

From “Cold Resource” to “Hot Industry”: A “Structure-Function” Analysis of the Formation of Ice and Snow Industry

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The study is based on the overarching paradigm of "resource-culture-industry" and utilizes the ice and snow industry in Harbin as a case study. The objective is to analyze the structural and functional transformations of ice and snow respectively as a resource, culture, and industry. This is achieved by examining the interrelationship between and transition among these dimensions to demonstrate the entire dynamic process from "cold resource" to "hot industry". The study examines the development of ice and snow culture, characterized by regional distinctiveness, which emerges from the early stage of resource utilization. As a form of structural heritage, this culture not only can guide resource allocation but also plays a dynamic role in shaping the local economy. Moreover, the industrialization of cultural heritage facilitates the transmission of exemplary traditional cultural practices while promoting the industrial transformation of the ice and snow sector and fostering a growth of related industries. This research posits that by prioritizing ice and snow cultural heritage, it is possible to cultivate competitive endogenous advantages, thereby infusing new vitality into the sustainable development of the local economy.

Keywords: neo-classic “structure-function theory”, ice and snow culture heritage, ice and snow industry, endogenous development

INTRODUCTION

"Deep snow, solid ice, and long-lasting winters" were initially regarded as restrictive factors for the survival and development of inhabitants in regions with extremely low temperatures. However, through an accumulation of extensive practical experience, the local population's perception of ice and snow has transformed, from a state of fear to affection. Ice and snow culture has emerged as a distinctive artistic medium and cultural form, integrating itself into daily life and catalyzing the emergence of new industries, thereby revitalizing the economy in cold regions.

Furthermore, the combination of cultural heritage and economic development has given rise to novel industries. For instance, the integration of culture and tourism has profoundly influenced industrial structures and ultimately contributed to the overall development and growth of our society. Concurrently, the symbiotic integration of spiritual civilization and economic development has the potential to transform ice and snow into a carrier that fosters both material and spiritual wealth, thereby offering novel perspectives for the sustainable development of the ice and snow industry. However, as a distinctive resource-based sector that originates from resource exploitation, the relationship between resources and

industry is not a direct conversion, and the structural factor may also play a significant role during the transformation process from resource to industry.

This study focuses on the culture and industry related to ice and snow as main research subjects. In the study of the ice and snow industry, scholars have predominantly concentrated on the current status and trends of industrial development from a macro perspective, treating the ice and snow industry as a holistic entity. The primary methodologies include industrial policy research, comparative analysis for textual analysis and interpretation (Liu et al. 2022; Ye, Zhang & Kan 2022), as well as investigations into industrial development models and economic benefits (Sun et al. 2022). Trends in mathematical analyses have emerged in recent years (Bai 2016), exemplified by the application of the SARIMA (Seasonal Autoregressive Integrated Moving Average) model for forecasting, which provides references for industrial strategic planning (Zhang & Tong 2012).

Cultural heritage studies have primarily focused on two levels. The first level, “ontological research”, centers on the cultural heritage itself. The second level, “cultural research”, delves into the cultural meaning embedded within the heritage. Despite explorations of cultural heritage and its connotations, there is a notable lack of focus on the systematic level of "socio-economic analysis" (Zhang & Wu 2021), which hinders the examination of the structural role that cultural heritage plays in the process of societal transformations from a socio-economic structural perspective. This paper proposes to adopt the theoretical perspective of neo-classic structure-function theory to conduct a dynamic and comprehensive "socio-economic analysis" of the "traditional-modern" transformation of cultural heritage within the context of socio-economic structural transition. The theory makes extensive use of the “cultural function theory” (Malinowski 1987:12-15), the “structure-function theory” (Radcliffe-Brown 2002:141-148), the “cultural development and utilization concept” (Fei 2001), the “other invisible hand” theory (Li 1992), the “endogenous development” theory (UNESCO 1988:2), and the “competitive advantage” theory (Porte 2012:113-116). This theory regards cultural heritage as a form of structural heritage, subject to passive influences from external structural factors such as urbanization, industrialization, and marketization, while also possessing an agency to achieve self-development, forming self-generating or self-expanding structures and functions (Zhang 2020). Furthermore, it argues that cultural heritage can guide the allocation of industrial resources and drive the development of industries through its own “structure-function” changes. In this context, structure is understood to mean association, emphasizing the transformation of industrial structure in the context of social change. This can be comprehended respectively through the three dimensions of ontology, external structure and self-generated structure. And function represents its specific utility to both ontology and the external structure. This theoretical framework provides a novel analytical lens for understanding the creative transformation and innovative development of cultural heritage.

This paper places particular emphasis on the creative transformation and innovative development of cultural heritage at the "structure-function" level. This issue is also a core component of neo-classic "structure-function theory". Furthermore, our investigation will delve into the intricate relationships existing among resources, culture, and industry. The study will also examine how cultural heritage influences industrial development and how its structure-function changes. To address these questions, this paper will utilize the Harbin ice and snow industry as a case study, employing the neo-classic "structure-function theory" and following the research line of "resource-culture-industry" for analysis. The specific research pathways are as follows.

Firstly, based on the ontological structure of cultural heritage, an in-depth analysis of the nature, characteristics, genesis, and development process of ice-snow resources will be conducted. Secondly, from the external structural perspective, cultural heritage is put within the specific environment to examine how it is influenced by external structure. Lastly, from the self-generating structural dimension, cultural heritage is regarded as a structural factor affecting industrial development, to explore how culture influences the external structure and propels the formation and development of the industry through interaction with the environment. Through this multi-dimensional analytical framework, this paper aims to provide a new theoretical perspective and analytical pathways for the study of the ice and snow culture and the related industry.

THE DEVELOPMENT AND UTILIZATION OF ICE AND SNOW RESOURCES

Ice and Snow Resource Endowment

Harbin is rich in ice and snow resources, which have engendered optimal natural conditions conducive to the development of new winter activities. The formation of this endowment is the result of a synergistic interaction between natural evolution and anthropogenic intervention. This city is characterized by a temperate continental monsoon climate, with four distinct seasons. Located within the mid-high latitudes of eastern Eurasia, the region's prolonged winters, with an average duration of approximately 180 days, are characterized by substantial snowfall, the formation of hard ice, and subzero temperatures that occur on over 45% of days throughout the year. These climatic conditions are influenced by polar continental air masses, contributing to the region's distinct winter features, which foster a long-lasting exhibition of ice and snow landscapes. The region's abundant winter precipitation and prolonged snowmelt period are further influenced by lower wind speeds and fewer periods of extreme cold, allowing for regular outdoor activities during winter while mitigating some adverse impacts on transportation and daily life.

According to the local geographical context, Harbin is located in the northeastern part of China's northeastern plains and the southwestern part of Heilongjiang Province, exhibiting a diverse topography: in the north are the Lesser Khingan Mountains, hilly terrain to the east, and expansive low-lying plains intersected by river networks in central areas. The Zhangguangcai Range, a globally renowned skiing belt spanning from Harbin to the Mutankiang River, boasts numerous ski resorts such as the Mao'er Mountain ski area and Yabuli ski area. The Songhua River, traversing the city from west to east, undergoes freeze-up from late November, lasting five months annually and creating favorable conditions for outdoor activities. Ice harvesting, which begins in early December, also provides a large amount of high-quality and abundant natural ice resources for the creation of artificial ice landscapes.

Furthermore, the human historical and cultural environment is a significant factor in the development of ice and snow resources and the formation of ice and snow culture. The integration of ethnic groups within China and foreign migratory flows from abroad has had a profound influence on these processes. From the Shang Dynasty (from 1600 B.C. to 1046 B.C.) and Zhou Dynasty (from 1046 B.C. to 256 B.C.) to the Sui Dynasty (from 581 to 618) and Tang Dynasty (from 618 to 907), the Manchus in Harbin had adapted themselves to cold environments through fishing, hunting, farming, and other agricultural activities, thus marking the genesis of a culture of ice and snow. At the onset of the 12th century, the Jurchen people migrated to the now Heilongjiang Province, accompanied by a substantial population movement. Concurrently, the Han Nationality culture in the central plains expanded, and for the first time, it encountered the local Jurchen culture in Harbin. This migration led to the dissemination of Han Nationality traditions in the region, marking the onset of a process of cultural syncretism. The Qing Dynasty (from 1616 to 1912) implemented policies that significantly influenced regional development, facilitating the migration of Han Nationality groups to the northeastern regions, which contributed to the dissemination of material and spiritual civilization from the central plains to the northeastern area, thereby gradually expanding the influence of Han Nationality culture (Huang 2002). In 1897, the completion of the Middle East Railway led to a significant influx of international immigrants to Harbin, which escalated rapidly. This influx of foreign immigrants also introduced modern industrial civilization and European cultural elements, particularly Russian ice and snow sports, to the region.

Ways to Develop and Utilize Ice and Snow Resources

At the earlier stage, the inhabitants living in cold regions were passively engaged in resource exploitation, constrained by the natural environment. They utilized the basic properties of ice, such as hardness and transparency. The development of resources from snow and ice encompasses a wide array of activities, including, but not limited to, ice harvesting, ice sculpture, snow sculpture, ice lanterns, ice skating, winter swimming, and ice plowing.

Each winter, the weather is cold, the ground is frozen, and the snow is covered with footsteps. The history of ice harvesting in Harbin is over a hundred years old. Initially, people harvested ice to create ice

cellars and ice banks to keep food cold. The remaining ice was used as a raw material to carve bowls and basins to hold things, or it was made into animal shapes for children to play with. This is the prototype of an ice sculpture. In the early days, ice sculptures were utilized for rituals, ceremonies, prayers, and other occasions. Snow sculpture developed from the ancient children's snowman game. After a heavy snowfall, making snowballs or saving snow in different shapes became an important outdoor activity for children living in cold areas in winter. The original ice lanterns were born along the Songhua River. Ice lanterns were initially used by fishermen as field lighting equipment for fishing on winter nights. Due to their affordability, individuals with limited financial resources opted to place them in front of their residences as festive decorations during the Chinese New Year holiday season.

The evolution of Harbin's ice and snow sports culture is inextricably linked to the influx of foreign immigrants. These immigrants were instrumental in the construction of sporting venues, the establishment of sports organizations, and the popularization of ice skating. The tradition of "baptism" was also introduced, and through the process of long-term cultural fusion and collision, winter swimming gradually became a prominent Harbin sports activity. During winter months, when temperatures dropped, winter swimmers constructed ice swimming pools for exercise or performance. The plow, with its flat bottom and rake-like shape, played a crucial role in the initial transportation on snow and ice. In addition, early Chinese northeastern border guards utilized ice plows to facilitate the passage of official documents and the distribution of prisoner rations.

Ice and snow resources are also used in the design and construction of houses. To survive in the low-temperature environment, people's residences have gone through a historical evolution from "cave" to "semi-cave". In the middle of the 10th century, the Jurchens began to build the ground rooming house. The Manchu houses followed the tradition of using pine wood as a frame, laying grass on the roof, placing a wooden frame on the grass, building walls with soil, applying mud on the outside of the soil, and building a heated bed inside the house so that the house became a comfy shelter for people to protect themselves from the heavy winter wind and snow. In addition, snow can be used to purify the air, kill insects, eliminate bacteria, and reduce noise. The water from melting snow can be purified and used for human drinking, to feed livestock, or to irrigate farmland, which were also important elements in the development and utilization of ice and snow resources in the early days.

Structure-function Analysis of Ice and Snow Resource Transformation

In a period characterized by the infancy of transportation and technology, natural ice and snow constituted the most accessible resources for inhabitants of cold regions. An analysis of this phenomenon reveals that the initial development of ice and snow resources was a passive behavior forced upon people by the cold environment, with limitations in terms of both function and structure. This survival strategy, adopted under emergency conditions, resulted in the preservation of ice and snow in their original state, thereby limiting the diversity of forms utilized. Consequently, the utilization of ice and snow resources remained limited to specific applications, including food refrigeration and storage, religious practices, transportation, physical activity, outdoor lighting, interior design, and to a certain extent, agricultural and military needs. The utilization of ice and snow resources for decorative purposes and recreational activities was infrequent and restricted to the economically disadvantaged. It is evident that the added value of ice and snow has yet to be fully realized, and its value function has not yet been adequately emphasized.

The development of resources is subject to inherent structural limitations. The objective of resource exploitation is not economic production, but rather the fulfillment of basic life needs within an agricultural society. At this time, ice and snow played a special role in daily agricultural life and had not yet entered urban society. The dispersed population, considerable geographical distance, challenges associated with transportation, and the limited scope of development eventually led to a concentration of activities related to ice and snow in the vicinity of rivers. The distribution of these activities had been characterized by a "point centralization in a small area and dispersal in a large field", resulting in minimal interactions and connections, and a limited impact of the activities. The development of resources in disparate regions was largely autonomous. Ice and snow, being a natural resource rather than a production factor, were constrained by regional conditions and lacked the capacity for independent development. The absence of a more

intricate social interaction and value network hindered the potential for these resources to exert a substantial structural influence on the advancement of the territory and the industry within it.

THE EMERGENCE AND DEVELOPMENT OF ICE AND SNOW CULTURE

Conditions for the Formation and Development of Ice Culture

Ice and snow culture arose in the process of continuous development of resources. After the personification and artistic reconstruction of the natural form of ice and snow, the humanization of nature started to possess cultural connotations (Yue 2019). Special natural geographical conditions and humanistic environments in history were perfect conditions for the emergence of ice and snow culture, giving birth to a kind of valuable cultural heritage for the descendants so that the industry related to ice and snow could take the lead in the economy in the northeastern regions of China.

Harbin, the acknowledged birthplace of modern ice and snow culture in China, is notable for its pioneering use of the term "ice and snow culture" in the late 1980s and early 1990s. Following the construction of the Middle East Railway in 1897, Harbin witnessed a significant influx of foreign immigrants, thereby fostering a cultural exchange between domestic and foreign influences. The large-scale development of ice and snow resources in Harbin commenced in the early 1960s, a period in which activities related to ice and snow were already characterized by professionalism and specialization. The increasing demand for ice led to the evolution of ice harvesting into a formal occupation. The natural ice from ice harvesting became the main source of raw materials for local parks and ceremonies in winter.

Concurrently, the influence of ice and snow culture increased, and the connection between culture and production was more closely integrated. A notable milestone in this trajectory was the inaugural Ice Lantern Exhibition, held with great success in 1963 in Zhaolin Park—a site now widely regarded as the birthplace of ice lantern art and the point of origin for China's modern ice and snow cultural history. Harbin International Ice and Snow Festival was held on January 5th, 1985, retaining some traditional items of the Ice Lantern Exhibition, which became the first local festival in China that used ice and snow as a vehicle through local legislation. The Harbin International Ice and Snow Festival has emerged as a prominent global affair, showcasing a wide array of ice and snow-related cultural expressions on a substantial scale. This festival has contributed to the advancement of various disciplines related to ice and snow, including landscape architecture, culinary arts, cultural traditions, and sporting activities. Presently, the Harbin International Ice and Snow Festival has been recognized as one of the world's four major ice and snow festivals, thereby signifying its global influence and reputation as a world-renowned event.

To promote the innovative development of ice and snow culture, researchers propose to take it as the core of the industry and integrate land, forest, and border features into the ice and snow culture; the fusion of culture and tourism has become the development trend of the industry, and there are also new industrial development modes such as "ice and snow plus culture". On this basis, policies have been introduced to let people benefit from the ice and snow culture, which is conducive to expanding the mass base of participation in ice and snow activities so that people can share the charms thereof.

Content and Classification of Ice and Snow Cultural Heritage

By the Neo-classical "structure-function theory", the integration of cultural and industrial elements gives rise to a novel structure of cultural heritage, which, in turn, becomes a structural heritage capable of allocating resources and exerting influence on the development of the local economy (Zhang & Hou 2020). The concept of structural heritage encompasses three distinct categories: material heritage, institutional heritage, and customary heritage.

The first is material heritage, which mainly refers to ancient cities, towns, and buildings with historical significance. Due to the difficulty in storing ice and snow resources and their seasonal limitations, not such heritage has been formed. Since snow and ice in their natural state do not have an independent structure and layout, they cannot form attractions or scenic spots if they are not developed.

During a long-term practice, ice and snow activities have gradually developed a stable time, place, and content with certain institutional arrangements (Liu 2022), forming the second type of institutional ice and

snow cultural heritage that belongs to the intangible cultural aspect. This type of heritage can be classified into two distinct categories: traditional festivals and rituals. The first is traditional festivals, such as the Ice Lantern Exhibit and the Harbin International Ice and Snow Festival, as previously mentioned. The second is ritual activities, such as ice fishing and ice harvesting in winter.

The third category encompasses customary ice and snow cultural heritage, which refers to food, crafts, and other intangible cultural elements that have been passed down through time, usually with the characteristics of being usable, edible, and observable (Zhang 2020). For instance, food and its processing, production, storage, and other crafts were formed in the ice and snow environment. In terms of craftsmanship, the exhibition includes ice sculptures, ice lanterns, ice architecture, and other landscapes. Ice and snow sports culture can also be included in the above category. The unique Euro-Asian ice and snow culture lays a solid foundation for the development of ice and snow sports culture and industry.

Structural-Functional Analyses of Changes in Ice and Snow Culture

The evolution of ice and snow culture is chiefly exemplified by two interwoven dimensions: resource utilization innovation and artistic function enhancement. In its nascent stage, it exhibited a loose structure and a singular function. However, as resource development practices deepened, a gradual shift in cognitive paradigm occurred, transitioning from a single material attribute to a multi-dimensional value cognition encompassing aesthetic qualities, economic value, and symbols.

This cognitive transformation has created a symbolic interaction mechanism between the subject and the object and promoted the extension of the interaction form from the physical level to the symbolic and ideological levels. This has not only reduced the economic cost but also deepened the communication efficiency. The resulting new "structure-function" system integrates multiple forms, including occupational division of labor, events and exhibitions, ceremonies and festivals, and decorative arts. This system is mainly responsible for recreation and leisure, employment promotion, and the creation of public space. A case study of the Harbin Ice and Snow World shows that the implementation of a strategy involving local cuisine and multi-brand catering not only meets the daily needs of residents but also promotes the development of an industrial cluster for interregional tourists. Ice and snow exhibitions have become a central channel for showcasing cultural significance and industrial progress.

From the perspective of systematic evolution, snow and ice culture has made a triple structural leap: resource development activities have moved from isolation to systematic association, forming a classification system with differentiated functions; individual behaviors have been upgraded to institutionalized practices with collective participation; and the mechanism of transformation of factors of production has promoted the infiltration of ice and snow resources from the field of life to the field of production, leading to the restructuring of the pattern of industrial resource allocation. This structural process marks the completion of the paradigm shift of snow and ice culture from a natural existence to a cultural and economic complex.

THE FORMATION AND DEVELOPMENT OF THE ICE AND SNOW INDUSTRY

Conditions for the Emergence and Development of the Snow and Ice Industry

As the birthplace of Chinese ice and snow culture, Harbin, being rich in these two natural resources, was the first city in China to develop and operate the ice and snow industry, and has now formed an industrial structure with culture, sports, equipment, and tourism as remarkable format. The development of China's ice and snow industry has gone through several stages of evolution. The ice and snow industry started in the 1950s, along with the development of ice and snow sports in northern and northeastern China. In 1963, the first Ice Lantern Exhibit was successfully held in Harbin, which established a culture system centered on the art of ice lanterns, laying the foundation for modern ice and snow culture. Ice and snow festivals have become the key nodes of industrial reconstruction. Under these conditions, the ice and snow equipment industry came into being, and local government actively built the ice and snow industry chain, cultivating independent brands, to make this industry stronger. In 1992, the "Ice and Snow Sightseeing Tour" was listed as the national special tourism product, greatly enhancing the visibility of ice and snow

tourism in Harbin. Industrial structure to the service industry-led transformation, the formation of culture, tourism, and physical integration of the composite economic model. In 1999, Harbin Ice and Snow World was built, and ice lanterns and snow sculptures together form the three pillars of the culture and tourism industry.

At the level of regional synergy development, Harbin leads the construction of the ice and snow industry consortium in the three northeastern provinces in China by optimizing the spatial layout and infrastructure construction, and at the same time links the national ecological tourism resources to create a special ice and snow tourism belt (Zhang, Sun & Fan 2011). The 2022 Beijing Winter Olympic Games have played a pivotal role in propelling the Harbin's economic growth and the establishment of itself into an ice and snow culture capital, which aligns with the vision of "clean water and lush mountain are invaluable assets, and the ice and snow in Heilongjiang are also invaluable assets" stated by China's President Xi Jinping at a congress discussion meeting (E 2016).

Relationship Among Industry, Resources, and Culture

A close and symbiotic relationship exists among resources, culture, and industry. The evolution of resources invariably gives rise to the development of ice and snow culture, and the reciprocal influence of resources and culture is also evident. Consequently, the evolution of the industry must be anchored in cultural foundations. The cultural industry constitutes a significant segment of the ice and snow industry, and the economic benefits derived from this provide a crucial foundation for general cultural advancement. The mounting economic value of culture means that it is difficult to detach from the industry to talk about culture, thus underscoring the necessity for a holistic approach that acknowledges the intertwined nature of these sectors (Li & Zhang 2018).

In the context of social transformation, there has been an increased level of interaction between culture and industry. In addition to their ontological structure, the external and self-generated structures have undergone new changes that differ from those of the past. The concept of structure is inherently linked to a correlation: as cultural and industrial development progresses through various phases, novel interconnections emerge between industrial factors, thereby potentially giving rise to new structural configurations. Cultural resources, as an endogenous production factor, exert a driving effect on industrialization, and cultural heritage with a new "structure-function" can be applied to the original industry. The initial ice and snow festival economic and trade activity was successfully conducted in 1985. More than 160 transaction categories have been successfully negotiated, with a transaction volume of nearly 2 million yuan, thereby significantly contributing to the enhancement of the regional economy (Wang 2005:81-110). In the contemporary era, the evolution of Harbin's ice and snow industry has been characterized by a shift towards more sustainable utilization of natural resources that are unique to the region, whilst also honoring the city's historical and cultural heritage. The Harbin City Culture, Radio, Television and Tourism Bureau has published data indicating that during the ice and snow season from 2024 to 2025, Harbin received a total of 90,357,000 tourists and achieved a tourism revenue of 137.22 billion yuan. This represents an increase of 9.7 per cent and 16.6 percent year-on-year, respectively (Xinhuanet 2025). The evolution of the ice and snow industry has led to a continuous transformation in the structure and function of the ice and snow cultural heritage. This not only promotes the transformation of the industry itself but also drives the development of related industries, forming an endogenous mode of economic development and promoting the benign operation of the local economy. (Lei & Zhang 2021; Li & Zhang 2019).

Structural-Functional Analysis of the Formation and Development of the Ice and Snow Industry

The emergence of the ice and snow industry stems from the sustained exploitation of resources and the progressive enrichment of cultural connotations. Undergoing "structure-function" transformations across historical phases, ice and snow have evolved from agricultural necessities to urban landscapes, transitioned from agrarian to industrial societal contexts, and transformed from natural resources into cultural symbols and production factors. With resource development as the origin and industrial formation as the outcome, culture serves as a structural factor permeating the entire industrial development process. The initial distinct

trajectories of resources, culture, and industry have now achieved a symbiotic coexistence, which is ultimately driving industrial maturation.

The modern transformation of the ice and snow cultural heritage presents multidimensional characteristics. Firstly, its functional attributes have evolved from cultural symbols to tools of political and economic influence, and it has realized a paradigm shift from the interaction of cultural elements to the symbiosis of culture and economics. Secondly, in the spatial dimension, the scope of its radiation breaks through the geographical limitation and forms a globalized influence network. Next, the mechanism of action has undergone a structural transformation, from a passive environmental response to active economic participation, forming a dynamic structural heritage system and deeply restructuring the economic and social structure (Shao & Zhang 2022). Cultural elements have established a systematic connection with production factors through industrialization, and their ontological function has evolved from satisfying the needs of life in agricultural societies to becoming a core component of the integration and development of multi-industries in industrial societies. According to statistical data, by 2025, the aggregate output value of the ice and snow industry is projected to reach 75 billion yuan, constituting over 25% of the province's total output. By 2030, the structure of the ice and snow industry in Harbin is expected to be more optimized, the comprehensive strength will be enhanced, and the total output value of the ice and snow industry will exceed 150 billion yuan, accounting for more than one-third of the province. The industrial structure in Harbin will be further streamlined, with the aggregate output value exceeding 150 billion yuan, accounting for over one-third of the province's total output (Harbin Municipal People's Government 2022). This transformation has not only promoted the extension of the industrial structure to the manufacturing industry and cultural and tourism services, but also restructured the market and consumption system through the process of industrialization, marketization, and globalization, and realized the structural transformation of cultural capital into economic value.

CONCLUSION

The present study focuses on the current state and results of the ice and snow industry, whilst also paying close attention to the changes of "structure-function" in the process of culture and industry formation. The study employs an integrated research paradigm encompassing the interaction of "resource-culture-industry" and attempts to illustrate the dynamic process and action mechanism of the formation and development of the ice and snow industry. The ensuing conclusions are as follows.

Firstly, the formation of the ice and snow industry is the result of a continuous interaction between resources and culture. The development of ice and snow resources is understood to be closely related to the influence of cultural elements, and the continuous development of resources, the continuous enrichment of cultural connotations, and the effective inheritance of cultural heritage together enable the formation and continuous development of the ice and snow industry.

Secondly, the ice and snow cultural heritage is considered to belong to the category of structural heritage. From an external structural perspective, the development of ice and snow cultural heritage has shifted from being primarily driven by external utility to being valued for its inherent economic potential. From an external structural standpoint, it has transitioned from a state of passive adaptation to a more integrated role within modern society. From an internal structural perspective, cultural heritage has moved from being defined by natural resources and cultural symbols to being a structural entity, with its inherent energy, that influences the distribution of resources.

Thirdly, the development of ice and snow culture and industry is stage-specific. The development of resources, cultural formation and industrial development are subject to specific laws, with the 'structure-function' paradigm of heritage often serving as a pivotal catalyst for transformation. Large-scale festivals are of great significance to the development of ice and snow culture and industry, not only as a turning point but also as a result of an embodiment in the cultural and industrial stage of development.

Finally, it is imperative to emphasize the importance of mining the cultural heritage. The transformation of figurative natural resources into cultural symbols with social significance is pivotal in the formation, development and perpetuation of the ice and snow cultural heritage. Industrialization is an effective conduit

through which culture can proactively adapt and integrate into modern society. In the future, it is anticipated that the ice and snow cultural heritage will continue to play an important role as structural heritage. A comprehensive exploration of the cultural heritage, coupled with the continuous infusion of dynamic energy into industrial development, is essential for the revitalization of the local economy and the generation of substantial “hot business opportunities” through the utilization of “cold resources” (Wang 2012). Such an approach ensures the stability and comprehensive scope of industry development.

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