

Representation of the Information Ecosystem Centered on the informational Energy of Iran's Publishing Industry Based on Grounded Theory

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Abstract

Purpose: Iran's publishing information ecosystem has become increasingly complex and unstable due to digital transformation, shifting audience behavior, and political and economic pressures. A major challenge is the absence of a comprehensive information system that limits effective decision-making. This study aims to represent the structure, interactions, and disruptions within this ecosystem, focusing on the flow of informational energy, using a grounded theory approach.

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Method: A qualitative grounded theory approach was employed. Data was collected through semi-structured interviews with 20 key stakeholders, including publishers, government officials, booksellers, authors, and union representatives from Tehran and other regions. Thematic analysis was conducted through open, axial, and selective coding. Validity was ensured via participant review, constant data comparison, and theoretical saturation.

Findings: The central phenomenon is a disruption in the flow of informational energy, caused by the lack of a comprehensive information system, centralized policies, cultural censorship, and information monopolization. Contextual factors, including regional disparities, weak digital infrastructure, limited informational literacy, and opaque policymaking, exacerbate this disruption. Stakeholders predominantly adopt reactive strategies, relying on informal networks, withdrawing from formal processes, and producing content without market analysis, reflecting a fragmented and inefficient information environment.

Conclusion: Iran's publishing information ecosystem lacks transparency, dynamism, and informational equity. To restore the flow of informational energy, the study recommends developing a comprehensive publishing information system, decentralizing information resources, enhancing publishers' information literacy, and creating open data networks. These measures aim to support informed decision-making and foster cultural dynamism.

Keywords: Book production system in Iran, Cognitive flow, Cultural policy, Data-driven infrastructure, Knowledge capital

Introduction

The publishing industry is one of the main channels for the production and transmission of knowledge and culture in human societies. Since ancient times, books and the publishing process have been assumed as the primary means of conveying intellectual, scientific, and cultural values. With the transition from the printing era to the digital era, the structure and function of the publishing industry have undergone fundamental changes. However, in many countries, including Iran, this structure still faces both traditional and modern challenges. In the present era, information and information flows have become one of the main sources of power, development, and resilience in societies. Cultural industries, especially publishing, are not only platforms for knowledge transfer but also vital infrastructures within the information ecosystem of each country. In Iran, despite its long history, the publishing industry faces complex and multi-layered challenges in production, distribution, policymaking, and information circulation (UNESCO, 2022). These challenges are often rooted in the lack of information coherence, weak communication among actors, and inefficiency in transferring information energy.

In this context, information energy refers to the trajectory of knowledge, content, economic, and technological resources from the primary sources of production to final consumption (readers or cultural consumers). It encompasses transformation, transfer, redistribution, and control across different layers of the publishing system. In this sense, information energy serves as a metaphor for the flows that sustain the publishing ecosystem.

As artificial intelligence and smart automation reshape global supply chains through real-time data and predictive analytics, the concept of informational energy emerges as a strategic force within information ecosystems particularly in knowledge-driven industries such as publishing (shamsuddoha et al, 2025).

Publishing, as a composite phenomenon, consists of a complex and intertwined interaction among economy, culture, and technology, and is inherently dynamic and variable. These three fundamental factors operate in an interconnected manner, such that no aspect of publishing can be analyzed independently of the others. The success of publishing depends on achieving a sustainable balance between these components ensuring that economic and technological benefits are realized while cultural advancement is preserved without undermining values.

Guiding publishing policies toward setting this balance is the primary responsibility of institutions such as publishers, unions, cultural planners, and creators. In this regard, the role of publishing researchers, media professionals, and authors in explaining the capacities and achievements of a strong publishing system aligned with cultural ideals is significant. Moreover, the complexities of publishing such as tensions between economy and culture, market demands, intellectual property, social pressures, conflict of interests, and political or executive fluctuations—necessitate a holistic and strategy-oriented approach towards publishing management. Thus, publishing planning should be grounded in a systematic understanding of its internal and external interactions (Azarang, 2018).

Babalhavaeji identifies the issue of distribution as one of the most fundamental problems in Iran's book market. She argues that the country's geographical size, the dispersion of cities, and the lack of an efficient information system have rendered access to information far more difficult. Most publishers either distribute books themselves, exchange them with other publishers, or rely on distribution institutions. Hence, establishing a dynamic center for book distribution is essential. The problem is acute: many books are published but remain unsold. The gap between supply and demand is striking, and distribution fails to reach key segments of society including villagers, workers, housewives, schools, and prisons (Bab alhavaeji, 2008).

The concept of the information-energy ecosystem refers to a network of interactions between data, energy, matter, and cognitive processes, in which information plays a structuring and driving role in physical and biological systems. Within this framework, information is treated as energy and is linked to concepts of entropy and information thermodynamics (Floridi, 2011). Information processing requires energy consumption, and its efficiency is influenced by the laws of thermodynamics. Watson et al. (2010), for instance, examined the role of information systems in sustainable environmental development and introduced the concept of energy informatics. In this view, information is not merely the processing of data but also a resource for optimizing energy use and fostering sustainable structures. This aligns with theories equating information with matter, as information here is seen as a source of structural change in physical and social systems. Some theories even consider matter and information to be equivalent, with information capable of generating complex natural structures.

The rate of change reversal theory proposed by Ritchie et al. (2022) suggests that the speed of changes in environmental or human factors, rather than their intensity alone, can cause instability and sudden reversals in systems. This perspective is especially relevant for analyzing the sustainability of information and publishing ecosystems, where rapid changes in technology, policy, or consumption patterns may disrupt established structures without allowing sufficient time for gradual adaptation. Such insights are valuable for modeling scenarios of transformation in Iran's publishing industry, particularly in contexts where the book market and audience behaviors are undergoing rapid shifts (Ritchie et al., 2022).

In energy policy studies, energy information—such as consumption data from smart meters—can influence citizen behavior and contribute to shaping “energy citizenship.” This concept emphasizes active public participation in transitions to sustainable societies, which requires providing consumers with accurate and accessible information (Devine-Wright, 2012, cited in Hamann, 2022).

Information theory, originally proposed by Claude Shannon (1948) in telecommunications engineering, is now widely applied in information science, knowledge management, and communication studies. In this theory, information is the basic unit of meaning transfer flowing along a communication channel between sender and receiver. Applying this framework to publishing helps analyze how meaning is transmitted through books, journals, digital media, and other formats, while also examining interference (noise), feedback, and the quality of transmission across the ecosystem.

The theory of information energy also enables the analysis of temporal and spatial dynamics of information. In Iran's publishing industry, cultural policy shifts, technological innovations, and social transformations influence both the volume and quality of information energy. For example, the rise of digital publishing platforms has accelerated information transfer and reduced dependence on traditional structures.

Within this framework, publishing is analyzed not only as an economic structure but also as an information system with cultural and social dimensions. This perspective makes it possible to examine publishing's role in shaping public discourse, knowledge production, and cultural value transmission. It also sheds light on the influence of

government policies, civil society institutions, and new technologies on the information energy of the industry.

Studying Iran's publishing information ecosystem through the lens of information energy thus offers a novel approach towards uncovering hidden relationships, identifying information nodes, and analyzing driving and inhibiting forces within this complex system. Given rapid technological developments and the absence of a coherent information system, Iran's publishing industry faces persistent challenges such as institutional fragmentation, non-data-driven decision-making, and resource waste. This research therefore aims to propose an analytical model grounded in information energy theory, with a view to identifying governing mechanisms, strengthening information-processing capacity and resilience, and ultimately providing a foundation for policy, structural, and technological interventions.

Objectives of the Study

The present study is intended to analyze the structure of Iran's publishing information ecosystem and identify the key actors, nodes, and flows of information, also to examine the relationships and interactions among stakeholders within the publishing industry, including publishers, government officials, booksellers, authors, and unions. To identify the main challenges, disruptions, and inefficiencies affecting the flow of informational energy in the publishing ecosystem, such as policy centralization, information monopolies, and digital infrastructure weaknesses. To explore the contextual factors (e.g., regional inequality, low informational awareness, non-transparent policymaking) that exacerbate disruptions in the information ecosystem. To investigate the strategies and behaviors adopted by stakeholders in response to information gaps and systemic challenges, including reliance on informal networks and withdrawal from formal processes. To develop a conceptual model of the publishing information ecosystem based on the grounded theory analysis, highlighting the flow of informational energy and structural blockages. To propose actionable recommendations for improving transparency, equity, and resilience in the publishing information ecosystem, including designing comprehensive information systems, decentralizing resources, and enhancing information literacy among stakeholders.

Literature Review

Understanding the mechanisms of the publishing industry's information ecosystem requires a clear grasp of key concepts such as information ecosystem, information energy, information resilience, and the role of actors. To design a native model, it is also necessary to examine existing theories in the fields of information, communication, and complex systems. Roland, Nicholas, and Huntingdon (2004), in their article on the expectations of scientific authors in the digital environment, highlight both the challenges and opportunities of scientific communication within the publishing ecosystem. They show that authors demand open access, quality peer review, and effective interaction with specialized audiences. These expectations emphasize the need for smoother information flows and the optimization of information energy in scientific publishing. In this context, information energy understood as the driving force behind knowledge production, transfer, and consumption functions effectively only when publishing infrastructures and libraries can meet the needs of authors and users. Their findings highlight the importance of rethinking traditional publishing models and strengthening digital infrastructures so that the publishing ecosystem can adapt to the dynamics of the new era.

An information ecosystem can be defined as a complex network of actors, resources, technologies, and information flows that interact within a given socio-cultural context. Such systems are characterized by dynamism, interdependence, self-regulation, and sensitivity to environmental conditions. The components of an energy-information ecosystem include: information actors (publishers, authors, policymakers, cultural institutions); information flows (production, processing, storage, distribution, feedback); infrastructures (technologies, communication networks, statistical and decision-support systems); and interactive relationships (synergistic, intersecting, or conflictual) (Parsons & Hayek, 2008). A publishing actor refers to any individual or entity playing an active role in the publishing process, such as publishers, the Ministry of Islamic Guidance, distributors, libraries, or the media. Analogous to the Sun as the primary energy source in natural ecosystems, raw information energy in an information ecosystem is the motivation that fuels content creation and human knowledge.

According to Duff and Chen (2019), information energy represents the potential or actual ability of an entity to generate, process, and

transmit information within a given environment. This concept integrates principles from complex systems, information thermodynamics, and organizational theory. Key elements include: an actor's data-processing capacity, ability to manage information complexity, structural position within networks, and level of interaction and feedback with others. Manifestations of diminished information energy include data blockages, institutional isolation, technological resistance, and centralized information control. Information resilience—particularly within cultural systems—refers to the ecosystem's ability to recover information flows after crises, pressures, or structural disruptions. Elias and Gonzalez (2021), in a study on libraries and digital publishing, demonstrate how the absence of data-driven policies reduces cultural resilience at the national level.

Within the publishing industry, information technology functions not merely as a tool but also as an integral component of social and cultural structures. Accordingly, the “social information” approach seeks to uncover how institutional, economic, and cultural contexts shape the design, adoption, and functioning of publishing technologies. For instance, implementing international standards such as the International Book Exchange Standard in Iranian publishing depends not only on technical infrastructure but also on understanding actor behavior, organizational capacities, and policymakers' views on information flows. This perspective provides a theoretical foundation for scenario-based analyses, modeling interactions, and explaining resistance or acceptance of digital transformation in publishing.

Research into Iran's publishing information ecosystem has explored structures, actors, barriers, and developments using both qualitative and quantitative approaches. For example, Faraj Pahlou, Asgharnezhad, and Farajpahlou (2018) conducted a survey of Iranian publishers regarding the impact of information technologies on publishing processes. Their results showed that 97% of publishers have internet access and most positively assess the role of information technology. Nevertheless, distribution and sales remain problematic, pointing to weaknesses in commercial and informational infrastructures. Similarly, Afzali and Aboojafari (2018) examined Iran's publishing economics through a value chain model, identifying challenges such as declining household spending on books, lack of reading habit, poor distribution networks, the dominance of new media, and an exam-driven education system. They call for targeted policies

including legal reforms, innovations like print-on-demand and audiobooks, online sales, and the introduction of economic indicators.

Other domestic studies support this view. Torabi et al. (2021), using grounded theory, identified major obstacles to effective distribution, including unprofessional networks, lack of comprehensive structures, guild interference, weak regulations, and low demand. Their model emphasized strategies such as strengthening bookstores, merging small centers, leveraging new technologies, and government support, while highlighting the central role of the Ministry of Culture and Islamic Guidance. Ebrahimi et al. (2024), through surveys and factor analysis, identified publishing economics, government support, copyright protection, auditing, advertising, management, content production, and training most essential to professional publishing. They outlined five main dimensions: technical elements, cultural and literary institutions, creators and audiences, electronic systems, and distribution and marketing. Such findings provide useful foundations for supportive policymaking and improved management processes. Collectively, domestic studies indicate that Iran's publishing information structure remains opaque, fragmented, and insular; critical market information, consumer feedback, and performance data are largely unavailable; and theoretical work, while addressing cultural, economic, and institutional issues, rarely adopts an ecosystemic, information-centered perspective.

At the international level, numerous studies have examined publishing developments, information's role in the value chain, and the impact of new technologies. Research in developed countries often centers on smart publishing, data-driven publishing, and digital publishing ecosystems. According to Bonina et al. (2021), information resilience within publishing is not simply a technological need but also a structural necessity. Disruptions in data flows can collapse interactions among actors; hence, platforms for knowledge exchange, performance analysis, and decision-making tools are vital for sustainability and innovation. Bozart and Handfield (2016) similarly analyze cultural supply chains, emphasizing the role of information energy in resilience. Skroff, Kreutzmann and Schroff (2022), in their study entitled 'An Approach to Openness', criticize the monopolistic dominance of Amazon in the e-book market. They demonstrate how the closed Kindle ecosystem creates user lock-in, limits consumer choice, and reduces publisher autonomy in pricing—ultimately harming author income and visibility. From a competition law perspective, they call for

compatibility across e-reader formats to enhance competition and rethink restrictive contractual clauses such as MFN.

While domestic research often emphasizes functional and localized issues, it has largely neglected holistic, network-based models of Iran's publishing ecosystem grounded in concepts like information energy. Most of the domestic studies address economics or distribution in isolation, while foreign studies are largely focused on digital publishing in developed economies, distant from Iran's conditions. No comprehensive research to date has applied grounded theory alongside information energy analysis to look into Iran's publishing ecosystem. This study, therefore, aims to fill this gap by combining grounded theory with the information energy framework to map the publishing value chain, identify informational blockages, and design a local operational model. Its innovative contribution lies in analyzing structural, political, technological, and human factors simultaneously to better understand and enhance Iran's publishing information ecosystem.

The present study is based on the concept of informational energy in Iran's publishing ecosystem. Informational energy represents the knowledge, content, and technological resources enabling the flow, analysis, and redistribution of information within the publishing system. Grounded theory was employed for empirical analysis and the extraction of key categories, identifying information flows, bottlenecks, and feedback loops within the ecosystem. Furthermore, the information ecosystem framework examined the relationships among actors (publishers, authors, professional associations, and governmental institutions) as well as digital and informational infrastructures. This framework allows for the identification of weaknesses, blockages, and opportunities to improve information circulation and enhance the resilience of the publishing industry.

Method

This study employed a qualitative approach based on grounded theory, as it is particularly suitable for exploring complex and under-researched phenomena such as information ecosystems. The main objective was to design a native model for the Iranian publishing industry's information ecosystem. Grounded theory allows for the systematic generation of theory from empirical data, making it appropriate for discovering

hidden relationships and structural nodes, as well as for constructing a practical and context-specific model.

Research Community and Sampling

The research community included key actors in the Iranian publishing industry: private and state-owned publishers, managers of professional and governmental institutions (e.g., the Iranian Book and Literature House, the Ministry of Culture and Islamic Guidance, the Publishers' Union), as well as stakeholders in policy-making, research, book production, and distribution. Sampling was conducted purposively and later expanded through a snowball technique. In total, 20 in-depth semi-structured interviews were conducted, and continued till theoretical saturation was achieved. The interviews explored:

The role of actors in the publishing ecosystem; experiences of information-related challenges; existing information flows and their barriers; institutional and policy interactions; suggestions for improving information circulation.

In addition, documentary evidence was analyzed, including regulations, statistical reports from the Iranian Book and Literature House, national book fair reports, support policies, and interviews with publishing professionals.

Data Analysis

Following the Strauss and Corbin (1998) framework, data analysis was carried out at three stages:

- Open coding: breaking down interview transcripts into semantic units, extracting initial concepts, and clustering them into primary codes. A total of 165 codes was identified.
- Axial coding: establishing relationships between codes, forming 47 subcategories, and merging them into 7 core categories. A paradigmatic model was applied to classify causes, contextual conditions, intervening variables, strategies, and consequences.
- Selective coding: identifying the central phenomenon "Disruption in the flow of information energy as a factor of structural collapse in the Iranian publishing ecosystem" and integrating all categories into the final theoretical model of the publishing information ecosystem.

Validation Strategies

To enhance the credibility and reliability of the research, multiple strategies were applied:

Internal validation through participant feedback on findings; systematic documentation of analytical steps and theoretical decisions; peer review of codes by a second researcher; provision of a rich, contextual description of the ecosystem and actor conditions.

Ethical Considerations

The research adhered to academic ethical standards by obtaining informed consent from all participants; ensuring confidentiality of individuals and institutions; allowing participants to withdraw freely at any stage; restricting the use of data exclusively to academic purposes.

Methodological Strengths

The methodology provided deep analysis grounded in real-world data; identification of hidden patterns within the publishing information system; the design of an operational theoretical model for structural reform; and integration of qualitative insights into institutional and technological perspectives.

Findings

This section presents the findings extracted from the framework of grounded theory, with a particular focus on the concept of “information energy” in the Iranian publishing ecosystem. The analysis identifies the main sources and pathways of information energy in this system. Data was systematically coded and analyzed in interaction with both theoretical and empirical categories, reflecting the capacities, semantic flows, and structural tensions that shape the dynamics of the publishing industry. The findings not only explain causal relationships and conceptual patterns but also clarify the role of information components in sustaining or disrupting the ecosystem, thereby paving the way for future theoretical interpretations.

In line with the qualitative data analysis process, all interviews were fully transcribed and carefully reviewed. During the open coding stage, 165 conceptual codes were extracted, capturing the diversity and richness of participants’ experiences. Through subsequent analysis and classification, these codes were organized into seven main categories and 40 subcategories, each illuminating a distinct aspect of the

phenomenon under investigation. This conceptual framework provides a robust foundation for building the final grounded theory model, in which the seven central categories represent the core dimensions of information energy.

These categories, encompassing more than 40 subcategories, are grounded in the 165 initial codes derived from 20 interviews. Within the final model, the information energy categories function as the driving forces of the publishing information ecosystem. Table 1 illustrates these categories and subcategories, along with representative quotations from interviewees.

By re-analyzing the qualitative data through the lens of the information energy theory, a set of non-repetitive initial codes was consolidated into seven conceptual dimensions. These dimensions constitute the fundamental elements of the proposed theoretical model, representing the resources, processes, outcomes, and foresight capacities of the Iranian publishing information ecosystem.

Table 1. Dimension of Informational Energy and Number of Initial Codes

Row	Initial Related Code	Count
1	Information Sources	22
2	Information Flow and Distribution	26
3	Information Filtering and Analysis	18
4	Information Consumption and Decision-Making	21
5	Informational Feedback and Systemic Learning	17
6	Structural and Systemic Barriers	25
7	Actors and Informational Role Players	22
8	Emerging Opportunities in Digital Publishing	14
9	Total Initial Codes	165

The initial coding process generated eight core categories reflecting the informational dynamics of the publishing ecosystem: information sources; information flow and distribution; information filtering and analysis; information consumption and decision-making; informational feedback and systemic learning; structural and systemic barriers; actors and informational role players; and emerging opportunities in digital publishing. Together, these categories constitute the total set of initial codes that formed the analytical basis for subsequent stages of grounded theory development.

In Table 2, 40 subcategories pertaining to the concept of “informational energy” in the Iranian publishing ecosystem are presented along with sample interview quotations and the corresponding core category. These subcategories were extracted from qualitative analysis of interviews with publishers and publishing experts, and in the framework of grounded theory, they fall under the core category of “informational energy.” Table 2 presents 40 subcategories derived from qualitative interviews with Iranian publishers and domain experts. Each subcategory is linked to a central thematic category of “informational energy”, highlighting the dynamic flows, bottlenecks, and structural enablers within the national publishing ecosystem. This structured coding provides a foundation for developing a grounded theoretical model of informational energy in the context of Iran’s publishing industry.

Table 2. Subcategories, Core Categories, and Sample Interview Statements

Row	Subcategory	Core Category	Sample Interview Statement
1	Scientific capacity of authors and researchers	Sources of Informational Energy	"We have capable authors in Iran, but they lack publishing opportunities."
2	Production of indigenous and national content	Sources of Informational Energy	"We should not just translate; we need localized content."
3	Researchers' motivation for authorship	Sources of Informational Energy	"When there is no feedback, there is no motivation to write."
4	University support for publishing	Sources of Informational Energy	"Universities only focus on thesis printing, not effective publishing."
5	Production of specialized content in emerging fields	Sources of Informational Energy	"We lack content in technology fields because there are no specialized authors."
6	Role of research institutions in providing original content	Sources of Informational Energy	"If research institutes are active, content production will be stronger."
7	Role of intermediary publishing institutions	Intermediaries for Informational Energy Transfer	"If properly managed, the Book and Literature House can serve as a bridge."

8	Function of book fairs	Intermediaries for Informational Energy Transfer	"Book fairs provide opportunities for visibility of information and books."
9	Communication technologies and platforms	Intermediaries for Informational Energy Transfer	"Platforms like Fidibo have changed the flow of information."
10	Specialized book media	Intermediaries for Informational Energy Transfer	"There are no media in the book review sector that shape information flows."
11	Publishing associations and unions	Intermediaries for Informational Energy Transfer	"An active union can facilitate communication between publishers and institutions."
12	Professional events and meetings	Intermediaries for Informational Energy Transfer	"We need regular publishing meetings to exchange experiences."
13	Censorship-oriented policies	Bottlenecks and Informational Blockages	"Some policies have caused books to disappear even before being published."
14	Centralized licensing in Tehran	Bottlenecks and Informational Blockages	"A provincial publisher must repeatedly travel to Tehran to obtain a license."
15	Weak IT infrastructure in publishing	Bottlenecks and Informational Blockages	"We do not have accurate data on book circulation."
16	Lack of open access to market data	Bottlenecks and Informational Blockages	"We don't know which books are bestsellers in the market."
17	Inefficiency of publishing databases	Bottlenecks and Informational Blockages	"Book information is incomplete or outdated."
18	Monopoly in distribution and communication channels	Bottlenecks and Informational Blockages	"A few companies control the entire distribution."
19	Departure of authors and creators	Informational Energy Leakage	"Authors unable to publish leave or stop writing."
20	Publishing abroad	Informational Energy Leakage	"Good content is being published abroad."
21	Waste of content resources	Informational Energy Leakage	"Years of research are conducted but do not reach books."
22	Self-censorship by authors	Informational Energy Leakage	"Many do not write at all because they know it will be rejected."

23	Data exit without internal feedback	Informational Energy Leakage	"Researches are published internationally but remain unknown domestically."
24	Lack of information archives	Informational Energy Leakage	"We have no historical memory; every publisher starts from zero."
25	Adaptation and rewriting of old works	Informational Energy Recycling	"Our classical literature has potential for regeneration."
26	Recycling information in new formats	Informational Energy Recycling	"Audiobooks have given content a new life."
27	Using theses	Informational Energy Recycling	"Thousands of theses sit idle in libraries."
28	Transforming content into educational products	Informational Energy Recycling	"Books can be converted into workshops, videos, and podcasts."
9	Reviving classic content	Informational Energy Recycling	"Republishing old works with a new design attracts audiences."
30	Reusing historical data	Informational Energy Recycling	"Research publishers reuse historical documents."
31	Weak access for provincial publishers	Center-Periphery Informational Flow	"We don't even have access to the list of published books."
32	Lack of mutual interaction	Center-Periphery Informational Flow	"Provincial publishers are not involved in decision-making."
33	Informational centralization	Center-Periphery Informational Flow	"Everything is in Tehran, from decision-making to data."
34	Lack of information distribution channels	Center-Periphery Informational Flow	"Book information does not reach provinces."
35	Lack of regional intermediary institutions	Center-Periphery Informational Flow	"We need a provincial publishing center."
36	Discrimination in visibility opportunities	Center-Periphery Informational Flow	"Only Tehran publishers stand out at fairs."
37	Lack of data for demand analysis	Informational Energy in Book Life Cycle	"We print books based on personal taste."
38	Disconnection between publisher and audience	Informational Energy in Book Life Cycle	"We don't know if books are read; we just sell them."
39	Lack of feedback mechanisms in publishing	Informational Energy in Book Life Cycle	"We have no data to improve future editions."

40	Absence of monitoring systems	Informational Energy in Book Life Cycle	"Publishing in Iran happens without a monitoring system."
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Subcategories, core categories, and representative interview statements were identified during the open coding process. The table (2) illustrates how specific themes (subcategories) were grouped under broader analytical dimensions (core categories) and supported by direct quotations from interviewees. These data provide empirical grounding for the conceptualization of informational energy flows, blockages, leakages, and recycling within the Iranian publishing ecosystem.

Table 3. Core Categories of Informational Energy with Sample Subcategories

Row	Sample Subcategories	Core Category
1	Scientific capacities, indigenous content production, specialized authorship, university research	Sources of Informational Energy
2	Intermediary institutions (Book & Literature House, media, platforms), communication technologies, publishing events	Intermediaries for Informational Energy Transfer
3	Censorship, distribution monopolies, weak platform infrastructure, restrictive policies	Bottlenecks and Informational Blockages
4	Departure of talent, authors migration, loss of content resources, systematic censorship	Informational Energy Leakage
5	Adaptation, rewriting, reuse of old resources, adaptation to new technologies	Informational Energy Recycling
6	Tehran–province imbalance, weak data transmission, information centralization	Center–Periphery Informational Flow
7	Tracking, feedback, and analysis throughout a book’s production, distribution, and reception	Informational Energy in the Book Life Cycle

Table 3. Core categories of informational energy and their representative subcategories. This table summarizes the main analytical dimensions identified through the coding process, highlighting how specific subcategories exemplify each core category. The table provides a structured overview of informational energy sources, transfer mechanisms, blockages, leakages, recycling processes, center–periphery flows, and lifecycle-related information management within the Iranian publishing ecosystem.

Explanation (Scientific Style) Based on the data-driven analysis, the central phenomenon identified in Iran’s publishing information ecosystem

is “Informational Energy.” This metaphorical concept captures the capacity for the generation, processing, storage, transfer, and redistribution of information among actors in the publishing sector. The presence of this energy ensures cohesive ecosystem performance, while its absence or weakness disrupts fundamental publishing functions.

Informational energy flows in this ecosystem as a complex, cyclical, and cross-sectional process, continuously shaped by cultural, political, economic, and technological factors. Any blockage or discontinuity in one part of this cycle (production, regulation, distribution, or consumption) may lead to disruptions throughout the entire information chain.

Table 4. Conceptual Categorization and Sample Subcategories

Analytical Dimension	Core Categories	Sample Subcategories
Central Phenomenon	Informational Energy	Information flow, content processing and storage, knowledge redistribution, technological and economic capacities
Causal Conditions	Lack of integrated publishing information system	Fragmented performance of governmental institutions, absence of a national information policy in the book sector
Contextual Conditions	Unequal cultural–geographical structures	Cultural policy centralization, inefficient digital infrastructure, center–periphery gaps
Intervening Conditions	Inequalities in information capital and publishing literacy	Low information literacy among publishers, unstable government support policies, unequal data access
Actor Strategies	Alternative mechanisms to cope with disruptions	Informal networking among publishers, reliance on commercial platforms, empirical market data analysis
Consequences	Disruptions due to weakened informational energy flows	Ineffective decision-making, deepening information gaps, emergence of closed publishing ecosystems

Table 4. Conceptual categorization of the Iranian publishing ecosystem based on grounded theory analysis. The table presents the analytical dimensions, core categories, and representative subcategories, illustrating how causal, contextual, and intervening conditions interact with actor strategies to shape the central phenomenon of informational energy and its consequences. This framework provides a systematic

overview of the factors influencing information flow, content processing, and knowledge redistribution within the ecosystem.

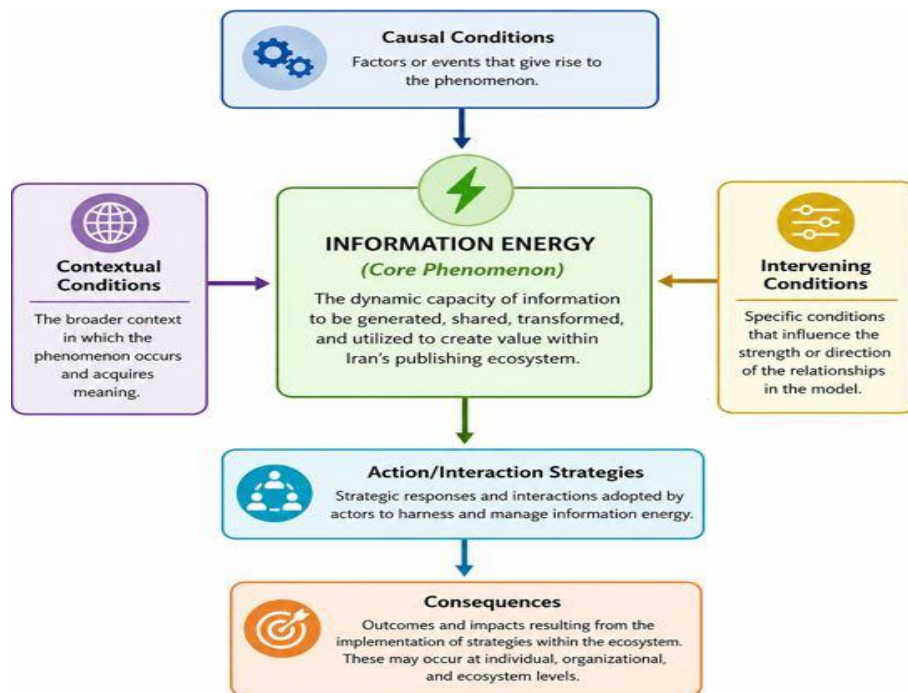


Figure 1. Final Paradigmatic Model of Information Energy in Iran's Publishing Ecosystem (based on grounded theory findings)

Explanation

- Causal conditions: Root causes affecting the ecosystem, such as fragmented systems and lack of integrated policy.
- Central phenomenon: Informational energy as the driving force of the publishing ecosystem.
- Contextual conditions: Environmental and structural factors shaping the flow of information.
- Intervening conditions: Factors mediating actor responses, such as unequal access to resources or literacy gaps.
- Actor strategies: Tactics employed by actors to maintain or recover information flows, e.g., networking, using platforms.
- Consequences: Outcomes of disrupted informational energy, including inefficiency, widening gaps, and creation of closed ecosystems.

In the Iranian publishing industry, informational energy plays a vital role in shaping dynamics among actors. The lack of information infrastructure, insular policymaking, and information inequality have reduced the capacity for data-based decision-making. Publishers often try to compensate for these deficiencies using alternative and experience-based strategies; however, the absence of a macro-level information system remains a significant obstacle to the ecosystem's resilience. The following presents answers to the research questions based on theoretical analysis, the paradigmatic model, and research findings. The structure of the answers follows grounded theory methodology and the informational energy model for representing the information ecosystem of the Iranian publishing industry.

- Main Question: What are the characteristics of the information ecosystem of the Iranian publishing industry, and how can it be represented?

Based on grounded theory derived from field data, the information ecosystem is a complex network of actors, formal and informal structures, information flows, and interaction mechanisms. These operate under specific contextual conditions such as centralization, weak technological infrastructure, and center-periphery inequality. A key feature of this ecosystem is information asymmetry and weak informational energy capacities of its actors. The ecosystem's representation is divided into three domains causal, contextual, and interventionist centered on the phenomenon of "disruption in the efficient flow of publishing information."

- Sub-question 1: What are the main actors and how do they interact?

Actors include central and county-level publishers, the Ministry of Culture and Guidance, the Iranian Book and Literature House, distributors, booksellers, authors, libraries, and governmental and trade organizations. Interactions among these actors are often unsystematic, fragmented, and lack information synergy. Provincial publishers are frequently excluded from formal information cycles, while government institutions operate top-down, weakening collective participation.

- Sub-question 2: What information challenges do actors face?

Major challenges include the absence of a comprehensive publishing information system, scattered and inefficient publishing data, limited access to market and audience information for small publishers, dominance of control-oriented over analytical perspectives, and weak

integration of production, distribution, and consumption data. These issues disrupt strategic decision-making and increase the costs of information exchange.

- Sub-question 3: What mechanisms strengthen resilience and informational capacity?

Strategies include designing a national publishing data platform for big data aggregation and analysis, empowering peripheral actors with digital tools and information intelligence, decentralizing information from central authorities to distribution networks, increasing transparency in governmental and trade institutions, and promoting publishers' information and analytical literacy, especially in smaller cities.

- Sub-question 4: What is the role of government and policymakers?

The government plays a pivotal role but centralized, outdated, and insular policies have hindered ecosystem growth. Government actions often prioritize managerial-supervisory perspectives over information policymaking. Other weakening factors include the lack of a publishing big data roadmap and inter-organizational information sharing infrastructure. If the government adopts participatory regulation and information empowerment, it can facilitate ecosystem resilience.

- Sub-question 5: What is the conceptual model based on grounded theory?

The conceptual model provides a systematic representation of the Iranian publishing information ecosystem. It centers on the "disruption in the flow of publishing information" and identifies structural, contextual, interventionist, strategic, and consequential dimensions based on qualitative analysis.

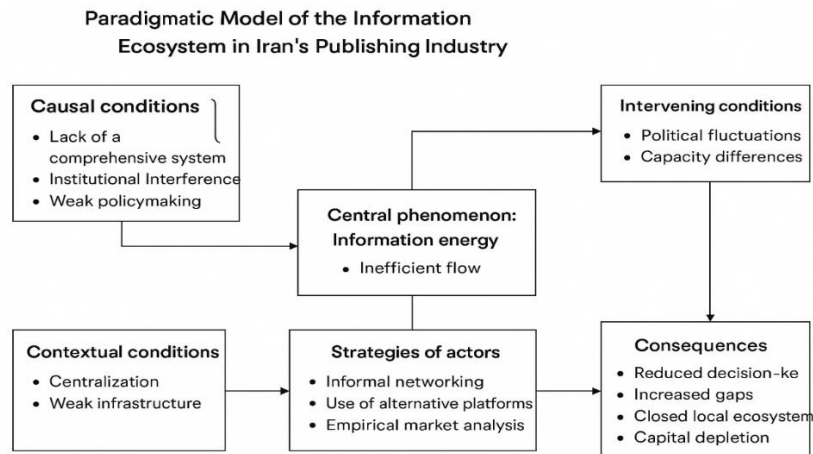


Figure 2. Graphical Representation of the Information Ecosystem in Iran's Publishing Industry Based on the Concept of Informational Energy

According to the paradigmatic model (Figure 1), the central phenomenon of Iran's publishing industry is "informational energy", which functions as the driving force behind decision-making, planning, and synergy among actors.

Causal conditions include the absence of a comprehensive publishing information system, institutional overlaps, and the lack of an integrated information policy.

Contextual conditions, such as cultural centralization and weak digital infrastructure, hinder the free flow of information.

Actors have adopted strategies such as informal networking, reliance on experiential data, and the use of alternative systems.

The ultimate consequence is the emergence of static and unequal informational ecosystems undermining the resilience of the publishing industry.

Conclusion

This section presents the theoretical analysis of the study, focusing on the discovery and articulation of grounded theory. The theory-building process was based on data obtained from 20 in-depth interviews with key stakeholders in the publishing sector and proceeded through the following stages:

- Open coding: Extraction of 165 initial codes from interviews.

- Axial coding: Aggregation of codes into 47 subcategories and 6 main categories.
- Selective coding: Identification of informational energy as the core category.
- Theory development: Formulation of a network of causal, contextual, intervening, strategic, and consequential conditions.

The concept of informational energy, derived from information ecosystem theory, functions as the lifeblood of the publishing ecosystem. Similar to energy in natural systems, information can sustain and revitalize the ecosystem only when it can be produced, circulated, accessed, and redistributed among actors. Iran's publishing information ecosystem is a multilayered and complex structure of actors, information flows, technological infrastructures, policymaking environments, and regulatory mechanisms that, in interaction with contextual and environmental factors, determine the quality of information production, distribution, consumption, and feedback in the publishing industry.

McLellan (2016) introduced the concept of institutional learning to describe information-oriented organizations, emphasizing their ability to learn from mistakes, feedback, and user needs. He argued that a healthy information ecosystem requires flexible policymaking, informational transparency, and institutional responsiveness. However, this research reveals a sharp contrast: most of Iran's upstream publishing institutions (e.g., the Ministry of Culture and Islamic Guidance, the Book and Literature House of Iran, and the Tehran International Book Fair) lack mechanisms of institutional learning. They fail to learn from past mistakes, ignore feedback from publishers and authors, and repeatedly implement ineffective policies.

In line with this, Duff and Chen (2019) proposed a participatory theory of the information ecosystem based on meaningful interactions among human agents (e.g., publishers, librarians, readers), structural factors (e.g., publishing policies, economics), and technology (e.g., digital platforms). They stressed the necessity of transparency, accessibility, and the free flow of information. Iran's publishing ecosystem, however, suffers from weak actor interaction—particularly among regional publishers, libraries, and academic institutions. The absence of participatory policies and the weakness of technological infrastructures (e.g., reliable publication databases, accurate publishing

statistics) prevent the realization of Duff and Chen's model in the Iranian context.

From the perspective of Claude Shannon's information theory, informational energy can be conceptualized as a dynamic flow of data transmitted through communication channels from senders (authors and content producers) to receivers (readers and information consumers). This flow is characterized by entropy, reflecting the novelty, diversity, and unpredictability of transmitted data. Consequently, the quality of content and the efficiency of communication media directly determine the value and productivity of the publishing system. Optimizing this process—by minimizing communication noise and improving the speed and accuracy of meaning transmission—is essential in Shannon's framework. Thus, informational energy serves not only as the driver of ecosystem vitality but also as the foundation for a knowledge-based economy and sustainable information culture.

Qualitative data analysis indicates that Iran's publishing information ecosystem faces disruptions at causal, structural, strategic, and contextual levels. The absence of holistic information policymaking and the weakness of intermediary knowledge-producing institutions lead to fragmented information flows and misalignment among key publishing actors. Inefficient interactions between producers, distributors, and consumers of knowledge result in structural asymmetries in the information cycle, limiting the system's adaptive capacity to environmental changes. Strategically, actors operate in isolation and in informational vacuums, producing passive resilience patterns and raising the risk of sectoral collapse. At the contextual level, Tehran-centric centralization, ineffective support policies, lack of informational justice, and weak intermediary institutions remain persistent barriers to ecosystem growth. Comparison with the quintuple helix model further highlights the lack of coordinated interaction among universities, the publishing industry, government, civil society, and the natural environment in Iran. Revitalizing this ecosystem requires a new information architecture built on data integration, technological empowerment, evidence-based policymaking, and expanded feedback loops. Only through an ecosystemic approach and cross-sector networking can the sustainability and dynamism of the publishing industry be achieved.

Grounded Theory Outcome

The Iranian publishing information ecosystem, weakened by insufficient informational energy, fails to establish effective linkages between producers, distributors, policymakers, and audiences. In the absence of an integrated information system, decision-making and cultural production are based on trial-and-error and informal relationships. In this situation, ecosystem sustainability depends on rebuilding informational institutions, ensuring equitable distribution of data resources, and empowering peripheral actors. By focusing on informational energy, this study analyzed the causal, contextual, strategic, and consequential mechanisms shaping Iran's publishing industry. The final model, developed through grounded theory, represents a network of relationships among the ecosystem's key variables and offers a foundation for policy recommendations, infrastructural design, and capacity development in the sector.

Theoretical Contribution

The core theoretical innovation of this research is the metaphor of "informational energy"—the idea that information, like energy, is a vital driver that, when allowed to circulate freely, generates dynamism, innovation, and resilience in the publishing industry. By integrating concepts from information ecosystems, structural inequality, and theories of information and development, this study introduces a new conceptual model for analyzing Iran's publishing structure.

Re-engineering Iran's Publishing Information Ecosystem: A Framework for Data-driven Policymaking, Actor Empowerment, and Future Research

At the policy level, this study proposes actionable strategies to enhance information governance in Iran's publishing sector, including:

- Designing and implementing a comprehensive publishing information system as a central hub.
- Integrating existing information institutions.
- Formulating a national data policy with evidence-based decision-making indicators.

Such measures would improve institutional cohesion, enhance informational transparency, and increase efficiency in macro-level decision-making. Strengthening data infrastructures and creating a

central information authority for publishing would also foster effective interaction among diverse actors.

For private stakeholders and research institutions, the study highlights the importance of improving information literacy, engaging in data production and analysis, and forming data consortia. Publishers, booksellers, and research institutions can expand their capacities for market analysis, audience insight, and informational innovation through specialized training, digital tools, and data-driven collaboration. Supporting interdisciplinary research and comparative regional studies can further contribute to the development of localized models and more effective cultural policymaking.

All the same, this study has to grapple with such limitations, as reliance on qualitative data, restricted access to government-sponsored institutions, and limited coverage of certain publishing actors. The rapid pace of digital technological change and the focus on Persian-language publishing also necessitate continuous updating of findings. Future studies should quantitatively test the proposed model, analyze specific publishing genres, and conduct comparative research with other regional contexts. Ultimately, re-engineering cultural information governance through the lens of informational energy can pave the way for sustainability, innovation, and resilience in Iran's publishing industry.

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