC–MACTOR). This framework not only enables precise identification of key drivers and uncertainties but also provides an effective analytical tool for monitoring changes, forecasting developments, and restructuring strategies for publishers, policymakers, and active digital platforms in the publishing domain. The proposed framework can facilitate future-oriented decision-making and enhance the resilience of this industry in the face of rapid environmental transformations.

Keywords: foresight, publishing industry, key drivers

Introduction

The global publishing industry is undergoing an unprecedented transformation driven by rapid technological innovation, shifts in consumer behavior, and the redefinition of traditional value chains. The advent of digitalization, artificial intelligence (AI), and open-access paradigms has challenged the conventional model of publishing and knowledge dissemination. Digital publishing platforms, e-books, and virtual libraries are reshaping the way content is produced, distributed, and consumed, forcing stakeholders to adapt to a hybrid ecosystem that blends print and digital modalities [1]. As the boundaries between content creation, management, and distribution blur, publishers are required to rethink their operational structures and adopt strategies that ensure sustainability, accessibility, and ethical integrity in the digital age [2].

The integration of advanced technologies into editorial and publishing processes has not only increased efficiency but also democratized access to knowledge. However, it has simultaneously raised new challenges related to intellectual property, data governance, and the authenticity of information. The ongoing transformation in editorial workflows—from manuscript submission to digital editing, formatting, and distribution—reflects the sector's struggle to maintain quality control while

accommodating technological disruptions [3]. The shift toward automation and algorithmic support has enabled faster processing of large volumes of content, yet it has also generated ethical and managerial concerns regarding authorship attribution, bias in AI-generated text, and the erosion of peer-review integrity [2].

The digital revolution has fundamentally redefined how readers interact with content. Digital libraries and e-book platforms have expanded global access to knowledge while fostering new patterns of information consumption [1]. Younger generations, in particular, are migrating toward interactive, multimedia-rich formats, often preferring audiobooks, visual storytelling, and subscription-based digital reading ecosystems over printed materials [4]. These evolving behaviors signal not only a technological shift but also a cultural transformation in how individuals conceptualize reading and learning. The modern reader is now both a consumer and co-creator of content, engaging through digital feedback loops, online reviews, and social media-driven discourse [5].

Within this evolving context, the commercialization of publishing innovation has become a decisive factor in the sustainability of the book market. Publishers are increasingly investing in digital platforms, data analytics, and AI tools to forecast market trends, optimize production processes, and customize user experiences [6]. The Ukrainian publishing sector, for instance, has exemplified the rise of innovative business models that capitalize on digital solutions to maintain competitiveness and international visibility [6]. Similarly, the global publishing industry has been witnessing a convergence of technology and creativity that fosters both economic growth and inclusivity—yet this convergence demands robust governance mechanisms and the continuous adaptation of business models [7].

From a broader socio-economic perspective, the digitalization of publishing aligns closely with global sustainability goals, particularly those related to education, innovation, and reduced inequalities. The 2030 Agenda for Sustainable Development emphasizes the importance of access to quality education and information as a foundation for equitable societies [8]. Sustainable publishing practices, therefore, contribute not only to knowledge dissemination but also to the democratization of learning resources, especially within urban and developing communities [9]. Urban innovation ecosystems have demonstrated that the digital transformation of information infrastructures can significantly advance the Sustainable Development Goals (SDG11), particularly through improved access to cultural and educational materials [9].

The convergence of AI, big data, and digital libraries is redefining academic and professional publishing. AI's integration into research and content production has significantly increased the speed and scale of academic publishing but has also introduced challenges related to originality, authorship verification, and the preservation of scholarly integrity [10]. Scholars and publishers alike are now confronted with the ethical implications of machine-assisted authorship and automated peer review systems [2]. While AI offers the potential to streamline editorial workflows, reduce human error, and expand global research visibility, it simultaneously calls for new frameworks for ethical accountability and transparency in digital publishing [10].

Moreover, the business and economic aspects of publishing are experiencing fundamental restructuring. The traditional profit models centered on print circulation and retail sales are increasingly giving way to data-driven strategies, freemium models, and subscription-based access [3]. Publishers now rely heavily on analytics to anticipate consumer preferences and tailor content to niche markets. This paradigm shift is not only transforming revenue generation mechanisms but also redefining relationships between authors, publishers, and readers [4]. The emergence of participatory economies in the

publishing sector—where readers' feedback and engagement influence editorial decisions—reflects a broader democratization of knowledge production and distribution.

However, digital transformation is not devoid of systemic risks. As observed in global sectors undergoing technological modernization, the imbalance between technological progress and regulatory adaptation can lead to inequities, exclusion, and ethical dilemmas [11]. The publishing industry, much like healthcare or insurance systems, must develop policies that ensure fair access to digital tools, equitable remuneration for content creators, and the safeguarding of intellectual property rights [12]. These challenges underscore the need for strong institutional frameworks capable of integrating technological innovation with ethical and social responsibility.

The expansion of digital publishing is also altering labor relations and academic production patterns. Scholars now navigate a complex ecosystem of open-access platforms, digital repositories, and institutional mandates that redefine what constitutes legitimate scholarly communication [13]. Publishers are no longer mere intermediaries; they are becoming facilitators of global knowledge ecosystems, responsible for maintaining the quality, visibility, and accessibility of research outputs [14]. The emergence of collective funding and open-access publishing models represents a growing effort to counter the monopolization of academic knowledge and return scholarly communication to the public domain [14]. This transition, however, raises questions about long-term financial sustainability, especially for smaller publishers and regional academic journals operating outside the global mainstream [7].

From an educational standpoint, digital transformation has profoundly influenced how learning materials are produced, distributed, and consumed. Advances in digital publishing technology have created opportunities for inclusive and adaptive educational systems that promote equity and accessibility [8]. Interactive and multimedia learning materials—supported by e-publishing platforms—are enhancing student engagement and learning outcomes across diverse educational contexts [5]. At the same time, academic institutions and policymakers must ensure that digital equity remains a central concern, particularly in low-resource settings where access to technology remains uneven [15].

The shift toward digital ecosystems has also introduced the necessity for new competencies among publishing professionals. Editors, designers, and content managers are now required to master digital tools, data visualization software, and content management systems that go far beyond traditional publishing skills [3]. As the editorial process becomes increasingly data-driven, the role of human judgment and creativity must be preserved to balance algorithmic efficiency with cultural and ethical sensibility [1]. This balance is especially important in a globalized publishing landscape where cultural diversity and linguistic inclusivity remain central to the integrity of knowledge exchange.

Looking toward the future, the convergence of foresight methodologies, digital innovation, and sustainable publishing practices presents a strategic opportunity for reimagining the publishing industry as a resilient, adaptive, and ethically grounded system.

Methodology

This research employed a foresight-based qualitative design aimed at developing a hybrid model for future studies and scenario planning in the publishing industry. The foresight approach was selected because of its ability to identify long-term trends, key drivers, and uncertainties that shape the evolution of industries under rapidly changing technological and social

conditions. The study was designed to combine qualitative and exploratory methodologies to ensure comprehensive coverage of multiple dimensions—technological, economic, social, and policy-related—affecting the future of publishing.

The target population included experts, policymakers, and professionals with extensive experience in the publishing and digital transformation domains. The sampling strategy followed a purposive approach, which allowed the researcher to select individuals with substantial expertise and relevant insights regarding the research topic. The inclusion criteria required participants to have at least ten years of professional experience in the publishing industry or related sectors, to hold managerial or specialized positions, and to possess familiarity with emerging digital publishing technologies and global industry trends. The final sample consisted of 20 participants: 10 publishing industry specialists, 5 governmental policymakers, and 5 technology and digitalization experts. This composition provided a balanced and multi-perspective representation of stakeholders across the publishing ecosystem.

The purposive sampling technique was used because it enables the collection of rich, in-depth qualitative data from informed participants who can offer strategic insights into the structural transformations of the industry. Each participant's contribution was essential to identifying the complex network of interrelated factors influencing the future of publishing. This sampling method ensured theoretical saturation, as data collection continued until no new concepts or categories emerged from the interviews.

Data were collected primarily through semi-structured, in-depth interviews complemented by document analysis and literature review. The semi-structured interview format allowed for flexibility in exploring individual perceptions, while maintaining consistency in addressing key themes such as technological change, economic shifts, regulatory frameworks, and cultural transformations in the publishing sector. Each interview lasted between 60 and 90 minutes and was conducted either in person or via online communication platforms to accommodate participants' schedules and geographical locations.

An interview guide was developed based on the research objectives and foresight framework. The guide consisted of three sections: introductory questions to explore participants' professional backgrounds and perspectives on industry developments; questions addressing the current challenges and dynamics of the publishing industry; and forward-looking questions that examined anticipated trends, opportunities, and threats over the next decade. The questions encouraged participants to discuss the role of emerging technologies such as artificial intelligence, blockchain, and augmented reality, as well as the influence of government policies and consumer behavior shifts.

All interviews were recorded with participants' consent, transcribed verbatim, and subsequently verified for accuracy. MAXQDA software was employed to manage and code the qualitative data systematically. Supplementary sources, including industry reports, academic publications, and policy documents, were analyzed to triangulate findings and ensure methodological rigor. This triangulation strengthened the validity of the study by allowing comparisons between interview-derived insights and documented evidence from global publishing trends.

Data analysis followed the grounded theory methodology, which enables the systematic development of conceptual frameworks directly rooted in empirical data. The process unfolded in three sequential stages: open coding, axial coding, and selective coding.

In the open coding stage, the raw data derived from interview transcripts were segmented into discrete units of meaning. Each segment was labeled with descriptive codes that reflected key ideas, patterns, or experiences shared by participants. Coding was performed line-by-line to ensure comprehensive coverage of all relevant concepts. Approximately seventy-five

open codes were identified, representing various technological, economic, and behavioral phenomena in the publishing industry. MAXQDA software was used to categorize and manage these codes, although manual analysis through structured tables and analytical memos was also applied to maintain interpretive flexibility.

The axial coding phase involved the organization of these initial codes into higher-order categories. Relationships among the codes were analyzed to identify causal, contextual, and consequential linkages. Similar codes were grouped under broader thematic axes such as “technological transformations,” “consumer behavior change,” “publishing economy and revenue models,” “policy and governance,” and “social and cultural impacts.” This process led to the emergence of eight axial categories that collectively described the structural dynamics of the industry.

Selective coding was the final stage of analysis, in which a single core category was identified as the central theme integrating all other categories. The core category—“technological transformations and digitalization in the publishing industry”—was selected because it demonstrated the strongest interconnections with all other dimensions, serving as both a driver and mediator of change. A qualitative conceptual model was developed to illustrate the relationships between this core category and the axial categories, highlighting how technological evolution influences economic, legal, social, and policy-related aspects of the industry.

The data analysis process continued until theoretical saturation was achieved, meaning that no new themes or relationships emerged from additional data. The validity of findings was ensured through iterative coding checks, expert validation, and methodological triangulation using both qualitative insights and document analysis. This approach resulted in the construction of an integrated foresight framework capable of explaining the key drivers, uncertainties, and developmental pathways of the publishing industry in the digital era.

Findings and Results

Open coding, as the first step in the qualitative data analysis process based on grounded theory, was conducted with the aim of breaking down raw data into initial, understandable concepts. In this stage, the data collected from semi-structured interviews with 20 experts—including publishing industry professionals, government policymakers, and actors in the field of technology and digitalization—were analyzed line by line or paragraph by paragraph to identify key phrases, recurring themes, and preliminary patterns. The purpose of this process was to uncover fundamental concepts without any predetermined assumptions in order to accurately reflect the participants’ real experiences and perspectives.

After the interviews were recorded and transcribed into text, they were systematically analyzed. Each portion of text containing a distinct idea, experience, or viewpoint was labeled with a descriptive code. These codes were selected in a descriptive manner and kept as close as possible to the interviewees’ original language to prevent distortion of meaning. To enhance organization, MAXQDA software was used, which enabled the recording, categorization, and review of codes; however, in some cases, manual analysis using tables and memos was also employed to maintain flexibility in interpretation. Overall, the coding process continued until all data relevant to the research topic (foresight and scenario planning in the publishing industry) were covered.

At this stage, a significant number of initial codes were extracted, reflecting the diversity of opinions and the complexity present in the publishing industry. In total, 75 initial open codes were identified, which are presented below. These codes

served as the foundation for the next stages of coding (axial and selective coding) and facilitated the identification of the main categories.

Interview Questions:

Section 1: Introduction and Background

Please introduce yourself and describe your professional experience in the publishing industry.

How long have you been active in this field, and what roles have you undertaken?

In your opinion, what have been the most important changes and developments in the publishing industry in recent years?

Section 2: Current State of the Publishing Industry

In your view, what are the main challenges currently facing the publishing industry?

How do you assess the impact of digital technologies on the publishing industry?

Has the change in consumer behavior (e.g., reduced purchase of printed books, increased consumption of digital content) affected publishing businesses? How?

To what extent do current government policies and regulations influence the publishing industry?

How do you evaluate the roles of key actors (publishers, authors, booksellers, distributors, government, etc.)?

Section 3: Foresight and Influential Trends

In your opinion, what are the most influential trends shaping the future of the publishing industry in the next 5 to 10 years?

What opportunities and threats do you foresee for traditional and digital publishing in the future?

Which technologies might contribute to the transformation of the publishing industry in the future (e.g., artificial intelligence, blockchain, interactive books)?

Which countries or companies do you consider to be pioneers in publishing innovation, and why?

Do you believe electronic publishing can replace traditional publishing, or will both continue to operate complementarily?

Table 1

Open Codes Extracted from Interviews and Their Frequency

No.	Open Code	Frequency (Number of Occurrences)
1	Decline in printed book sales	12
2	Rising printing and distribution costs	9
3	Negative impact of digitalization on traditional publishing	10
4	Change in consumer reading behavior	11
5	Decreased interest in physical books	8
6	Growing popularity of audiobooks	13
7	Expansion of e-books	14
8	Emergence of new revenue models (subscription and advertising)	7
9	Development of online publishing platforms	10
10	Reduction in print runs	9
11	Importance of artificial intelligence in analyzing reader behavior	6
12	Personalization of content based on reader preferences	5
13	Increased access to books via the Internet	8
14	Growth of publishing-related startups	7
15	Impact of social media on promoting reading	12
16	Weakness of traditional publishing marketing	6
17	Use of interactive and multimedia books	8
18	Shift in audience preference toward video content	10
19	Entry of blockchain technology for protecting publishers' rights	4
20	Reduced government support for traditional publishers	9
21	Rising cost of producing high-quality content	6
22	Difficulty for new authors entering the publishing market	5
23	Increase in plagiarism and illegal distribution	11
24	Need to change book distribution models	7

25	Limitations of traditional printing and publishing	5
26	Decreased interest of younger generations in physical books	8
27	Growing competition between small and large publishers	6
28	Development of online book distribution systems	9
29	Financial challenges for small publishers	7
30	Growing demand for digital editions	10
31	Impact of technology on reducing distribution costs	8
32	Need for local platforms in publishing	6
33	Increased use of educational podcasts instead of books	9
34	Weak regulation in the field of digital publishing	7
35	Inequality between traditional and digital publishers	5
36	Importance of data analytics in understanding audiences	6
37	Challenges in converting traditional content to digital	5
38	Change in consumption patterns of scientific and educational content	8
39	Need for standardization in digital publishing	4
40	Emergence of hybrid learning models (book + video)	6
41	Decline in the number of physical bookstores	9
42	Competition between domestic and global publishing giants	6
43	Difficulty of direct sales for independent authors	7
44	Impact of economic crises on book purchasing	10
45	Decline in consumers' purchasing power	11
46	Increase in printed book prices	9
47	Mismatch between book supply and demand	5
48	Weakness in book distribution systems in provincial areas	7
49	Decreased interest in translated books	4
50	Importance of faster translation of international works	6
51	Need for optimization of publishing processes	5
52	Emergence of independent digital publishers	7
53	Transformation in the business model of traditional publishers	6
54	Growing role of book influencers in advertising	9
55	Promotion of book-sharing culture	8
56	Need for increased collaboration between publishers and authors	5
57	Challenges in protecting authors' rights in the digital space	6
58	Growth of the digital specialized book market	7
59	Decline in the production of high-quality literary content	4
60	Changing role of libraries in accessing digital books	8
61	Readers' tendency toward book summaries instead of full reading	9
62	Necessity of collaboration between publishers and universities	6
63	Advances in 3D printing technology for publishing	5
64	Growth of academic and scientific publishing markets	7
65	Increasing importance of multimedia storytelling	6
66	Need for investment in digital publishing infrastructure	8
67	Decline in the reading of classical works among youth	6
68	Need for increased international interactions in publishing	5
69	Economic challenges faced by independent authors	7
70	Need for Iranian platforms for digital publishing	6
71	Emergence of new technologies in content distribution	5
72	Importance of user experience in digital book platforms	7
73	Increasing role of artificial intelligence in book recommendation and selection	6
74	Development of micro-payment platforms for book purchases	5
75	Changing role of authors in the digital publishing industry	6

Following the stage of open coding, which involved identifying and extracting initial concepts from raw data, the process advanced to axial coding. In this stage, the identified open codes were compared with each other, and the relationships among them were examined to form axial categories. This process involved grouping and integrating similar concepts, establishing connections among open codes, and identifying key patterns in the data. The goal of axial coding was to organize the data into meaningful and coherent main categories that could logically and structurally represent key themes. These categories played a crucial role in the final analysis of the future of the publishing industry. The following table presents the main categories extracted from open codes along with their related subcodes.

Table 2

Axial Coding and Main Categories

No.	Axial Code	Subset Open Codes
1	Technological transformations in the publishing industry	Impact of digital technology, artificial intelligence in publishing, e-books, changes in the publishing supply chain, digitalization of printing processes, use of blockchain in publishing, growth of online publishing platforms
2	Changes in consumer behavior	Decrease in reading printed books, increase in digital content consumption, changing book purchase patterns, growth of content sharing, use of audiobooks, tendency toward free content
3	Publishing economy and new revenue models	Decrease in print runs, increase in production costs, transformation of publishing business models, growth of in-app advertising, subscription-based book sales, emergence of freemium revenue models
4	Legal challenges and intellectual property rights	Digital plagiarism, need for new legislation, copyright challenges, changes in authors' rights, issues related to translation and international publishing
5	Developments in book distribution and sales	Changes in distribution channels, decline in physical bookstores, growth of online bookstores, the role of social media in publishing marketing, dominance of Amazon and similar platforms
6	The role of policymaking and government in the publishing industry	Government support policies, publishing subsidies, censorship laws, impact of sanctions on publishing, challenges related to publishing licenses, influence of cultural policies on content production
7	Social and cultural impacts of publishing	Decline in general reading levels, increase in low-quality (tabloid-style) content production, changes in authors' writing styles, growth of educational content, influence of social media on reading culture
8	Future uncertainties of the publishing industry	Impact of economic crises on publishing, competition with video content platforms, the future of traditional versus digital publishing, potential shifts in audience behavior among new generations, impact of emerging technologies on the publishing industry

Selective Coding and the Qualitative Conceptual Model

After completing the axial coding stage, in which main categories were derived from the open codes, the research proceeded to the selective coding phase. In this stage, the core category of the study was identified, and all other categories were examined in relation to it. The aim of this stage was to integrate categories and develop a conceptual model that demonstrates how the different elements are interconnected and form a meaningful pattern. The qualitative conceptual model proposed in this study helps to analyze the key trends, drivers, and uncertainties of the publishing industry within a unified theoretical framework.

The core category in the selective coding process represents the central concept that connects all other categories and provides a meaningful structure for data analysis. This category is chosen as the main axis of the research, and the other categories are either influenced by it or interact with it. Based on grounded theory and other qualitative methodologies, the core category must possess the following characteristics:

- **High interrelation with other categories:** The selected category should have the strongest connection with other categories. The more it can explain the various phenomena in the study, the more appropriate it is as a core category.
- **Frequency and prominence in the data:** The core category should be one that appeared most frequently in interviews, documents, and data analyses and was referenced by the majority of participants.
- **Theoretical generalizability:** The core category should provide the foundation for developing the conceptual model and serve as the basis for scenario planning and foresight analysis.
- **Predictive and explanatory potential:** In foresight and scenario studies, the core category should be able to explain future transformational paths and link the key variables shaping the future.
- **Internal coherence and comprehensiveness:** The category should be sufficiently broad and integrative, covering other related concepts coherently without omitting any significant topic.

To select the core category in this study, the following stages were undertaken:

Stage 1 (Data analysis and identification of axial categories):

After open coding, a large number of initial codes were extracted. During axial coding, these codes were organized into several main categories. At this stage, each category could potentially serve as the core category; however, the degree of interconnection among categories needed to be evaluated.

Stage 2 (Analyzing relationships among categories):

For each category, it was examined whether it encompassed other categories and could explain their interconnections. The category that best accounted for causal relationships, consequences, and future trends was selected as the core category.

Stage 3 (Selection and theoretical justification of the core category):

The core category selected for this study is **"Technological transformations and digitalization of the publishing industry."** The theoretical justifications for this selection are as follows:

- **Highest level of influence:** Digital transformation has impacted all aspects of the publishing industry, from revenue models and content distribution to consumer behavior and government policies.
- **Key category in foresight analysis:** Future scenarios of the publishing industry largely depend on the development trajectories of emerging technologies.
- **Driver of change in other categories:** New content distribution models, legal challenges, and shifts in audience behavior all stem from technological transformations.
- **Strong interconnection with other categories:** The identified categories either arise from or are shaped by technological transformation.
- **Applicability to scenario planning and future modeling:** In foresight models, technological change and digitalization are among the most critical drivers that outline multiple possible pathways for the future of publishing.

The following table illustrates the relationship between the core category ("Technological transformations in the publishing industry") and the other axial categories.

Table 3

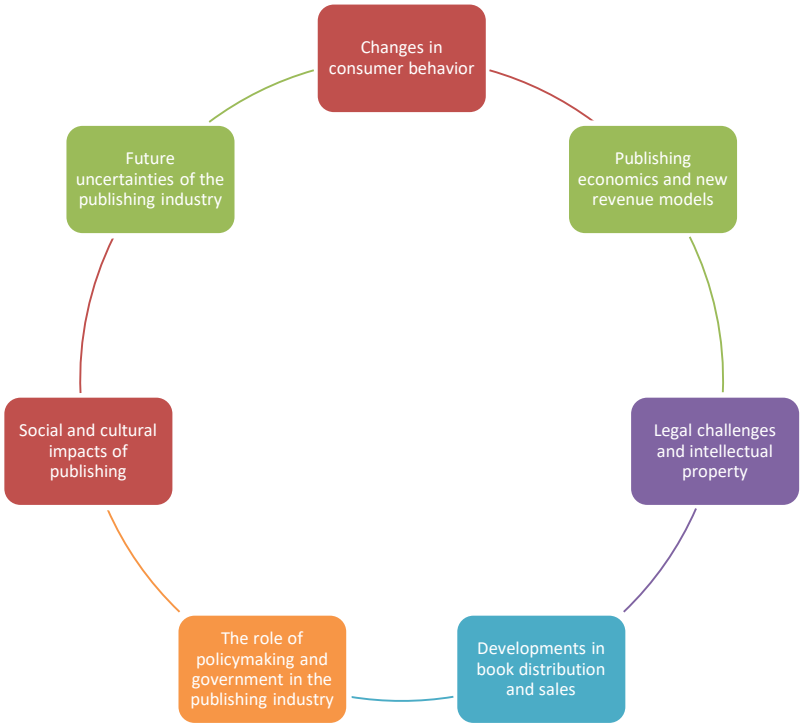
Relationship of the Core Category "Technological Transformations in the Publishing Industry" with Other Axial Categories

No.	Axial Category	Relationship with the Core Category (Technological Transformations in the Publishing Industry)
1	Changes in consumer behavior	New technologies have altered patterns of reading and book purchasing (e.g., e-books, audiobooks, and content-sharing platforms).
2	Publishing economics and new revenue models	The digitalization of the publishing industry has led to new business models such as subscription-based access, pay-per-read, and targeted advertising.
3	Legal challenges and intellectual property	Digital technologies have complicated issues such as plagiarism, illegal distribution, and copyright.
4	Developments in book distribution and sales	The growth of online platforms and digital books has reduced dependence on physical bookstores.
5	The role of policymaking and government in the publishing industry	Governments are seeking to support traditional publishers and to regulate laws related to digital publishing.
6	Social and cultural impacts of publishing	New technologies have transformed reading practices and access to knowledge, resulting in cultural change.
7	Future uncertainties of the publishing industry	The pace of technological change has introduced significant uncertainties into the future of the publishing industry (e.g., the impact of artificial intelligence on content creation).

The qualitative conceptual model is a framework developed based on selective coding that integratively displays the relationships between the core category and the other axial categories. In this model, "technological transformations in the publishing industry" is selected as the core category because the other categories are either influenced by it or interact with it. This model demonstrates how new technologies affect the economy, consumer behavior, policymaking, and other dimensions of the publishing industry, and how foresight and scenario planning can be used to analyze the uncertainties in this domain. The conceptual model comprises one core category (technological transformations in the publishing industry) and seven axial categories that interact with it.

Figure 1

Conceptual model comprising the core category and the axial categories



The identification of key drivers and uncertainties is one of the most important stages in the foresight and scenario-planning process, addressing the principal factors that shape the future of the publishing industry. In this section, building on the results of the qualitative analysis of interview data and using the grounded theory approach, the key drivers and the uncertainties affecting future transformations in the publishing industry have been extracted. This stage serves as a bridge between qualitative findings and the development of future scenarios and helps identify the forces that steer the trajectory of this industry as well as its areas of ambiguity and uncertainty. To identify drivers and uncertainties, the axial categories derived during axial coding and the qualitative conceptual model were first reviewed. Then, using foresight techniques such as driver analysis, the key factors influencing the publishing industry—obtained from interview data and expert opinions—were prioritized. Drivers were defined as forces of change with high impact and relative certainty that can significantly influence the industry's development path. In contrast, uncertainties were identified as factors with high impact but low predictability regarding their direction or outcomes, which may lead to divergent scenarios. The identification process comprised the following steps:

Review of codes and categories: Open codes and axial categories were examined to extract factors repeatedly cited by interviewees as primary drivers or points of ambiguity.

Assessment of impact and certainty: Each factor was evaluated on two key criteria—impact (its degree of influence on the publishing industry) and certainty (the degree of confidence in its occurrence or direction). This assessment was conducted using expert judgment and qualitative analysis.

Prioritization: High-impact factors were divided into two groups—drivers (high certainty) and uncertainties (low certainty).

Alignment with the conceptual model: Drivers and uncertainties were aligned with the core category "technological transformations in the publishing industry" and the other axial categories to confirm their fit within the overall research framework.

Drivers are forces that, with relative certainty, are shaping the future of the publishing industry and were extracted from the qualitative data as recurring and influential factors. Due to their high frequency in interviews and strong linkage with the axial categories, these drivers were identified as the principal catalysts of transformation in the industry. The table below presents the key drivers along with brief explanations.

Table 4

Key Drivers of the Publishing Industry

No.	Key Driver	Explanation	Related Category
1	Digitalization of the publishing industry	The expansion of e-books, audiobooks, and online platforms that has transformed the traditional structure of publishing.	Technological transformations in the publishing industry
2	Change in consumer behavior	Declining interest in printed books and a shift toward digital and multimedia content among audiences.	Changes in consumer behavior
3	Rising production costs	Increasing printing and distribution costs that steer publishers toward digital models.	Publishing economics and new revenue models
4	Emergence of new revenue models	The development of subscription models, micropayments, and advertising that substitute for traditional sales.	Publishing economics and new revenue models
5	Growth of online distribution platforms	The rising role of digital stores and platforms in providing access to books.	Developments in book distribution and sales

These drivers represent the definitive trends currently observed in the publishing industry and are likely to continue into the future. For example, "digitalization of the publishing industry," as a principal driver, has not only been affirmed by most interviewees but is also evident in the research literature and global developments in this field.

Uncertainties are factors that, although highly influential for the future of the publishing industry, cannot be predicted precisely due to their dependence on multiple variables and environmental complexities. These factors were extracted from the qualitative data and will serve as the basis for scenario planning in subsequent stages. The table below presents the key uncertainties.

Table 5

Key Uncertainties of the Publishing Industry

No.	Key Uncertainty	Explanation	Related Category
1	Speed and direction of technological change	The extent of adoption of technologies such as artificial intelligence and blockchain and their impact on publishing is unclear.	Technological transformations in the publishing industry
2	Future of traditional versus digital publishing	Whether traditional publishing will be entirely displaced or will continue as a complement.	Future uncertainties of the publishing industry
3	Government policymaking	The impact of supportive or restrictive government policies on the growth or decline of the publishing industry is uncertain.	The role of policymaking and government in publishing
4	Competition with video-content platforms	Whether video content will replace books or remain a complement.	Social and cultural impacts of publishing
5	Impact of economic crises	The severity and persistence of economic crises on audiences' purchasing power and content production is undetermined.	Future uncertainties of the publishing industry

These uncertainties constitute the focal points around which alternative future scenarios of the publishing industry can be constructed. For example, the "speed and direction of technological change" may lead to scenarios in which artificial intelligence or blockchain either fully transform the publishing industry or remain merely auxiliary tools.

Discussion and Conclusion

The findings of this study provide an integrated understanding of the key drivers, uncertainties, and emerging dynamics shaping the future of the publishing industry in the context of digital transformation. The analysis revealed that "technological transformations and digitalization of the publishing industry" serve as the core category connecting all other thematic dimensions, including economic restructuring, evolving consumer behaviors, legal challenges, policy interventions, and cultural impacts. This central position reflects the increasing dependence of publishing ecosystems on digital infrastructures, AI-driven processes, and online distribution platforms. The results highlight that technological innovation is not merely a supportive tool but rather a structural force that is redefining the identity, function, and sustainability of the publishing industry itself [1, 3].

One of the major results emerging from this study concerns the growing role of digitalization as a transformative driver across all dimensions of the publishing ecosystem. Participants emphasized that digitalization has accelerated production workflows, increased accessibility to global markets, and diversified content formats through the proliferation of e-books, audiobooks, and subscription-based models. These findings align with the argument that the evolution of digital publishing reflects both technological necessity and market-driven adaptation [1]. As Berzina and Lezunova [3] demonstrate, the transformation of editorial and publishing processes in the digital era involves an intricate balance between automation and human creativity. This duality—technological efficiency versus editorial authenticity—emerged repeatedly in expert interviews, suggesting that future publishing models must integrate technological advancement without compromising cultural and intellectual integrity.

The results also show that the digitization of publishing has reshaped consumer behavior, leading to more personalized and interactive modes of reading and content engagement. Experts noted that data analytics, recommendation algorithms, and mobile-based reading platforms have transformed readers from passive consumers into active participants in the publishing ecosystem. This observation is consistent with Shrayberg's [4] analysis, which illustrates how digital markets have altered consumer patterns by prioritizing instant access, interactivity, and cross-platform content consumption. Similarly, Suico et al. [5] found that younger generations increasingly favor multimedia and interactive literary formats, reflecting a broader cultural transition toward multimodal literacy. The participants' emphasis on the rise of "data-driven readership" mirrors these trends and confirms that consumer engagement is now deeply tied to digital infrastructure and platform design.

Economic restructuring within the publishing industry represents another core finding of this research. The study identified a significant transition from print-based sales to diversified digital revenue streams such as subscriptions, micro-payments, and advertisement-supported content. These results resonate with the argument that technological disruption has fundamentally altered the economic logic of the publishing industry [3, 6]. The commercialization of publishing innovation, as highlighted by Khramova, Shymoshenko, and Reshetniak [6], has fostered new business models that rely on digital platforms for both content delivery and audience analytics. Interviewees pointed out that this shift toward digital economies introduces both opportunities and vulnerabilities. While digital distribution reduces costs and expands reach, it also exposes publishers to the volatility of platform dependency and algorithmic monopolies. These concerns correspond to Olson's [7] discussion on recombinant scholarly publishing, which underscores the tension between technological opportunity and institutional dependence on large digital intermediaries.

A further insight derived from the data concerns the rise of AI and its transformative role in research and publishing. Participants highlighted that artificial intelligence is revolutionizing how manuscripts are reviewed, formatted, and distributed. However, concerns were expressed regarding the ethical implications of AI in authorship attribution, peer review bias, and intellectual property rights. These concerns are consistent with findings by Lund et al. [2], who warn that AI-assisted publishing challenges traditional notions of academic authorship and raises questions about accountability and transparency. Similarly, Panchal [10] emphasized the importance of establishing clear ethical frameworks for AI integration in research publishing, particularly in developing contexts. The present study's findings support these arguments by demonstrating that technological innovations in publishing must be accompanied by ethical governance mechanisms to ensure integrity, credibility, and inclusivity.

The study also underscored the importance of policy frameworks in shaping the future of the publishing industry. Participants stressed that government interventions—through subsidies, regulatory reforms, and digital infrastructure development—are vital for mitigating risks and promoting innovation in the publishing sector. This finding echoes Kajwang's [12] analysis of policy alignment with national development agendas, which demonstrates how targeted governance can facilitate technological adaptation across industries. Likewise, the role of policymaking in promoting equitable access to digital resources parallels the Sustainable Development Goal (SDG) agenda for inclusive education and innovation [8, 9]. The participants noted that without coherent policy support, the digital divide may deepen, disadvantaging smaller publishers, local authors, and marginalized readers.

The qualitative data also reveal that social and cultural transformations are both outcomes and catalysts of technological change in the publishing ecosystem. The shift from print to digital has redefined cultural consumption patterns and influenced literary production styles. Authors now adapt their writing for digital formats, interactive storytelling, and social media marketing. This echoes the findings of Merga [13], who argues that scholarly and creative labor is increasingly oriented toward knowledge mobilization through digital media. Similarly, Pooley [14] contends that collective funding and open-access initiatives are essential to reclaim scholarly publishing from commercial dominance and to restore its social purpose. The present study supports these perspectives by showing that digitalization not only affects production and distribution but also reconfigures the cultural role of publishers as mediators of public discourse.

Uncertainty remains one of the defining characteristics of the digital publishing landscape. Participants frequently identified two major uncertainties shaping the industry's trajectory: the speed and direction of technological innovation, and the resilience of traditional publishing in a digitized environment. These findings align with Shrayberg's [4] observation that technological acceleration creates instability by continually reshaping audience expectations and market structures. Moreover, the uncertainty surrounding future government policies and the global economy further complicates strategic planning for publishers. Fajardo-Dolci and Santacruz-Varela [15] highlight that long-term forecasting and workforce planning in complex industries require flexible, data-informed approaches—principles equally applicable to publishing. The results of the current study affirm that foresight methodologies, such as scenario planning and trend analysis, can help publishing stakeholders anticipate future disruptions and design adaptive strategies.

In addition, the study revealed a strong connection between technological innovation in publishing and the broader sustainability agenda. Participants viewed digital publishing not only as a commercial innovation but also as a vehicle for sustainable education and cultural equity. This observation aligns with Ionescu et al. [9], who demonstrate that technological

progress in urban information systems can support the achievement of SDG11 by enhancing accessibility and participation in cultural life. Similarly, Ramadhan et al. [8] found that education and gender equality goals are closely linked to information access and dissemination, implying that publishing innovation can play a pivotal role in achieving sustainable development targets. By expanding access to knowledge, fostering multilingual content, and promoting open-access resources, digital publishing can contribute to reducing educational inequalities and advancing global literacy.

However, the participants also recognized structural challenges associated with digital transitions. The concentration of digital power among a few global platforms threatens to marginalize local publishers and limit cultural diversity. As Olson [7] and Pooley [14] argue, the commodification of scholarly communication has led to systemic inequities in access to information and the privatization of knowledge infrastructures. The present findings echo these concerns and emphasize the necessity of developing alternative, community-based publishing ecosystems that maintain intellectual autonomy. Moreover, the data suggest that technological innovation should not be viewed solely as an end in itself but as part of a broader vision of inclusive cultural and educational transformation.

Another significant insight relates to the professional competencies required for digital publishing. Experts reported that the transition to digital ecosystems demands new skill sets, including proficiency in data analytics, platform management, and digital content design. Berzina and Lezunova [3] argue that the evolution of publishing roles necessitates the integration of technical expertise with editorial judgment to sustain quality standards. Similarly, Gavali and Jagdale [1] highlight that digital libraries and e-books offer both opportunities and challenges for publishers, requiring continuous skill development and technological literacy. The current findings support these observations, suggesting that capacity building and professional training should become strategic priorities for publishing institutions seeking to remain competitive in a rapidly evolving environment.

Finally, the results confirm that the publishing industry's future resilience depends on its ability to balance technological innovation with ethical, cultural, and humanistic considerations. Digital transformation should not lead to homogenization or the erosion of cultural identity. Rather, it should foster pluralism and diversity in knowledge production, dissemination, and access. As Lund et al. [2] emphasize, the ethical integration of AI and digital technologies into publishing must prioritize transparency, accountability, and respect for human creativity. The conceptual model developed in this study illustrates how technological change interacts with economic, policy, and cultural dimensions, offering a roadmap for strategic foresight and sustainable industry development.

While the study provides valuable insights into the future of the publishing industry, it is not without limitations. First, the research relied primarily on qualitative interviews with a relatively small and purposively selected group of experts. Although this approach ensured depth and contextual understanding, it may limit the generalizability of findings to broader industry contexts. Second, the study focused primarily on the perspectives of professionals within the publishing, technology, and policymaking sectors; the views of readers, authors, and educators were not extensively represented. Including these groups could provide a more comprehensive understanding of the socio-cultural impacts of digital transformation. Third, the rapid pace of technological change means that findings are time-sensitive and may require periodic updating as new developments—such as generative AI tools or blockchain-based copyright systems—emerge. Finally, the absence of quantitative validation or econometric modeling limits the ability to measure the relative influence of identified drivers and uncertainties on future industry outcomes.

Future studies should adopt mixed-method approaches that combine qualitative foresight analysis with quantitative modeling techniques such as trend extrapolation, network analysis, and system dynamics. Comparative studies across different cultural and linguistic contexts would also provide valuable insights into how digital transformation manifests in diverse publishing ecosystems. Furthermore, research could explore the ethical governance of AI in publishing, focusing on transparency, accountability, and inclusivity in algorithmic content generation. Investigating the role of digital literacy among authors and consumers could also help identify barriers to equitable participation in the digital publishing economy. Finally, scenario-based research could be extended to test policy interventions and simulate their potential effects on industry resilience, equity, and sustainability.

Practitioners in the publishing industry should prioritize the development of adaptive strategies that balance technological innovation with ethical responsibility and cultural inclusivity. Investment in digital infrastructure, professional training, and data governance frameworks is essential for maintaining competitiveness and integrity. Policymakers should establish supportive regulations that encourage innovation while safeguarding intellectual property and ensuring equitable access to digital resources. Publishers should also foster cross-sector collaboration among technology providers, educational institutions, and cultural organizations to promote sustainable growth. Above all, the publishing community must embrace foresight and continuous learning as guiding principles for navigating uncertainty and building a resilient, inclusive, and future-oriented publishing ecosystem.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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