Goals, Norms, and Spirit: Conceptualizing the Chinese Paradigm of Science Communication and Its Implications–Centered on the China Association of Scientific Journals (1947-1950)

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Abstract

【Objective】 To investigate the early practical explorations of the Chinese-style modernization of the science communication community, trace and analyze the historical origins and connotative characteristics of the construction of the "Chinese Paradigm" of the scientific communication system, and provide historical reference and inject spiritual core for the innovative development of an autonomous knowledge system for science communication on the foundation of Chinese-characteristic culture.

【Methods】 Based on the connotation construction of the science communication community, this study examines the practical activities and related exchange discussions of the China Science Journal Association in promoting science journal editing and publication, analyzing and summarizing its construction of the connotative dimensions of the Chinese science journal paradigm.

【Results】 The China Science Journal Association constructed the connotative dimensions of the science journal paradigm from three aspects: institutional objectives, behavioral norms, and spiritual ethos. In terms of institutional objectives, it required science journals to survive collectively and fulfill their missions; regarding behavioral norms, it demanded that science journals adhere to a China-based orientation and develop through categorized construction; concerning spiritual ethos, it required science journals to struggle arduously and disseminate belief.

【Conclusion】 The organizational exploration of the China Science Journal Association represents the conscious practice of Chinese scientific workers regarding the social role of scientists, preliminarily establishing the connotative dimensions of the Chinese science journal paradigm. Under the guarantee of social conditions such as "scientific nationalization" and "people' s science" in New

China, the scientific communication system of the "Chinese Paradigm" was successfully implemented.

Full Text

Goal, Norm, and Spirit: The Construction and Implications of the Chinese Paradigm in Science Communication—Centering on the Chinese Association of Scientific Journals (1947-1950)

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Abstract

This study examines the early practical explorations of Chinese modernization within the science communication community, tracing the historical origins and connotative characteristics underlying the construction of a "Chinese paradigm" in the science communication system. By providing historical insights and injecting a spiritual core, this research aims to foster the innovative development of an independent knowledge system for science communication rooted in China's distinctive cultural foundations. Drawing upon the connotation construction of the science communication community, this paper investigates the practical activities and related discussions through which the Chinese Association of Scientific Journals advanced the editing and distribution of scientific periodicals, analyzing and summarizing its contributions to constructing the paradigm connotation of Chinese scientific journals. The findings reveal that the Association built this paradigm through three dimensions: institutionally, it demanded that scientific journals survive through unity and fulfill their mission; behaviorally, it required them to maintain a China-centered stance and pursue classified construction; spiritually, it called for hard struggle and the dissemination of scientific faith. The organizational exploration of the Chinese Association of Scientific Journals represents the conscious practice of Chinese scientists regarding their social role, having initially constructed the paradigm connotation of Chinese scientific journals. Under the social conditions guaranteed by New China's "scientific nationalization" and "people's science," the Chinese paradigm of the science communication system was successfully implemented.

Keywords: scientific community; science communication; Chinese Association of Scientific Journals; science communication system

The scientific community constitutes a social group formed by scientists through relatively stable connections in scientific activities, with scientific communica-

tion serving as its foundational basis [1]. The regular publication of academic journals and the periodic convening of academic conferences constitute the substantive work of the scientific community. Scientific journals represent the primary channel for the diffusion and exchange of scientific information and the main institutionalized mode of communication within the science communication system [2], facilitating extensive exchange and collaboration within the scientific community while promoting the germination, dissemination, and exchange of new scientific spirits and ideas. During the modern process of Western learning spreading to the East, scientism emerged in China, and influenced by Eurocentrism, a mindset developed that Western scientific culture was superior to China' s and that Western civilization equaled scientific civilization—a perspective whose influence persists today. Some scholars argue that "the Chinese paradigm of science and technology, before it could fully develop, experienced rupture due to external social and historical factors. Chinese scholars on the brink of national extinction had no opportunity to reflect upon and improve China' s scientific development model" [3]. "Historically, China' s scientific community lacked the truth-seeking, innovative scientific spirit and self-regulating behavioral norms formed through long-term development in the Western scientific world" [4]. In reality, however, with the formation and development of the modern scientific community, China' s distinctive science communication system underwent a process of integration and self-evolution. Examining the early practical explorations of Chinese modernization in the science communication community and tracing the historical origins and connotative characteristics of the "Chinese paradigm" in the science communication system provides historical lessons for preserving the foundation and soul of Chinese modernization in science communication, dispelling the myth that "Westernization equals modernization," and constructing an independent knowledge system for science communication upon China' s distinctive cultural foundations.

Following the victory in the War of Resistance Against Japanese Aggression, to adapt to the world entering the "atomic energy" era of Big Science, Chinese scientific circles recognized that national revival depended on the creativity and achievements of experts, making the popularization of science imperative. Scientific publications consequently flourished, creating a boom in founding scientific journals. In January 1947, Zhang Mengwen, editor-in-chief of *Science* monthly, invited editors of various Shanghai-based scientific journals to a fellowship meeting at the China Science Society. Over thirty participants attended, including Cao Liangxia, Lu Yudao, Zhang Changshao, Qiu Weiyu, Mao Qishuang, Yang Youzhong, Xie Junmin, Yan Xichun, Zeng Shiying, and Wang Tianyi. The meeting unanimously resolved to organize the Chinese Association of Scientific Journals (hereafter "the Association") to facilitate connections and advance editorial and distribution work, designating *Science*, *Science Pictorial*, *Chemical World*, *Electrical World*, and *Science World* as the preparatory committee members [5]. "Among current publications, none sells worse than natural and applied science books and periodicals. Therefore, we worry that people may abandon science altogether. Now, over twenty science magazine publishers have formed

a scientific journal association, hoping to overcome various difficulties through collective strength and continue serving the nation' s scientific work" [6]. The Association' s formation represented a pioneering effort in uniting China' s science communication workers, providing historical wisdom for exploring Chinese modernization in the science communication community. Due to limited materials, specialized research on the Association remains scarce, primarily confined to brief introductions of its basic establishment, second annual meeting activities, and historical significance, used to demonstrate the vigorous development of Shanghai' s scientific journals after the war [7][8], to corroborate its historical practice of assisting scientific journal distribution [9], or to illustrate the professional spirit and sense of mission among science journal workers [10][11]. These studies suffer from two main deficiencies: first, they rely on scarce and singular historical materials, limited to the Association' s founding declaration, introductions to member publications in the second annual meeting proceedings, and brief records of guest speeches. Second, the Association itself is not the primary research object but merely serves as auxiliary historical material to illuminate other subjects, such as operational characteristics of *Science Popular* [9] or the professional spirit upheld by editors of the China Science Society [12].

Chinese modernization constitutes the theoretical and practical foundation for China' s independent knowledge system in science communication. From the perspective of Chinese modernization in the science communication community, this paper examines the Association' s exploratory practices, inheritance, and renewal, utilizing richer historical materials beyond contemporary newspaper records of the Association' s activities. These include chief editors' memoirs, authors' and editors' discourses on science communication and popularization, and national science and technology policies in early New China, enabling a clearer grasp of the broader context, entire process, and full story of the Association' s historical practice. Analyzing and summarizing the Association' s construction of the "Chinese paradigm" for scientific journals and the social conditions and path choices for its realization from three connotative elements —institutional goals, behavioral norms, and spiritual temperament—this study reveals how the science communication community, under the leadership of the Chinese Communist Party, insisted on placing national and ethnic development on the foundation of its own strength. By injecting a spiritual core into the innovative development of China' s independent knowledge system in science communication, this research deepens understanding of the value foundation, historical environment, historical position, and development logic of the people' s science perspective.

2.1 Research Methods

First, the literature method. This study centers on the Association' s exploratory practices and historical experiences, representing past-oriented research. Through thorough examination of existing relevant literature and materials, it seeks historical facts, compiles a complete list of the Association' s

publications—including titles, sponsoring institutions, categories, founding dates, editors, and their professional backgrounds—and employs this information to describe, analyze, and interpret evolutionary processes, thereby providing insights for understanding relevant contemporary concerns.

Second, the induction method. Based on collecting, organizing, and observing historical records related to the Association, this study inductively summarizes its exploratory experiences. Through interpretive understanding of research subjects' behaviors and meaning construction, it derives generalizable knowledge from known individual facts to discover essential, common, and inevitable patterns.

Third, theoretical analysis methods from the sociology of science. The sociology of science reveals that the profound connotation of the scientific community lies in its special institutional goals, behavioral norms, and spiritual temperament, which sustain its vitality. The scientific community' s goal is to advance knowledge and benefit humanity, making it not merely the "producer" but also the "constructor" and "disseminator" of scientific knowledge, emphasizing the important influence of social factors on scientific knowledge production and exchange [13].

2.2 Data Sources

The literature and materials used in this study primarily derive from contemporary newspaper records, including news reports, discursive articles, meeting minutes, copyright page information, and editors' correspondence, as well as national science and technology policy documents issued at the time, participants' memoirs, and works concerning relevant historical figures' backgrounds and experiences.

3.1 Institutional Goal Exploration: Collective Survival and Mission Fulfillment

The Chinese Association of Scientific Journals was established in Shanghai in July 1947 as a publishing trade organization comprising natural and applied science periodicals. Initially formed by eighteen Shanghai-based scientific journals, Zhang Mengwen, editor-in-chief of *Science*, served as chair, while Mao Qishuang, editor-in-chief of *Electrical World*, and Wang Tianyi, editor-in-chief of *Science Popular*, served as executive directors. By March 1949, the Association had grown to thirty-five member journals (see Table 1). In terms of categories, these included specialized scientific publications and popular science periodicals, with the latter predominating. Specialized journals were relatively more academic, primarily introducing foreign scientific knowledge and renowned scientists. Popular journals focused on disseminating basic scientific knowledge and the latest scientific and technological achievements to the broad masses. Annual membership fees were set at a base rate of five yuan multiplied by the cost-of-living index at the time of payment. The Association' s council met

monthly, typically at the Chinese Chemical Industry Association.

Table 1 List of Publications of the Chinese Association of Scientific Journals

The table appears incomplete in the source material, showing fragmented entries for various journals including "Science and Life," "Practical Radio," publications by the China Science Society, Science Popular Society, Science Era Society, Chinese Natural Science Society, and others, with categories marked as specialized or popular.

3.1.1 Collective Survival: Seeking to Overcome Immediate Difficulties Given that "Chinese science lags behind in every aspect, with incomplete equipment, scarce materials, insufficient national research funding, thin academic atmosphere in society, no channels for experts to publish their insights, and no access for eager youth" [14], scientific workers consciously shouldered the mission of constructing a science communication system to fully realize the mediating function of scientific journals— "advancing to communicate and exchange academics with foreign scientists, retreating to disseminate and guide domestic intellectual youth and the general public, gradually promoting development" [14]. Meanwhile, with prices soaring monthly, publishing costs had reached a point unsustainable by private forces, and inconvenient transportation, inspection, and delivery left journal survival precarious. How to address the operational crisis of scientific journals required collective discussion and resolution by citizens who cared about science and sought national reconstruction. In March 1947, the Chinese Association of Scientific Workers passed a resolution on "Close Cooperation Among Domestic Scientific Organizations and Scientific Publications to Promote Scientific Development," stating that "although many domestic scientific organizations exist, their dispersed strength and uncoordinated steps prevent them from playing significant social roles. All scientific publications face difficulties in funding and manuscripts, which could be reduced through concentrated efforts" [15]. The Association' s formation represented a positive response to this resolution.

The Association' s publications were all non-governmental popular science periodicals of moderate difficulty, targeting scientific work groups or individuals. These journals "some have been published for over thirty years, some less than one year; some focus on specialized academic promotion, others on basic knowledge popularization" [14]. Among them, twenty were popular science journals founded between 1945 and 1948 after the war, characterized by weak academic orientation. Service and inspiration constituted their consistent shared features. "The increase in popular science journals and the scientific community' s refusal to ignore general readers undoubtedly represent a major driving force for Chinese scientific publications"[16]. The Association's goals were to advance editing and distribution: on one hand, using collective strength to overcome immediate difficulties— "having opportunities to meet, exchange opinions, solve problems, and discuss editorial and distribution policies and methods, which benefits not only the journals themselves but also readers and the progress of China' s entire

scientific community" [17]; on the other hand, seeking further advancement of scientific journal work to promote public understanding of science. "All current work represents paving efforts for scientific re-cognition and popularization—arduous and unappreciated. We firmly believe that visionary publishers should resolutely shoulder this burden" [18].

3.1.2 Mission Fulfillment: Advancing Editing and Distribution Amidst continuous warfare and economic turmoil, scientific journals faced difficulties in paper, printing, distribution, and finance. Under the Association' s organization, various scientific journals strengthened connections, supported each other, and united in struggle, securing a considerable share of fair-priced printing paper from the "Shanghai Publishing Trade Guild," allocated according to each journal' s actual sales volume, thereby reducing printing costs economically. Sixteen of the Association' s over thirty publications were printed by China Science Company, which provided substantial assistance in printing fees. However, distribution remained entirely in the hands of newspaper dealers with unreasonable payment methods. Currency instability caused book prices to depreciate significantly by settlement time, and repeated negotiations proved fruitless. Financially, the Association also fell into difficulty because the Central Bank of the Nationalist Government in Nanjing refused direct loans. Given the mission of scientific journals to promote public understanding of science, the Association organized joint advertising and participated in science exhibitions at the Nanjing Ten Organizations Annual Meeting, Qingdao Engineering Exhibition, Shanghai Secondary Education Science Exhibition, and Taiwan Expo. "Although our publications differ in cognitive levels, their basic beliefs have converged. On the eve of liberation, we stood together through storm and stress, encouraging each other, firming our convictions, and welcoming Shanghai' s dawn" [19]. Each member journal donated fifty to one hundred copies per issue to the Association, which uniformly solicited opinions, inquired about needs, and distributed them free to schools and academic organizations.

During its nearly three-year existence, Association members, embodying a spirit of mutual assistance and encouragement, regularly conducted joint meetings to review their achievements. Deeply concerned about working in isolation and failing to meet societal needs, they organized thematic discussions involving editors, authors, and readers from various journals as references for developing scientific periodicals. At the Association's second annual meeting, Zeng Shirong, editor-in-chief of *Modern Railways*, recommended a new printing method: using Chinese typewriters for typing and pasting, then photographing and printing with rubber rollers to save typesetting time and copper-zinc plate production costs [20]. Readers of Association journals could apply to attend based on conference news published in the journals, receiving entry permits; those unable to attend could submit written opinions [21]. The Association organized exhibitions and annual activities, with member journals publishing conference news, reporting keynote speeches, introducing guest perspectives, and clarifying

future tasks for Chinese scientific journals: promoting truthful scientific spirit and practical scientific methods to transform society' s boastful and hypocritical atmosphere; emphasizing that scientific journals' social function lies in cultivating scientific spirit and promoting the widespread and correct application of scientific thinking methods; and defining the journal' s task as "being both truthful and vivid, making the true inner workings of science clear and accessible to the public, enabling their understanding and interest. In other words, making scientific knowledge popular among the masses, preventing science from becoming mysterious, enabling the public to truly understand its connotation, and thus making science knowledge needed by the people" [22].

3.2 Behavioral Norms Exploration: China-Centered Stance and Classified Construction

How to modernize information services in scientific journal editing, publishing, and distribution, construct the normativity and constructiveness of China' s science communication system, and promote societal understanding of science constituted topics actively explored by Association members. They explicitly proposed that in editorial direction, journals should not be "vendors of foreign goods," stating that "American scientific publications are definitely not our learning model; the popularization issue should be China-centered" [23]. Both editors and authors of scientific journals needed thorough self-examination of editorial direction and methods. Scientific journals were divided into two categories by content nature: popular and specialized, requiring classified construction. Popular scientific journals must emphasize service function construction, while specialized journals must focus on quality standard construction.

3.2.1 Popular Scientific Journals: Strengthening Service Function Construction What kind of content should popular science journals publish? Association members believed that popular science journals should focus on daily life and practical technology to meet public needs without excessively catering to the public' s inertia. Scientific journals should be popularized so that all cultural workers understand scientific development and its cultural assistance. Popularity does not mean lower knowledge depth or difficulty, nor does it mean everyone can understand it; rather, a popular science journal should particularly impact the scientific literacy of the majority of the public. China lacked a popular journal for university and high school students that was more specialized than *Science Pictorial*. To run such journals well, the first step was gathering three or four people who enjoyed this work and were willing to take responsibility. Since science covers an extremely broad scope, finding people knowledgeable in all fields was difficult, necessitating cooperation. For manuscript sources, foreign scientific news could be verified through America' s *Science News Letter* and Britain' s *Monthly Science News*. For domestic scientific news, newspapers and news agencies should be more cautious: "Whenever someone claims a discovery or invention in a scientific field, the newspaper or agency receiving the news must consult reliable and responsible local experts in

that field before publication" [24].

What textual forms should popular journals adopt to introduce scientific knowledge? Association members advocated that popular journals should provide more services to readers, such as responding to letters, discussions, and guidance. Editorial techniques should feature vivid titles, attractive subheadings, and abstract layouts. Each issue should contain about fifty to sixty thousand words, using relatively common language to describe research results and outstanding problems in various scientific fields, providing historical background for scientific news, and including abstracts of various scientific papers. The main content should feature news and brief comments from foreign and Chinese scientific communities, summaries of interesting articles from various magazines, and book introductions. The opening article should be longer, either inviting domestic experts to describe their work, translating similar foreign articles, or having domestic experts introduce foreign research. Additionally, a piece on scientific history should be included, with substantial content, concise language, and sincere descriptions of research purposes, methods, and results, avoiding the mistake of pursuing superficial simplicity at the expense of objective detail [25]. Huang Zongzhen, president of *Science Era*, explicitly stated that scientific journals should serve the people, not minorities, and should critically introduce China' s scientific heritage: "Journal columns could involve scientific thought, knowledge and technology, editorials and special commentaries related to scientific movements. Each issue should publish problem-solving challenges and small wisdom sections to strengthen connections with readers" [26].

3.2.2 Specialized Scientific Journals: Emphasizing Quality Control
At the time, most specialized domestic scientific journals were sponsored by academic institutions. Some were natural science quarterlies founded by universities such as Peking University, Tsinghua University, Wuhan University, Central University, and Sun Yat-sen University, with miscellaneous content covering everything from mathematics to biology in a single issue, making it difficult to attract readers or gain attention from foreign scientific colleagues. Others were scientific journals published by research institutes of the Nationalist Government' s Academia Sinica, the Science Society' s Biological Survey Institute, and the Fan Memorial Institute of Biology. Although these journals had specialized natures, their page numbers were inconsistent—five or six pages one month, over a dozen the next. Whether universities or research institutions, all faced insufficient manuscripts when publishing a single journal, often printing whatever was available without regard for content quality.

How to guarantee manuscript quantity and quality for specialized scientific journals? Chinese scientific colleagues proposed that domestic specialized societies each elect dedicated personnel to organize committees to host their society' s journals, responsible for selecting and revising submitted articles. This would encourage domestic researchers in each field to submit relevant research to their society' s journals. With more articles, journals would have selection leeway,

making it easier to maintain standards; with specialized nature and adequate standards, they would attract attention from foreign researchers in the same field and naturally contribute to scientific progress [25]. Mao Yisheng advocated that each scientific journal should have its focus to avoid duplication, that journals of similar nature should coordinate publication schedules to avoid simultaneous release, and that scientific terminology should be unified [27].

3.3 Spiritual Temperament Exploration: Hard Struggle and Disseminating Faith

Scientific construction comprises material and spiritual aspects. With their circulation and promotional capacities, scientific journals bear responsibility for spiritual construction. Association journals were basically funded and published by academic institutions, societies, groups, or private individuals. Although the overall quality and quantity of scientific publications at the time were insufficiently optimistic, the fact that authors were willing to write and institutions willing to publish indicated that cultivating a Chinese-characteristic science communication system was feasible from a spiritual perspective [28]. Association members struggled hard, constantly improved themselves, disseminated scientific faith, and inspired the public to join scientific work for national construction.

3.3.1 Scientific Journals: Helping the Public Establish Scientific Faith

How should popular science journals help the public establish scientific faith? Association members proposed three strategies: First, popular science journals should have broad material scope, not limited by narrow reality and life, but should attract readers' interest away from vulgar narrowness at the spiritual construction level. Authors could stimulate readers' interest in science by emphasizing its beauty, wonder, and greatness. "Popular science journals tell readers how to mine coal while not hesitating to introduce the latest atomic power machines, even lunar travel or cosmic expansion—seemingly illusory and absurd topics. Science' s greatness, wonder, and beauty arouses automatic research curiosity; with interest comes love and worship, fantasy and longing" [23]. Second, popular science journals should tell readers how scientists work and how inventions are made, instilling scientific methods and spirit through stories. "Popular science is not just mechanical narration of things; it should emphasize the spiritual and active factors involved. When telling readers about an experimental method, it should focus on training automatic experimental capability" [23]. Third, popular science journals should foster interest in loving nature and guide readers to actively explore nature' s mysteries. "Nature is the source of science; without love for nature, science cannot emerge. For a nation, nature is the land; without love for the motherland' s land, construction cannot be discussed. A nation' s nature encompasses broad fields: agriculture, forestry, minerals, water conservancy, animal husbandry, sericulture, fishing··· Which is not fundamental to national economy and people' s livelihood? Which is not science? Chinese people' s lack of natural concepts leads to lack of scien-

tific exploration, development and construction of natural resources, resulting in national poverty and backwardness" [23].

In the 1940s, Chinese scientific journals had limited readership, mostly young students, with content mostly instilling foreign scientific knowledge, failing to attract general public attention. Association members recognized that to maximize scientific communication effectiveness, appropriate media were essential, and that mass media played increasingly important roles in advancing science to the people. They advocated strengthening coordination between mass media and scientific journals to promote scientific knowledge dissemination and popularization. Mao Yisheng called for using various media tools—radio, film, lectures, etc.—in coordination to enhance public scientific cognition, suggesting that expanding newspaper science news coverage, broadcasting scientific stories via radio, regularly showing scientific films, and holding scientific speeches would promote societal understanding of science and increase demand for scientific journals, thereby fulfilling their mission [26]. Xu Junyuan, editor-in-chief of Shanghai' s *Ta Kung Pao*, pointed out that in wartime with turbulent situations and inadequate social education, science had not reached the people, newspaper science supplements had few readers, and their space was often squeezed, urgently requiring strengthened assistance and connection with the scientific community. He also noted frequent errors in scientific terminology translation in newspapers and expressed hope that the scientific community could compile and publish a "Dictionary of Scientific Terms" to meet popularization needs [26]. Qiu Weiyu, editor of *Electrical World*, proposed that scientific journal content must be popularized, should regularly publish simple experimental methods, standardize scientific terminology, eliminate unsuitable terms, strengthen connections among editors, readers, and authors, publish children' s science reading materials, and conduct rural science lectures and film screenings [26]. Lu Yuyan, editorial board member of *Science*, pointed out that scientific journals' mission was to promote science and disseminate scientific knowledge to the people, making the public understand the importance of scientific spirit. "Now funding is difficult, and the government does not support at all. If the government were reasonable, all problems would be solved" [26].

During the 1940s, with continuous domestic warfare, impoverished livelihoods, and blocked postal routes, Association journals could only be sold in the Shanghai area, as Central and South China post offices refused to distribute them. Association members hoped for early transportation restoration to gain more direct subscribers, noting that "with national and social instability, no new distribution methods could be attempted" [27]. As the national liberation cause advanced, the Chinese Communist Party Central Committee proposed "scientific nationalization"and "people's science"as the national guidelines for scientific and technological development [29]. Association members began examining scientific fundamentalism, correcting the "science for science' s sake" perspective, and pooling collective strength to truly bring science closer to workers and peasants, serving New China' s construction.

3.4.1 Inheritance: Expanding Readership to Serve National Construction New China' s establishment provided a stable social environment for science and technology development. Against the backdrop of developing the national economy, building strong national defense, and catching up with world advanced science and technology, the Party and government proposed the guiding ideology that science and technology should "serve national construction and serve the people,"establishing the "people's science perspective"[30]. Association journals actively cooperated with national construction priorities, publishing relevant scientific content to stimulate reader interest in related fields, expanding their readership scope, timely adjusting the proportion of content difficulty, and actively adapting to readers with different educational levels. *Electrical World* originally targeted intellectuals with high school education or above, not truly facing the masses. After receiving letters from several workers who introduced the journal to many worker comrades and suggested content revisions to make it understandable and interesting for workers, while simultaneously receiving feedback from other readers that content was too superficial and should be deepened, the editorial board sincerely noted that "meeting both wishes cannot be achieved by a single publication. Under current economic conditions, when we cannot publish two separate journals, we can only appropriately adjust the proportion of difficulty levels" [31].

Given China' s backward science and technology and urgent need to learn from advanced countries, Association members advocated that when introducing foreign achievements, scientific journals should aim to digest and absorb them. Foreign scientific and technological achievements must be screened to eliminate dross and absorb essence. They also engaged in self-criticism and reflection on parochialism within Chinese scientific circles: "Due to past training, scientific workers tend to worship individualism in capitalist countries, believing that scientists' duty lies in seeking truth, and that freely choosing a topic based on their learning and researching it with full capability fulfills their responsibility. They fail to realize that scientific research funding comes from production obtained through labor by agricultural and industrial classes. Following the principle of taking from the people and using for the people, scientific research must connect with agriculture, industry, and medical and health undertakings" [32]. Scientific journal language should approach the people, opposing peculiar writing styles and obscure examples, exploiting readers' curiosity, exclusively seeking fresh material from foreign publications without considering Chinese readers' levels or providing supplementary organization, and wholly adopting Westernized tones and structures [33]. Simultaneously, they emphasized that while prioritizing popularization, improvement work remained necessary, calling for efforts to run specialized scientific journals well, requiring such high-level journals to maintain popular perspectives and prioritize people' s interests.

3.4.2 Renewal: Realization of the "Chinese Paradigm" in the Science Communication System The "Chinese paradigm" is a complex concept encompassing China' s uniqueness and distinctiveness in cultural, political,

economic, and social aspects, emphasizing autonomy and innovation in modernization, and highlighting modernization explorations suited to China' s national conditions and their impact on future development. New China systematically and organizationally developed people' s science work, closely linking science communication with national construction needs. In April 1950, due to partial overlap with the Shanghai Magazine Editors' Symposium, the Association decided to disband after approval by all member journals. Under the Shanghai Magazine Editors' Symposium, a "Science and Technology Forum" was established to meet monthly, determining four tasks for future science and technology journals: coordinating with current situations to align science and technology with politics; strengthening division of labor and mutual coordination; connecting with readers and accepting public opinions; and organizing a joint operation agency for cooperative supply and nationwide distribution [34].

In May 1950, to unify translation terminology across academic and publishing circles, the Government Administration Council' s Cultural and Educational Committee formulated the "Preliminary Plan for Unifying Academic Terminology Work" and established the "Academic Terminology Unification Work Committee," with five working groups under it: natural science, social science, medicine and health, current affairs, and literature and arts [35]. These groups were respectively managed by the Chinese Academy of Sciences, the Publishing Administration, the Ministry of Health, the News Administration, and the Ministry of Culture, with experts invited to undertake review work. In August 1950, the All-China Federation of Natural Science Societies and the All-China Association for Science and Technology Popularization were established [36], cooperating through division of labor between popularization and improvement. Science popularization workers nationwide disseminated production technology knowledge, general health knowledge, and maternal and infant knowledge to the masses through various forms including science exhibitions, journals, popular reading materials, lectures, and scientific films, building a nationwide science communication and popularization network that truly served the people.

4.1 Optimizing the Science Communication Ecosystem to Unleash Innovation Vitality

Scientific nationalization implements an organized, planned, public, and collaborative research system, optimizing the science communication ecosystem and accelerating public acceptance and recognition of science' s societal impact [37]. In the 1940s, the Association conducted extensive discussions on the development of Chinese scientific journals, embodying scientific cultural spirits of truth-seeking, fact-respecting, teamwork, and critical skepticism. However, in semi-feudal, semi-colonial old China, scientific workers could not systematically and extensively connect with reality and the masses, limiting the science communication community's effectiveness to small circles. After New China's founding, "striving to develop natural science to serve industrial, agricultural, and national defense construction; rewarding scientific discoveries and inventions;

and popularizing scientific knowledge" [38] was incorporated into government policy. Scientific nationalization integrated science into national goals through planning, organically combining scientific research with popularization, effectively integrating scientific resources, and realizing the Chinese paradigm of the science communication system.

Scientific nationalization has evolved to combine science, technology, and economy into an innovation-driven development strategy. Innovation has expanded into all social domains, with science integrating into people' s daily lives. The core of innovation is scientific spirit, with the science communication community as its primary carrier. Innovation-driven development requires building a trustworthy science communication community as the starting point, cultivating an innovation culture combining traditional values with contemporary characteristics, scientific spirit with humanistic concern, and national needs with scientific frontiers, forming Chinese-characteristic innovation development practice [39].

4.2 Upholding the People' s Science Perspective: Transitioning from Knowledge Popularization to Value Guidance

A nation' s modernization path is inseparable from educational development and universal improvement of people' s scientific and cultural levels. From "science popularization" to "people' s science perspective," the Association' s understanding of the science communication community' s spiritual connotation continuously deepened. In the 1940s, the Association discussed and practiced science popularization and localization, but without unified leadership and planning, these explorations failed to materialize. After New China' s founding, the Party Central Committee established the people' s science perspective, adhering to people-centered development thinking and implementing a series of science and technology policies that created favorable political conditions for nationwide science popularization movements. Modernization' s essence is human modernization, which must be accomplished by high-quality people. Upholding the people' s science perspective requires communicating scientific knowledge, promoting scientific spirit, disseminating scientific thought, advocating scientific methods, and enhancing scientific rationality with the people, resisting feudal superstition, guiding society toward correct understanding and support for technological innovation, improving the scientific and cultural quality of all citizens, and laying foundations for achieving high-level scientific and technological self-reliance [40]. As Chinese modernization advances, national science popularization capacity building has expanded to integrate scientific thinking with excellent traditional Chinese culture, manifesting new characteristics including diversified popular science creators, informatized means, and matrix-based communication [40]. Science communication concepts should correspondingly transform from knowledge popularization to value guidance, building a socialist science culture with Chinese characteristics that is national, scientific, and popular, advancing cultural self-renewal, confidence, and strength, and enhancing spiritual power for national rejuvenation.

The emergence, development, inheritance, and renewal of the Chinese Association of Scientific Journals as a science communication community possess historical inevitability. The boom in founding popular science journals in post-war Shanghai represented Chinese scientific workers' conscious practice of their social role in the atomic energy era of Big Science. These non-governmental media, missioned with disseminating scientific knowledge and spreading scientific faith, needed to "band together" to overcome difficulties. By forming a community to fulfill their mission of spreading scientific faith, they preliminarily constructed the paradigm connotation of China' s science communication system, advancing scientific exchange and popularization. Chinese modernization in the science communication community is both process and goal, with connotations evolving with the times, possessing both common features of global modernization and distinctive characteristics based on national conditions. For China' s 1.4 billion people to collectively advance into modern society requires not only cutting-edge technology but also various other scientific and technological supplies, relying on science and technology to promote coordinated urban-rural and regional development, emphasizing that the goals of scientific and technological innovation should turn toward multi-mission-driven approaches and pay greater attention to human development [41]. Due to the author' s knowledge limitations and scarce historical materials, the depth of analysis on the "Chinese paradigm"of the science communication system has been affected, and the proposed implications and suggestions require further exploration and refinement. Future research should take Chinese traditions, practices, and problems as starting points and footholds, transforming China' s institutional, developmental, and cultural advantages into theoretical, academic, and discourse advantages [42], continuously improving and deepening these studies to summarize and distill Chinese practices in science communication and guide future development through a more independent knowledge system.

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