Constructing an Innovation Ecosystem for Future Industries: Structural Framework and Implementation Path (Postprint)

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Abstract

Frontier fundamental knowledge and generic key technologies continuously emerge and achieve breakthroughs, posing new theoretical and practical challenges to innovation ecosystems across multiple dimensions, including structure, function, and implementation pathways. By synthesizing relevant theories from natural ecosystems and innovation systems, and grounded in the characteristics and evolution patterns of future industries, a structural framework for future industry innovation ecosystems is constructed, comprising frontier knowledge creation communities, application scenario transformation communities, and industrial value realization communities, in which proactive government and entrepreneurial spirit serve as important actors and key elements. Policy directions for cultivating and developing future industries may consider innovation element identification, innovation actor collaboration, and innovation environment optimization.

Full Text

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Innovation Ecosystem of Future Industry: Structure and Path

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The continuous emergence and breakthrough of cutting-edge basic knowledge and generic key technologies pose new theoretical and practical challenges for the innovation ecosystem of future industry across multiple dimensions including

structure, function, and implementation path. Integrating theories of natural ecosystems and innovation systems, and based on the characteristics and evolution laws of future industry, this study constructs a structural framework for future industry innovation ecosystems composed of frontier knowledge creation communities, application scenario transformation communities, and industrial value realization communities. Promising government and entrepreneurial spirit serve as important entities and key elements in the future industry innovation ecosystem. Policy directions for nurturing and developing future industry should consider innovation element identification, innovation entity collaboration, and innovation environment optimization.

Keywords: future industry, innovation ecosystem, promising government, entrepreneurship

At the celebration of the 40th anniversary of the Shenzhen Special Economic Zone, General Secretary Xi Jinping proposed: "We must deploy innovation chains around industrial chains and layout industrial chains around innovation chains, plan strategically for emerging industries of strategic importance, cultivate and develop future industries, and develop the digital economy." Forward-looking planning for future industries is critical for China to achieve high-quality development and build new growth drivers, and represents a strategic opportunity to construct long-term competitive advantages in the new era. The United States, European Union, Japan, and others have also fully recognized the unlimited potential and profound impact of frontier technologies, and have strengthened their layout for future industries to seize the commanding heights of global technological competition and win the initiative in future industry development.

Currently, domestic academic research on future industries remains very limited, with few theoretical studies addressing the evolution laws of future industries. This paper attempts to construct an innovation ecosystem framework oriented toward future industries, explore feasible paths for nurturing future industry development, and provide references for formulating strategies and policies to promote future industry development.

Future Industry Concept and Evolution

The concept of future industry originates from the development practices of various governments [1]. As early as the 1980s, the United Kingdom and France introduced relevant policies to promote future industry development. In recent years, future industries have once again gained attention from countries worldwide. In 2019, the White House Office of Science and Technology Policy released the report *Industries of the Future*, identifying artificial intelligence, advanced manufacturing, quantum information science, and 5G communications as four industries belonging to the future industry category. Academic research on future industries has mostly concentrated on conceptual connotations and characteristics, lacking comprehensive understanding of the strategic importance and essential features of future industries [2], and systematic studies on the nature

and evolution laws of future industries are missing.

Connotation and Characteristics of Future Industry

Foreign scholars' research on future industries has primarily focused on summarizing U.S. future industry development plans. For example, Mckernan [3] analyzed the collaboration mechanisms in the implementation of U.S. future industry development plans. Ross [4] in *The Industries of the Future* identified robotics, cutting-edge life sciences, cybersecurity, and big data as key industries driving global economic and social changes over the next two decades. Domestic scholars' research on the concept of future industries has mostly emphasized their importance to global economic and social transformation, highlighting their leading role in overall economic and social development. Chen Jin [5] defined future industries as those formed after the industrialization of major scientific and technological innovations, representing new directions for future technology and industrial development more than strategic emerging industries, and serving as frontier industries playing key, supportive, and leading roles in economic and social transformation. Li Xiaohua and Wang Yifan [2] argued that future industries are emerging industries driven by frontier technologies in the exploration phase, aimed at meeting continuously upgrading economic and social demands, representing the long-term development direction of science and technology and industry, which will mature and achieve industrial transformation in the future, forming important support and tremendous driving force for the national economy, but are currently still in the incubation stage. This paper posits that future industries are strategic industries with leading potential and high growth prospects, driven by breakthroughs in frontier and disruptive technologies, providing crucial support and enormous impetus to national or regional economic development and determining the development destiny of nations or regions.

Future industries exhibit three typical characteristics: strategic leading capacity, super disruptiveness, and high growth potential. **Strategic leading capacity:** Future industries are built upon frontier and disruptive technological breakthroughs, representing the long-term development direction of science and technology and industry, driving and leading the future direction of national or regional economic development, and determining future competitiveness. Future industries demonstrate strong permeability across various fields, making it easier to achieve explosive group growth [1], providing more opportunities for latecomer countries or regions to "change lanes and overtake" or "change tracks and lead." **Super disruptiveness:** The disruptiveness brought by future industries is manifested not only in the development and breakthrough of frontier technologies but also in cross-boundary integration, innovative iteration, and superimposed development with digital and green technologies across all sectors of the national economy. This comprehensive disruptive change in product forms, production methods, business models, and governance mechanisms—industrial pattern transformation and value system reshaping caused by technological

change—represents holistic transformation encompassing production, management, and institutional systems triggered by industrial technological change. **High growth potential:** Future industries in their embryonic or early stages have already preliminarily validated the practicality and commercial value of their core technologies, showing strong substitutability for existing technologies or industries, or integrating with them to provide products or services with better performance, higher efficiency, lower cost, and superior experience. Once these frontier technologies achieve large-scale commercial application, they will undoubtedly demonstrate excellent growth potential.

Furthermore, the journey from basic research and technology transformation to successful industrialization is a discontinuous innovation process full of uncertainties, with prominent dual attributes of both technology and industry. Due to being in the early stages of technology and industrial development, future industries also exhibit additional characteristics beyond those mentioned above, including long development cycles, high uncertainty, substantial capital investment, and multi-agent collaboration across fields.

Development and Evolution of Future Industry

Compared with industries with relatively clear industrial forms, boundaries, and development models, future industries exhibit long-term dynamic evolution trends due to their prominent forward-looking nature and uncertainty [6]. Future industries are in the initial stage of their life cycle. As the industrialization process accelerates, some will gradually develop into leading industries or pillar industries, while some frontier technologies may be verified as lacking commercial value during application and exit the future industry category [7] (Figure 1 [Figure 1: see original paper]).

In the early development stage, as frontier technologies have just emerged from laboratories and lack application scenarios, future industries need to continuously create, explore, and expand demand, conduct constant trial-and-error and exploration regarding the performance, safety, and price of new products/services, and build and improve corresponding upstream and downstream industrial systems around new technologies, products, and services. The eventual commercialized product forms and application timing are difficult to predict. Therefore, the process of frontier technologies successfully achieving commercial value from uncharted territory involves numerous uncertainties. Once core technologies stabilize and product prototypes enter large-scale commercial application, future industries enter a rapid development track, demonstrating high-speed growth. As the technological penetration and diffusion effects of future industries become increasingly evident, they help promote productivity improvements, cost reductions, and product experience enhancements in other industries, becoming leading industries in the national economy. When the improvement and maturation of core technologies and market demand reach relative stability, industrial scale expands accordingly, and some future industries may develop into pillar industries of the national economy.

Global Layout of Future Industries

Major countries worldwide have regarded future industries as the first move to seize the commanding heights of frontier technology and industrial development, formulating specific and powerful measures in strategic planning, R&D investment, R&D organization, and market cultivation [6]. Countries' layouts for future industry development exhibit three main characteristics:

(1) **Identifying core key technology domains** that future industries rely upon. Countries focus on new technology fields such as information, biology, materials, and energy to cultivate future industries. The United States has proposed prioritizing the development of artificial intelligence, advanced manufacturing, quantum information science, and 5G communications [8]; Japan focuses on supporting the development of future industries such as artificial intelligence, digital economy, and environmental energy; South Korea has defined radiation technology as a new generation of "new atomic energy industry" and is prioritizing its cultivation.

(2) **Increasing investment intensity** in future industries. Countries have reached new highs in R&D investment for frontier technologies related to future industries. The White House, National Science Foundation, and Department of Energy in the United States announced an investment of over US$1 billion to establish 12 new AI and quantum information R&D institutions. Japan's economic stimulus plan in the "Economic Measures for Future-Oriented Investment" reached ¥28 trillion (approximately RMB 1.71 trillion), focusing on basic research layout for future industries in artificial intelligence, new materials, aerospace, and energy technology.

(3) **Exploring revolutionary innovation organizations and new paradigms.** Countries are attempting to promote future industry development by constructing new R&D organizational models. In 2021, the U.S. President's Council of Advisors on Science and Technology proposed establishing future industry institutes to innovate R&D models, management structures, and operational mechanisms for future industries in the report *Future Industries Institutes: A New Model for American Leadership in Science and Technology*. Meanwhile, Germany, the United Kingdom, and France are building future medicine clusters and parks with industry-university-research collaboration.

General Framework of Future Industry Innovation Ecosystem

With the advent of the innovation ecosystem era, the scope of innovation, innovation organizations, and innovation behaviors have all exhibited new changes and characteristics. The development of future industries depends on sound economic foundations and industrial conditions, and even more so on the effective support of innovation elements and innovation capabilities.

Definition and Function of Future Industry Innovation Ecosystem

Due to the broadness and diversity of research objects in innovation ecosystems, academic research on the scope of "innovation ecosystem" varies considerably. Some scholars have studied innovation ecosystems at the micro level, focusing on focal firms, enterprise technologies, and complex products. For example, Adner [9] proposed that an innovation ecosystem is an alliance structure established among diverse heterogeneous actors with mutual needs to achieve a common value proposition. Other scholars have examined innovation ecosystems at the meso and macro levels, such as specific industries or industrial clusters, regions, and nations. For instance, Freeman [10] defined national innovation systems as "a network of public and private sectors, through whose activities and interactions the initiation, introduction, improvement, and dissemination of all new technologies are realized." The breadth and depth of research objects and levels have fragmented the connotation of innovation ecosystems, lacking a universal definition that covers all research scopes and reflects the essence of innovation ecosystems. Domestic scholars have conducted explorations in this regard. Gao Shanxing and Tan Jing [11] noted that innovation ecosystems are organic bodies with evolutionary functions formed by connecting innovation systems at different levels based on their resources and activities through inter-system purpose linkages. Combining the fact that future industries are based on major breakthroughs in frontier and disruptive technologies, featuring leading capacity, uncertainty, and ecological dependence, this paper argues that the future industry innovation ecosystem is a dynamic open system built by various innovation communities formed around the cultivation and development of future industries, interacting and influencing each other within the innovation environment.

The functions of the future industry innovation ecosystem manifest in three aspects: (1) **Resource allocation optimization.** Generally, resources available during industrial development are limited, requiring reasonable resource allocation mechanisms. Future industries require massive innovation investment from the early cultivation stage. The future industry innovation ecosystem can guide and optimize the allocation efficiency of innovation resources and elements, establishing extensive network connections through collaboration among innovation participants to enable more rational allocation of various innovation resources within the system and achieve efficient utilization of limited innovation resources. (2) **Enhanced risk defense.** In most cases, future industries begin cultivation from the initial stage of developing core technologies or designing product prototypes, with highly uncertain technology and production routes. In other words, the development process of future industries faces numerous risks in industrial patterns including product forms, business processes, industrial formats, business models, production methods, and organizational modes. The future industry innovation ecosystem can digest trial-and-error costs, disperse failure risks, and enhance innovation risk defense capabilities through coordination among innovation participants. (3) **Improved innovation efficiency.** Future industries feature high starting points, large investments, and

cross-domain collaboration, with innovation activities involving frontier technology breakthroughs and knowledge achievement incubation and industrialization. The future industry innovation ecosystem provides an effective communication platform for participants within the system, from innovation resource allocation to innovation information exchange and innovation trend judgment. Participants within the system can timely grasp innovation resource flow trends through cooperation in innovation activities, achieve complementary capabilities among innovation participants, and thereby enhance the overall efficiency of the innovation system.

Overall Framework of Future Industry Innovation Ecosystem

The future industry innovation ecosystem focuses more on how innovation communities and innovation environments drive the system to accelerate evolution toward higher levels—that is, accelerating the transition of scientific and technological knowledge from the incubation stage of theoretical concepts to technology industrialization and industrial scaling stages, continuously promoting the rapid growth of future industries. The future industry innovation ecosystem consists of innovation communities and innovation environments (Figure 2 [Figure 2: see original paper]).

Innovation communities comprise three types: frontier knowledge creation communities, application scenario transformation communities, and industrial value realization communities. Each community generally includes innovation participants such as enterprises, universities, research institutes, new R&D institutions, and government. Each participant assumes different roles and functions according to the positioning and mission of its community. (1) **Frontier knowledge creation community**—the knowledge source of frontier and generic basic technologies in the process of future industry cultivation and development. The development of future industries is highly dependent on knowledge, requiring the ecosystem to be shaped from knowledge advantages and innovation capabilities. The original papers, patents, and other achievements generated by frontier knowledge creation communities are prerequisites for cultivating and developing future industry value realization. The knowledge creation process in frontier knowledge creation communities can generate spillover effects and produce long-term impacts on the knowledge learning atmosphere within the entire system, thereby enhancing the overall innovation capability of the system. Frontier knowledge creation is one of the most critical tasks in the future industry innovation ecosystem. Participants in frontier knowledge creation communities include government, universities, research institutes, new R&D institutions, and enterprises.

(2) **Application scenario transformation community**—the "bridge" connecting frontier scientific research with future industry value realization. The key to sustainable development of future industries is having stable, scaled demand. The application scenario transformation community transforms frontier and generic basic technology knowledge with public

goods properties into commercial products, exploring the realization of commercial value from frontier scientific research achievements along new paradigms or trajectories. Therefore, application scenario transformation communities require extremely high inventive creativity, market acumen, and risk perception; they need to fully leverage market mechanisms and innovate technology knowledge transfer and transformation mechanisms. Innovation participants in application scenario transformation communities mainly include government, universities, research institutes, new R&D institutions, enterprises, and intermediary service agencies. The foundation for cooperation among these participants is conducting concrete technological application and implementation based on major discoveries from basic research or breakthroughs in frontier technologies. The numerous involved actors in application scenario transformation communities are closely interconnected, and joint innovation entities centered on enterprises, universities, and research institutes can be established to directly carry out frontier technology implementation and transformation, with advantages in shortened transformation cycles and improved transformation efficiency.

(3) **Industrial value realization community**—the practitioner that achieves the ultimate commercial value of frontier and generic basic technologies for future industries. Industrial value realization communities need to construct production, sales, and service value chains for frontier technologies that already possess industrialization conditions, forming corresponding production and application capabilities to deliver final products transformed from knowledge generated by frontier knowledge creation communities to consumers. The transformation of frontier technologies into final products often poses challenges to existing production materials, processes, and personnel. Therefore, industrial value realization communities need to upgrade relevant supporting systems, achieve reshaping of existing industrial chains and value chains, and form a complete production service system that future industries ultimately depend on for sustainable development. Innovation participants in industrial value realization communities include government, enterprises, universities, research institutes, new R&D institutions, and intermediary service agencies. Participants in industrial value realization communities achieve the penetration and traction of future industries across various current sectors and fields through embedding and integration with existing industrial systems, driving productivity development, improving quality of life, and leading economic and social development.

The innovation environment is the collection of resources such as talent, capital, platforms, and policies in the process of interaction between innovation communities and surrounding elements. Innovation communities interact with surrounding elements through rational allocation and utilization to ensure sustainable system development [12]. The innovation chains, production chains, and value chains involved in future industry development are influenced not

only by the internal environment of the innovation ecosystem but also promote the evolution and improvement of internal environmental elements of the future industry innovation ecosystem through interaction with the external environment. Factors such as technological development, economic development, and social development are external environmental factors affecting the future industry innovation ecosystem.

Role and Function of Communities in Future Industry Innovation Ecosystem

In the frontier knowledge creation community of the future industry innovation ecosystem: (1) **Government's function** is to strengthen guidance in strategic planning, industrial policy, and innovation governance for future industries, mobilizing diverse research forces to plan and layout future industries proactively. Through scientific assessment and decision-making, government strategically deploys specific fields, investing talent, capital, technology, and other resources to serve the development of future industries in particular directions, while striving to effectively avoid certain risks during industrial layout. For example, in the R&D of disruptive technologies highly relevant to future industry development, countries such as the United Kingdom, Japan, and Sweden have begun learning from and emulating the operational model of the U.S. Defense Advanced Research Projects Agency (DARPA) to comprehensively layout national disruptive technology R&D. (2) **Universities and research institutes' functions** are primarily to strengthen guidance in basic research and talent cultivation, fully interacting and collaborating with other innovation participants such as enterprises and new R&D institutions. (3) **New R&D institutions' function** is to emphasize participation in original innovation through new mechanisms and models, uniting diverse research forces in a high-end, highly collaborative manner. (4) **Enterprises' function** is to emphasize deep interaction with all members of their community, timely, accurately, and comprehensively transmitting their knowledge needs from innovation activities to other members of the knowledge creation community through information transmission and feedback, and participating in knowledge creation at appropriate times.

In the application scenario transformation community of the future industry innovation ecosystem: (1) **Government's function** lies in leveraging the positive externalities of frontier basic research and generic technologies; providing application scenarios and complete, convenient infrastructure for new knowledge and new technologies during knowledge transformation; and using institutional innovations in taxation, innovation incentives, finance, and platforms to stimulate innovation participants' motivation. (2) **Universities and research institutes' functions** are primarily to provide intellectual support for knowledge application, serving as the transformation link from knowledge to achievements. Simultaneously, they train experienced innovation talent with knowledge, technology, and skills for enterprises during application sce-

nario innovation and frontier technology transformation processes. (3) **New R&D institutions' function** is to emphasize understanding and grasping the commercial value of new knowledge and new technologies, ensuring and improving knowledge transformation efficiency. New R&D institutions must fully leverage their connecting role between basic theoretical research and industrial value realization, possessing the ability to discover, identify, and create technology application scenarios or routes, thereby streamlining and empowering the application process of frontier technologies. (4) **Enterprises' function** is to emphasize opening up the connection channel between new knowledge and market demand, forming transformation networks around focal enterprises to convert knowledge generated by frontier knowledge creation communities into applicable technologies, products, and services, completing pilot testing and scaling-up processes. Enterprises should proactively explore the maximum potential of frontier technology applications from the demand side. Once enterprises master core key technologies of future industries, they will gain first-mover advantages and form core competitive strengths in future industries. (5) **Intermediary services' function** is to emphasize innovating technology transfer and transformation service mechanisms according to the characteristics of frontier technologies during the pre-knowledge transformation process, extending the front end of the technology transfer service chain as far as possible. They should provide standardized transfer and transformation services tailored to the special attributes of frontier technologies, such as technology assessment, technology trading, technology transfer, technology agency, technology auction, and technology integration, providing comprehensive resource support from capital, talent, and supporting facilities. Additionally, considering the public goods attributes of some frontier technologies, intermediary services should explore new models of public welfare technology transfer services.

In the industrial value realization community of the future industry innovation ecosystem: (1) **Government's function** is to emphasize institutional supply innovation in taxation, talent, and finance during the early development stage when future industries lack full competitive capabilities, creating an appropriate institutional environment for future industry development. Simultaneously, government must also govern ethical issues that arise during large-scale application of frontier technologies. (2) **Enterprises' function** is to play a core role in the industrial value realization community. When products/technologies meet production conditions, enterprises will find suitable positions in the value chain and participate in constructing future industry value chains. Enterprises should embed themselves into existing value chains/industrial chains to enhance the overall efficiency of future industries and continuously optimize the efficiency of future industry systems in production practice. (3) **Universities, research institutes, and new R&D institutions' functions** are to leverage their advantages in knowledge, R&D, and talent to provide intellectual support for upgrading key core technologies of future industries. (4) **Intermediary services' function** is to serve the entire future industry development, assisting enterprise-centered value networks to become stronger and larger.

Important Entities and Key Elements of Future Industry Innovation Ecosystem

Future industries represent deep integration and coupling between technologies and between technology and industry, emphasizing deep interaction among various innovation actors including government, universities, research institutions, and enterprises. Compared with general industry innovation ecosystems, the characteristics of future industries determine the imbalanced development of frontier knowledge creation communities, application scenario transformation communities, and industrial value realization communities during dynamic evolution, and also determine the differences in role and function positioning of innovation participants within each community. In particular, government and entrepreneurial spirit play important roles in the evolutionary development of future industry innovation ecosystems.

Government serves as the chief architect and institutional supplier for future industry development. (1) Government needs to attach strategic importance to future industry layout and plan future industry development proactively. (2) Government needs to coordinate and allocate key resources, serving as the resource guarantor for technology supply. It should increase investment and innovate R&D models in basic research supporting frontier technology exploration, guiding the formation of new organizational models suitable for future industry development. (3) Government should innovatively apply various policy tools to promote the establishment and iteration of application scenarios, accelerating the practical application of frontier technological knowledge. (4) Government needs to address the ethical dilemmas and technological risks of frontier technologies, actively exploring governance frameworks and means suitable for frontier technologies.

Entrepreneurial spirit is the key driving force for realizing the growth and development of future industries. Future industry development involves tremendous uncertainty, with extreme risks existing from frontier knowledge creation through application scenario transformation to industrial value realization. Therefore, during future industry development, all participants need to embrace risk challenges with the innovation and entrepreneurship based on entrepreneurial spirit and the courage to be pioneers. Especially during application scenario transformation and industrial value realization, entrepreneurs must possess not only keen commercial value judgment to transform frontier and generic basic technologies into products but also the courage to bear failure risks through continuous trial-and-error, as well as the "disruptive power" to substitute for and transform traditional industries. Therefore, in constructing relevant institutional environments, continuous reform is needed to leverage market functions while achieving innovation incentives and premium realization, allowing more entrepreneurs and investors to innovate boldly in an encouraging and tolerant environment.

Practical Considerations for Cultivating Future Industry Innovation Ecosystem

Competition in future industries is competition in ecosystem cultivation. Currently, the international competitive environment is complex and volatile, with "supply chain disruption" and "decoupling" threatening all aspects of industrial innovation development. Building an innovation ecosystem oriented toward future industries is a strategic choice commonly faced by countries worldwide in developing future industries. Innovation element identification, innovation entity collaboration, and innovation environment optimization are important levers for nurturing and developing future industries.

(1) **Enhancing the supply quality of innovation elements for future industries.** Scientific and technological innovation in future industry directions such as brain-inspired intelligence, quantum information, gene technology, future networks, deep-sea and aerospace development, and hydrogen energy and energy storage all have high threshold requirements for talent, technology, capital, and other elements. It is necessary to establish identification and allocation mechanisms for future industry innovation elements, using technology foresight and various element evaluation methods to identify innovation elements such as talent, capital, technology, and data needed for future industry development. Simultaneously, according to the changing demands for innovation elements at different stages of future industry development, various high-end innovation elements including talent, capital, technology, and data should be effectively allocated to improve the agglomeration level of innovation elements, promote efficient flow among innovation elements, and ensure the quality of element supply required for future industry development.

(2) **Increasing policy support for future industry cultivation.** The process from frontier technology to future industry is full of uncertainty and unpredictability, with technology routes and application domains constantly changing dynamically. Future industry cultivation policies face new demands and challenges. Support for interdisciplinary and cross-domain projects should be increased to cultivate more and better new technologies within the broadest possible scope. New infrastructure construction in fields such as brain-inspired intelligence, quantum information, and future networks should be promoted to create more application opportunities for frontier technologies, with comprehensive use of various policy tools including fiscal and tax measures to conduct pilot demonstrations. Local governments should be guided to cultivate and reserve high-quality potential projects in advance that align with local scientific, technological, and industrial characteristics, forming complementarity with traditional industries and strategic emerging industries to build a tiered development system for future industry clusters.

(3) **Strengthening supply security of key links in future industries.**

Basic materials, core components, basic processes, and generic technologies are the fundamental foundation for future industry development. Basic research should be strengthened to comprehensively enhance original innovation capabilities, providing basic guarantees for frontier technologies. Breakthroughs in some key basic technologies and "bottleneck" links should be accelerated to avoid supply chain security issues during the industrialization of frontier technologies. Top talent cultivation and recruitment should be increased to build a talent support system adapted to future industry development, establishing a list of scarce talent in frontier fields, and directionally recruiting talent needed for future industry development to improve the precision and industrial fit of talent acquisition. Ethical issues in science and technology triggered by frontier technologies such as artificial intelligence and synthetic biology should receive focused attention, with science and technology ethics education being developed and promoted to foster ethical awareness among research and industrial personnel.

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Innovation Ecosystem of Future Industry: Structure and Path

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Abstract: The innovation ecosystem of future industry faces great challenge in multiple dimensions such as systematic structure, function, and path for the continuous emergence and breakthrough of cutting-edge basic knowledge. Based on the theories of natural ecosystem and innovation system, this study builds a future industrial innovation ecosystem structure framework consisting of frontier knowledge creation community, application scenario transformation community, and industrial value realization community with consideration of the characteristics and evolution laws of future industry. In such innovation ecosystem, promising government and entrepreneurial spirit are important entity and key element, and policies for incubating and developing future industry should focus on innovation element identification, innovation entity collaboration, innovation environment optimization, etc.

Keywords: future industry, innovation ecosystem, promising government, entrepreneurship

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