Research on the Strategy of Combining Production and Research of Ice and Snow Culture and Digital Media

Hong Zhang\textsuperscript{1,a} and Wenjing Chen\textsuperscript{2,b}

\textsuperscript{1}School of Harbin Institute of Technology University, Harbin, China
\textsuperscript{2}School of Harbin Institute of Technology University, Harbin, China
\textsuperscript{a}zhangh@hit.edu.cn, \textsuperscript{b}chenwenjing.girl@foxmail.com

Keywords: Digital media, ice and snow culture, industry-research integration

Abstract. As a kind of communication carrier presented by the image of ice and snow art and culture, digital media technology is the worthy of reflection and discussion in the development of ice and snow culture. At present, the major research institutes have carried out a series of research topics in combination with the development trend of the cultural industry, laying a solid theoretical foundation for the development of the ice and snow cultural industry. The cultural image of a city should be easily identifiable and impressive, and digital media technology has reconstructed the cultural image of the city to a certain extent. In the development of the ice and snow industry in the new era, it is not only the integration of technology, art and cultural functions that is pursued, but also the inter-embedding between the human environment, natural resources, and digital technological innovation. Digital technology has transformed the ideographic form of ice and snow art and cultural images, making it more diverse and instant interactive. Therefore, the continuous research of digital technology has promoted the sustainable development of the ice and snow culture industry, and the scientific research of the ice and snow culture industry has also become the driving force for the continuous upgrading of digital media.

1 Introduction

Now we are at an important stage of cultural development. The development of cultural soft power has long been a competitive strategy for countries around the world. On June 6, 2019, the Ministry of Industry and Information Technology of China issued a 5G commercial license, which also means that China has entered the first year of 5G commercialization, and China will carry out a comprehensive strategic deployment at the 5G commercial level. The advent of the 5G era has accelerated the development of computer technology and accelerated the spread of culture between different regions. In 2022, the Beijing Winter Olympics is approaching. The state has repeatedly announced favorable policies and coordinated the resources of all parties to actively participate in the preparations for the Winter Olympics. The ice and snow culture has occupied people's attention with its heterogeneity. Development is also imminent. Only by integrating the development of scientific research and the cultural industry, can the "World of ice and snow" become the "Mountains of wealth".

2 Digital technology research and ice and snow industry promote each other

Ice and snow culture industry and digital media technology research can promote each other. By applying digital media technology to ice and snow cultural works, viewers can experience ice and snow works without obstacles and experience the sensory and emotional information provided by the creators. This interactive process is actually the "re-creation" of cultural works. This "re-creation" process is the process of reconstructing the cultural image in people's cognition. From a certain point of view, the audience's acceptance of ice and snow culture is actually the flow and mutual penetration of cultural awareness between the creator and the audience. Ice and snow culture has multiple definitions: regional factors, economic factors, human factors, digital technology development factors,
etc. It is precisely because of the continuous updating of multi-dimensional factors that the ice and snow industry can develop innovatively. Only by practically solving the problem of the combination of scientific research and cultural industries can we expand the application market of ice and snow culture. The study of art integrates and reconstructs the image of ice and snow culture, and fully explores the new way of survival of the ice and snow culture industry.

On the one hand, the cultural image of traditional ice and snow art has stimulated the development of the ice and snow tourism industry, attracting many tourists to come and experience the scenery of the Northland, thus influencing more funds and promoting the digital construction of ice and snow culture. On the other hand, the continuous updating and iteration of digital technology has broken the restrictions of region, climate and environment, broke through the "ceiling" of the market, accelerated the integration of ice and snow culture with different regions, different ideas and different audiences, and promoted cultural diversity. At the same time, it has stimulated the healthy competition of the ice and snow cultural industries in different regions. Digital technology enables virtual reproduction of ice and snow scenes: the feature of virtual and real fusion increases the immersion of ice and snow art display; the three-dimensional registration feature increases the user's experience of multiple perspectives of ice and snow art; the real-time interaction feature increases the fun in the interactive process. Virtual reality, augmented reality and other technologies have enriched the way of snow and ice culture transmission, and also have more forms of interaction between the audience and the works of snow and snow culture, and the interaction behavior, experience and cultural connotation of different people and works of snow and snow culture. There are differences in understanding, so the audience has also joined the construction of the image of ice and snow culture. The creation of works of ice and snow culture by digital technology will not cause damage to the ecological environment, which will stimulate economic activities to a certain extent, reduce the transitional development of the ecological environment, and reduce the economic expenditure for maintaining the ecological environment, thereby feeding back the development of digital technology.

3 Scientific research contributes to industry and industry feeds back scientific research

From the traditional expression methods to today's digital expression methods, ice and snow cultural works have undergone tremendous changes in the audience's sensory and emotional experiences. Therefore, related scientific research also tends to use digital technology to develop, transform and use ice and snow cultural resources. Especially today's hot virtual reality and augmented reality technologies break the geographical restrictions and use digital technology to improve the efficiency of cultural dissemination. Because people come from different regions, people with different identities have joined the experience and interaction of cultural works, thus reconstructing the image of ice and snow culture. Conversely, ice and snow culture also drives cultural innovation and industrial transformation and upgrading, providing an experimental base for scientific research, and transforming this cold resource into a hot industry that people long for.

3.1 Scientific research technology promotes industrial development

Western aesthetician Hegel once proposed that the two senses of sight and hearing occupy the most important position in people's aesthetic activities. It is not difficult to find that in traditional works of snow and ice culture, the audience recognizes the shape, color, light, shadow, rhythm and melody of snow and ice through instinctual sensory organs. However, the sense organs of the human body are not only sight and hearing, but also smell, touch and taste. The research on digital technology has enriched the sensory experience of ice and snow cultural works. The digitalized snow and ice works can virtually reproduce the snow and ice scenes, not only to experience the snow and ice culture visually and auditory sense, but also to give users different sensory experiences in touch and hearing. This sensory experience will inevitably cause the listener's psychological response. Virtual technology immerses the audience and enters the immersive experience, which makes them emotionally resonate with the cultural works of ice and snow.
Digital technology makes ice-snow culture works more universal, easy to use, and highly efficient in transmission. The audience of ice-snow culture has a variety of characteristics, such as variety and complexity. The creators of ice and snow cultural works are usually customized according to the personal preferences of the audience, so that the audience is more likely to be infected by the work. On the other hand, due to different ages, identities, beliefs and social statuses, the way people experience ice and snow is different. The study of digital technology has enriched the expressions of ice and snow cultural works. For example, children are more likely to accept the visual effects of animation and experience a wonderful snow and ice journey in Frozen; adults prefer ice and snow theme parks, such as "Ice World"; adventurous people like snow Extreme sports; young people are increasingly pursuing sensory stimulation, so the virtual reality market is becoming more and more popular. People want to enjoy the snow and ice landscape of the Northland without traveling. Today's virtual simulation technology can also bring an immersive experience.

The application of digital technology makes the art of ice and snow no longer limited to the visual shaping of the natural world. The creator will reshape the ice and snow art through his own cognition and personal experience. The application of this technology makes the spread of regional culture no longer limited by time and space. Digital technology has changed the perception form, perception mode, perception object and perception scale of ice and snow cultural works, and can also interact with the audience. The process of interaction is actually the audience's "re-creation" of ice and snow cultural works. The audience will interact differently with ice and snow cultural works in their inner cognition, and the emotions generated by the interaction will be mapped in the hearts of each audience, forming different cultural symbols, and gradually constructing a more diverse and inclusive cultural image, thereby promoting The development of the ice and snow industry.

3.2   The ice and snow cultural industry accelerates the transformation of scientific and technological achievements.

Throughout the history of ice and snow culture, people have always maintained the observation and cognition of the ice and snow world, using visual language to record and express their spiritual consciousness. The traditional forms of ice and snow cultural expressions are: ice sculptures, snow sculptures, ice and snow theme parks, ice and snow lanterns, ice and snow buildings, ice and snow amusement facilities, etc. With the continuous expansion of the ice and snow tourism market, modern scientific technologies such as digital media technology, network information technology, 3D technology, and virtual reality have promoted ice and snow culture to continuously form new expression forms in artistic expression and cultural image transmission, and its regional characteristics It has also gradually faded. Some regions with warm climates can also appreciate the charm of ice and snow culture. Ice and snow culture has broken the restrictions of region, climate, environment, time and space, and has a broader prospect for development. The rapid expansion of the cultural industry and the increasing demand for technology have promoted the transformation of scientific and technological achievements into economic and cultural benefits. The “cold resource” of ice and snow tourism is gradually changing to a “hot economy”. The influx of large amounts of funds not only attracts an influx of ice and snow cultural talents, but also promotes a virtuous circle within the industry, which is conducive to eliminating low-level and low-quality products. Relevant facilities with low technological content and insufficient cultural connotation, and sufficient economic resources have also laid a strong foundation for scientific research.

4   Optimization measures for the combination of ice and snow culture with production and research

4.1 Optimization measures at the research stage

In recent years, the state has issued preferential policies many times to upgrade the construction of sports facilities related to the snow and ice industry, revitalize the talents strategy of the snow
and ice industry, increase spending on the training of snow and ice talents, and build intelligent, digital stadiums, multifunctional skating rinks, ice rinks, ice and snow entertainment facilities. The construction also strengthened the maintenance of sports venues. The demand for the ice and snow market in the south is huge, but due to geographical constraints and lack of cold resources, the growth rate of the ice and snow market in the south is slow. It is possible to develop virtual ice and snow art in the south and break through regional restrictions. In terms of talent strategy: Seize the golden age of youth interest training, formulate a national fitness plan, cultivate youth interest in ice and snow sports, and improve related skills in ice and snow sports; strengthen the cultural quality education of ice and snow athletes; establish a digital media research laboratory. To support the upgrading of experimental equipment, increase scientific research funding, and supervise the output of scientific research results consistent with industrialization. With the support of national education, the number of unique ice and snow schools in China has increased from 440 in 2017 to 5,000 now, which shows China's determination to respect the combination of ice and snow industry production and research.

4.2 Optimization measures in the industrialization stage

With the support of digital media technology innovation, expand publicity efforts, multi-platform cooperation, and use different media publicity channels to enhance sharing and reciprocity. It is possible to improve the operation of ice and snow venues through big data technology, use big data technology to layer user groups, and customize personalized ice and snow cultural products for different users. The arrival of the Winter Olympics in 2022 has also promoted the transformation of scientific research technology and industrial transformation. The transformation of science and technology is also a key point and a difficult point. The first is to solve the problem of innovation and the copyright of digital ice and snow works. Scientific research investment must be rewarded and nurtured by the industry in order to form a virtuous circle of mutual promotion of production and research.

5 Conclusion

The 2020 Winter Olympics will be held in China, and the domestic ice and snow market will continue to heat up, which is also a bonus period for the ice and snow culture industry. The ice and snow market is developing rapidly and is becoming increasingly mature. Compared with the traditional ice and snow culture, today's ice and snow cultural works can be said to be another product of the common development of art, science and modern psychology. The infusion of artistic style, digital art, historical culture, and local customs in the ice-snow culture cannot be ignored, and the scientific research of digital media happens to be a powerful starting point for the expansion of the cultural industry. Digital media connects all the emotional elements together, making cultural works more convincing, and increasing the tension of the works to a certain extent. The digital creation of ice and snow art enables ice and snow culture to be presented in virtual space and time, bringing the audience into a more real scene. From the perspective of digital media research, enriching the creative forms of ice and snow culture is conducive to creating more outstanding spiritual products.

Acknowledgments

In this paper, the research was sponsored by the 2018 Heilongjiang Province Philosophy and Social Science Research and Planning Project: Research on the Digital Development of Ice and Snow Culture and Art in Heilongjiang Province (18TYD354).

References

[1] Pumin. Asong of Snow and Ice: With winter sport popularity on the rise, China anticipates a Winter Olympics at home. Beijing Weekly: English version, 2015(29):14-17.
[2] Zhang Rui-lin, Jilin Sport University. Construction of Business Model and Optimization of Industrial Structure of Ice and Snow Sports Industry in China[J]. China Sport Science, 2016.

[3] Liuhong Zang. A Study on the Development Strategy of Ice and Snow Sports Tour[C]//Future Computer Science and Education (ICFCSE), 2011 International Conference on. IEEE, 2011.

[4] Corrocher N, Guerzoni M. Product variety and price strategy in the ski manufacturing industry[J]. Journal of Evolutionary Economics, 2009, 19(4):471-486.

[5] UNEP. Global outlook for ice and snow[J]. 2007.

[6] Liu G, Schulte O. Deep Reinforcement Learning in Ice Hockey for Context-Aware Player Evaluation[C]//Twenty-Seventh International Joint Conference on Artificial Intelligence {IJCAI-18. 2018.

[7] Greer S, Strand D. Cultural Landscapes, Past and Present, and the South Yukon Ice Patches[J]. Arctic, 2012, 65(5):136-152.

[8] Lan L, Bing W. Characteristic Analysis and Development Strategy of Ice and Snow Sports Culture[J]. Journal of Hebei Sport University, 2019.

[9] Dewar K, Meyer D, Li W M. Harbin, lanterns of ice, sculptures of snow[J]. Tourism Management, 2001, 22(5):523-532.