

New Quality Productivity Enabling High Quality Development of Ice and Snow Economy: Logical Mechanisms, Key Dimensions and Promotion Strategies

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Abstract

With the continuous deepening of the high-quality development strategy of ice and snow economy, vigorously promoting digitization and actively improving the construction of ice and snow industry has become the top priority of ice and snow economic development. In this process, accelerating the development of new productivity is one of the most important innovation paths. This paper uses literature analysis method and expert interview method to explore the logical mechanism, key dimensions and promotion strategies of new quality productivity empowering ice and snow economy. The results show that giving full play to the role of new quality productivity in empowering the high-quality development of ice and snow industry requires scientific and technological guidance, integration of culture and tourism, green development, and two-way power of market and government. At the same time, it is also necessary to pay attention to the challenges such as resource bottlenecks and policy constraints that the ice and snow industry may face in the process of high-quality development, so as to promote the high-quality development of the ice and snow economy in the new era.

Keywords : ice and snow economy ; new quality productivity ; ice and snow economy ; high-quality development ; strategy

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Introduction

On November 6, 2024, the General Office of the State Council issued the “Several Opinions on Stimulating the Vitality of the Ice and Snow Economy with the High-Quality Development of Ice and Snow Sports”, which puts forward “taking ice and snow sports as the leader, driving the development of the whole industrial chain of ice and snow culture, ice and snow equipment, ice and snow tourism, and promoting the ice and snow economy as a new growth point” “By 2027 the total size of the ice and snow economy reached 1.2 trillion posts, by 2030 the total size of the ice and snow economy reached 1.5 trillion yuan” [1]. For many years, China has been strengthening the synergistic development of “sports + tourism”, and the ice and snow industry plays a multiple effect in the economy, culture, education and society [2]. In the context of the new era, China's sports service economy has a clear development trend, sports manufacturing from consumption to saving optimization transition, the efficiency level of the ice and snow industry is also constantly improving, creating new value for society [3]. According to the 2023 annual results statistics of the International Winter Sports Expo, the output value of ice and snow sports has risen sharply compared with the previous year, and the goal of 1 trillion in 2025 is about to become a reality. However, due to China's snow and ice industry is dominated by the ski industry, the profit model is single but subject to seasonal restrictions on the specificity of the “post-Winter Olympics era” of China's snow and ice industry to where to go is a question of the high quality development of the snow and ice economy is still a long way to go [4]. In this context, how to find new development kinetic energy to create new advantages in development, help industry modernization and transformation, has become one of the important issues of the ice and snow economy of high-quality development. 2024, General Secretary Xi Jinping in the 11st collective study of the Political Bureau of the twentieth session of the Central Committee clearly pointed out that “the development of new quality productive forces is the inherent requirements of promoting high-quality development and an important point of focus”. The development of new quality productive forces is an inherent requirement and an important focus for promoting high-quality development. It can be seen that the new quality productivity, as an advanced productivity quality, is the core kinetic energy of the high-quality development of the ice and snow economy, which can promote the ice and snow economy to turn to the deep innovation drive [5]. At present, the academic community has launched an extensive discussion on the new quality productivity. From the point of view of the proposal of new quality productivity, new quality productivity is the follow and extension of the theory of productivity and production relations in the basic principles of Marxism [6]. It is

generally believed that the new quality productivity is the advanced productivity led by scientific and technological innovation, which consists of new types of workers, new types of labor materials and new types of labor objects [7]. From the point of view of the development path of new quality productivity, new quality productivity is inseparable from the development of emerging industries and future industries, but “the development of new quality productivity is not to neglect or abandon the traditional industry metallurgy, but to form a synergy between traditional industries and emerging industries and future industries through industrial integration and cultivation of new forms of business, and to strengthen the resilience of the industrial chain together. It is worth noting that the ice and snow industry, as an organic intertwining of economic reproduction and natural reproduction, makes the ice and snow industry unique, and the ice and snow economy and the development of new-quality productivity should not be confused with other industries [8]. In view of this, this study aims to systematically analyze the mechanism and key dimensions of the new quality productivity empowering the high-quality development of the ice and snow economy, and put forward the corresponding promotion strategies based on the current realities faced, in an attempt to provide new ideas for the high-quality development of the ice and snow economy through the analysis from theory to practice.

Logical mechanism of new quality productivity empowering the high-quality development of ice and snow economy

Theoretical foundation

Innovation is a complex system composed of multiple elements interacting with each other, including enterprises, scientific research institutions, government, financial institutions and other subjects, as well as technology, knowledge, policy, market and other elements, this paper introduces the theory of the innovation system, emphasizing that the interaction and synergistic innovation among policies, elements, science and technology promote the development and change of the ice and snow economy. A series of policies issued by the government to support the development of the ice and snow economy, such as Several Opinions on Stimulating the Vitality of the Ice and Snow Economy with the High-quality Development of Ice and Snow Sports [1], are the key factors at the institutional level in the innovation system, guiding the direction of the allocation of innovation resources, motivating enterprises and scientific research institutions to carry out innovative activities in the field of snow and ice, and facilitating the cultivation and development of the new-quality productivity. Meanwhile, in the ice and snow economy, the integration of tourism, recreation, culture and other elements with the ice and snow industry is the very embodiment of the integration of elements in the innovation system, which can realize the emergence of new quality productivity and bring new growth points and competitive advantages for the ice and snow economy. In addition, we pay attention to the research and development and application of advanced science and technology represented by artificial intelligence and big data in the field of ice and snow economy. Scientific and technological innovation is the key force to promote the change of the ice and snow industry, which improves the production efficiency of the ice and snow industry and the quality of the service, and at the same time, changes the business model of the ice and snow economy and the consumption experience. Through the innovation system theory, it is possible to systematically integrate the three aspects of policy, factors and science and technology, and clearly explain how they interact with each other, which together constitute the logical mechanism of the new quality productivity empowering the high-quality development of the ice and snow economy.

Logical Mechanism

Policy Support as a Handle

In 2021, the Ministry of Culture and Tourism (MCT), together with the National Development and Reform Commission (NDRC) and the General Administration of Sport (GAS), jointly released a development strategy for ice and snow tourism. Based on the implementation of this strategy, the Ministry of Culture and Tourism further developed a three-year upgrade program aimed at further improving the product offerings of ice and snow tourism, enhancing the quality of services, and stepping up publicity and promotion efforts. During the ice and snow season from 2023 to 2024, the number of ice and snow leisure travelers in China is expected to exceed 385 million, while in the ice and snow season from 2024 to 2025, this number is expected to exceed the 500 million mark [9]. The Several Opinions on Stimulating the Ice and Snow Economy with the High-Quality Development of Ice and Snow Sports, issued by the State Council, explicitly states that it is necessary to start the implementation of an upgrading plan for ice and snow tourism. The new quality productivity has injected new vitality into the consumption environment of the ice and snow industry. Under the premise of getting policy support, in order to promote the level of sports consumption, it is necessary for us to strengthen the improvement of relevant national laws and regulations, improve the quality of sports products and services, continue to create a positive and upward consumption atmosphere, create ice and snow-related brands, accelerate the innovation and upgrading of the consumption mode of the ice and snow economy, as well as create a new mode of business of the ice and snow industry.

Factor integration as a way

The productivity of new quality encourages the integration of various elements and brings new vitality to the sports industry through the merging of resources in different fields. It is crucial to inject new vitality into the sports industry [10]. For example, combining various fields such as tourism, recreation and culture to create consumption scenarios combining ice and snow,

culture, sports, tourism and recreation to meet the diversified consumption needs of the people. The innovation of ice and snow consumption scenes is often closely linked to the integration of culture, tourism and recreation.

Science and technology innovation as the core

New quality productivity provides an innovative direction and technical support for the construction of hardware facilities in the ice and snow industry, which not only improves the consumer experience, but also lays a solid foundation for the sustainable development of the ice and snow industry. According to the data, there are now 75 ski resorts in Jilin Province, with a total area of more than 1,200 hectares and a total length of 358 kilometers of trails [11]. With the help of advanced technological tools, such as artificial intelligence and big data technology, we are committed to promoting the construction of smart snow courses to provide smarter and customized services for spectators, thus improving their viewing experience and enthusiasm for participation.

Key Dimensions of New Quality Productivity Enabling High-Quality Development of Ice and Snow Economy

The ice and snow economy has experienced a profound structural change driven by new quality productivity. This not only means incorporating new technological means into productivity, but more importantly, this change has demonstrated synergistic effects in all four dimensions: intellectually driven, power source, resource base, and brand new dynamics. Under the leadership of the new quality productivity, the ice and snow economy has been able to realize high-quality growth, which includes the development model of innovation, coordination, green, openness and sharing [12]. Figure 1 reveals the theoretical logical structure of the new quality productivity on which the high-quality growth of the ice and snow economy depends.

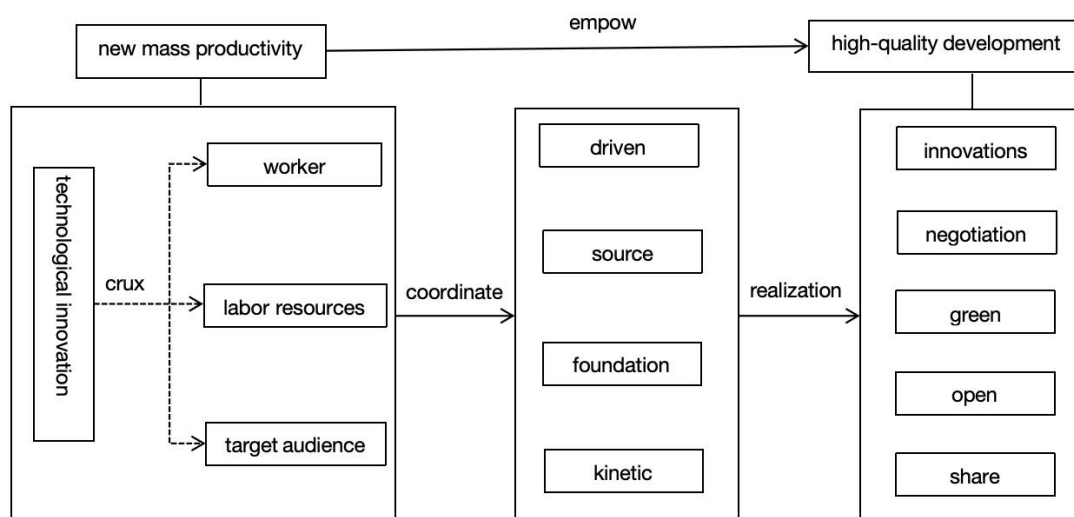


Figure 1 Theoretical Framework of New Quality Productivity Enabling High-Quality Development of Snow and Ice Economy

New Workers Provide Intellectual Drive for the High-Quality Development of Ice and Snow Economy

Compared with traditional workers, new workers tend to be more educated and have a stronger ability to learn and adapt, which is especially critical in the current context of digitalization and intelligence. They have the ability to use modern information technologies such as big data, cloud computing, and artificial intelligence to conduct in-depth market analysis of the snow and ice industry and provide highly personalized services to customers. The application of these advanced technologies not only helps to improve work efficiency, but also greatly enriches the diversity and connotation of tourism products, thus injecting new vitality into the continuous innovation and development of the ice and snow industry [13]. In addition, the cross-disciplinary integration ability of emerging workers constitutes another significant advantage for them to play a key role in the snow and ice industry. In the pursuit of high-quality growth in the snow and ice economy, we need interdisciplinary and cross-disciplinary expertise and skills. The new generation of workers has the ability to integrate expertise and skills from various fields in order to innovate tourism products and services to meet the diverse needs of consumers in terms of diversity and personalization.

New Labor Materials Provide a Power Source for the High-Quality Development of the Ice and Snow Economy

As a key driver of modern economic growth, new labor materials play an indispensable role in the high-quality development of the tourism industry. A variety of new labor tools such as algorithms, big data processing centers, automated manufacturing equipment, virtual reality and augmented reality equipment, as well as through the intelligent transformation of digital

technologies such as big data, cloud computing, blockchain and artificial intelligence, the traditional production tools have been upgraded and optimized [14], which has injected new vitality and innovation power into the ice and snow industry. For example, with the technical means of virtual reality and augmented reality, tourists have the opportunity to preview the destination of ice and snow tourism in their own environment and enjoy a virtual travel experience, or get a richer and more diverse ice and snow experience on the spot through augmented reality technology, which not only attracts more tourists, but also further expands the tourism market.

New labor objects provide a resource base for the high-quality development of the ice and snow economy

New labor objects provide an unprecedented resource base for the high-quality development of ice and snow economy. As the center of the information age, the network not only reshapes the dissemination path of tourism information, but also provides a technical basis for the online and personalized tourism services. Through the deep integration of emerging labor objects such as networks, information and data, we can not only improve the quality of tourism service provision, but also promote the innovation of tourism products and modes, providing a solid backbone for the sustainable development of the ice and snow industry [15]. Through the efficient use of these new types of labor objects, the ice and snow industry can better meet the needs of the market, improve the quality of services, and achieve the coordinated development between the economy, society and the environment.

Optimized integration of productivity factors provides new kinetic energy for the high-quality development of ice and snow economy

The core of optimization and integration lies in the adoption of advanced technology and scientific methods to make a reasonable layout of the new quality productivity factors, and scientific and technological innovation provides a constant impetus for the optimal combination of these factors. In the wave of digitization and intelligence, new workers rely on their innovative thinking and cross-border capabilities, new labor materials rely on their technological support, and new labor objects rely on their rich content. The three major elements of the new quality productivity will reshape the future of the ice and snow industry in an innovative and integrated way. The efficient integration and linkage of these elements constitute the core driving force for the innovative development of the ice and snow industry.

Realistic Obstacles and Promotion Strategies of New Productivity Enabling the High-Quality Development of Ice and Snow Economy

Realistic obstacles

Science and technology innovation bottleneck

Ice and snow economy science and technology innovation is faced with the problem of relying on imported technology and talent shortage. On the one hand, the snow and ice science and technology research and development investment is relatively small, the enterprise independent research and development ability is weak. Ski equipment rental area, for example, are generally imported equipment, and domestic production of snowshoes many are in the OEM state, the lack of localization, mostly in accordance with the physiological characteristics of Europeans, the shape of the skeleton production, resulting in advanced ice and snow equipment R & D lag [16]. On the other hand, there is a scarcity of professional ice and snow coaches, and the updating of college teaching materials is relatively slow, and the training of talents is out of touch with market demand. For example, the North Great Lake Ski Resort said that a large number of guests can't hire a coach, which not only affects the economic income of the entire snow field, but also affects the service experience of the tourists [16], which seriously hampers the in-depth application of scientific and technological innovation in the snow and ice industry, and restricts the improvement of new-quality productivity.

Factor integration barriers

There are integration barriers between different industrial elements. In the process of integration of the ice and snow industry with science and technology, culture and tourism, synergistic development is hindered due to differences in industry standards and uneven distribution of benefits. In the development of ice and snow cultural tourism products, the cultural sector, tourism enterprises and ice and snow sports organizations lack effective communication mechanisms, resulting in insufficient excavation of the cultural connotation of the product and unreasonable design of tourism routes. According to statistics, Jilin's snow fields are currently relatively far away, with uneven scales. The second is that there is obvious homogenization of the industry, and the industry is all based on skiing [16]. Unable to give full play to the role of factor integration on the stimulation of new quality productivity, limiting the diversified development of the ice and snow economy.

Green development challenges

The development of ice and snow industry faces difficulties in ecological impact and green transformation. A report shows that the northeast region puts pressure on the ecological environment in organizing large-scale ice and snow events. There is a significant decline in air quality after the tournament; the high use of water resources leads to a reduction in runoff and mild pollution of water quality after the tournament; the construction and modernization of venues and development triggers

changes in land use, which may affect agricultural production and the ecological environment; the diversity of wildlife is greatly affected by the construction, which increases the environmental burden, violates the concept of green development, and restricts the process of the new qualitative productivity of the green empowerment of the ice and snow economy [17].

Market demand fluctuations

Ice and snow economy is subject to seasonal and geographical restrictions, market demand fluctuations are obvious. Winter is the peak season for ice and snow consumption, but the length of winter in the northern region is limited, and the southern ice and snow market has potential but has not yet been fully developed. According to market research, Changbaishan Wanda International Resort needs two thousand staff members in the snow season, and may need five or six hundred in the non-snow season [16]. The general snow field presents a season to raise three seasons situation, market demand fluctuations make enterprises in the new quality of productivity investment in a cautious attitude, such as intelligent snow and ice facilities construction and maintenance costs are high, in the off-season idle serious, increased business operation risk, affecting the new quality of productivity in the snow and ice economy in the sustained empowerment.

Promotion Strategy

Science and technology leadership, breakthrough innovation bottleneck

1. Increase investment in research and development and talent training, the establishment of ice and snow science and technology special R & D fund, encourage enterprises, universities and research institutions to jointly declare projects, focusing on supporting ski equipment, ice and snow facilities intelligent technology and other key areas of research and development, to improve the level of localization, and to change the status quo of dependence on imports.
2. Promote cooperation between colleges and universities and snow venues, ice and snow equipment enterprises, the establishment of internship bases, based on market demand for timely updating of ice and snow professional teaching materials, customized training of both understanding of ice and snow sports and mastery of advanced science and technology of the composite talents [18], such as the opening of the “snow and ice science and technology and engineering,” “ice and snow sports intelligent management “ and other professional direction courses.

Culture and tourism integration, breaking the elemental barriers

1. establish a synergistic development mechanism to set up a special fund for the integration and development of ice and snow culture and tourism, which is used to support cross-sectoral and cross-business cooperation projects, such as the joint creation of ice and snow tourism festivals and events with regional cultural characteristics, and the development of comprehensive ice and snow culture and tourism routes, so as to enhance the overall competitiveness.
2. Innovate cultural tourism products and services, deeply excavate the connotation of ice and snow culture, combine local history, folklore and other cultural elements [19], design and develop diversified products such as ice and snow cultural theme parks, ice and snow performance shows, ice and snow folklore experience villages, etc., to enrich the experience of tourists, and avoid product homogenization.

Green development to cope with ecological challenges

1. Strengthen ecological protection and restoration, formulate special planning for ecological environmental protection of the ice and snow industry, carry out ecological assessment of ice and snow tournaments, venue construction areas, etc., and plan ecological protection measures in advance, such as constructing ecological isolation zones and adopting environmentally friendly building materials, to reduce ecological impacts [20]. After the event, timely ecological restoration work is carried out, and special funds for ecological restoration are set up for projects such as vegetation restoration, water purification, and wildlife habitat reconstruction to ensure ecosystem stability.
2. Promote green operation and technology application, encourage ice and snow enterprises to adopt clean energy, such as building solar and wind power generators in venues and snow facilities to supply power for lighting, snow-making equipment, etc., to reduce carbon emissions, practice the concept of green development, and realize the sustainable development of the ice and snow industry [21].

Market regulation, stabilize market demand

1. Improve the regulatory system and standards, refine the regulatory regulations of the ice and snow industry, clarify the regulatory standards and responsible subjects of the various aspects of ice and snow sports training, ice and snow tourism services, ice and snow equipment sales, etc., and establish a quality supervision system covering the whole industry chain to protect the rights and interests of consumers [22].
2. Innovative supervision methods and means, using big data, blockchain and other technologies to build a smart supervision platform for the ice and snow market, real-time monitoring of business data, market price fluctuations, consumer complaints and other information, to achieve accurate supervision and risk warning [23]. At the same time, the implementation of credit supervision mode, the establishment of ice and snow enterprise credit file, the integrity of business enterprises to give policy support and recognition and reward, the implementation of joint disciplinary action against illegal enterprises, to create a good market environment.

Conclusion

Under the background of globalization and informationization, the ice and snow industry is undergoing a far-reaching transformation. The Party and government of China have put forward strategic actions to promote the development of the ice and snow industry in the direction of high quality. As an advanced productivity model in line with the new development concept, the new quality productivity has emerged as a key driving force to push the ice and snow economy in the direction of high quality. This force has injected new vitality into the high-quality development of the ice and snow industry by optimizing the integration of new types of workers, new types of labor materials and new types of labor objects. In order to strengthen the development potential of the ice and snow industry in terms of high quality, we need to give full play to the role of new types of productive forces, take science and technology promotion as the forerunner, and at the same time, combine local culture and tourism culture to pursue a greener path of development, as well as to further strengthen the monitoring and management of the market[24]. In addition, in the pursuit of high-quality growth of the snow and ice industry, we should always be concerned about the possible resource constraints and policy constraints, in order to ensure that the snow and ice economy can move forward healthily and stably in the new era.

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Conflict of Interest

The authors declare no conflict of interest.

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