

CHU, Shaoquan. Research on the symbiosis of sports - characteristic towns and digital technology. *Quality in Sport*. 2025;38:58562. eISSN 2450-3118.

<https://doi.org/10.12775/QS.2025.38.58562>

<https://apcz.umk.pl/QS/article/view/58562>

The journal has been 20 points in the Ministry of Higher Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Higher Education and Science of 05.01.2024. No. 32553.

Has a Journal's Unique Identifier: 201398. Scientific disciplines assigned: Economics and finance (Field of social sciences); Management and Quality Sciences (Field of social sciences).

Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 r. Lp. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398.

Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).

© The Authors 2025;

This article is published with open access at Licensee Open Journal Systems of Nicolaus Copernicus University in Torun, Poland

Open Access. This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author (s) and source are credited. This is an open access article licensed under the terms of the Creative Commons Attribution Non commercial license Share alike. (<http://creativecommons.org/licenses/by-nc-sa/4.0/>) which permits unrestricted, non commercial use, distribution and reproduction in any medium, provided the work is properly cited.

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 07.01.2025. Revised: 12.02.2025. Accepted: 14.02.2025 Published: 14.02.2025.

## **Research on the symbiosis of sports-characteristic towns and digital technology**

Shaoquan Chu

College of Physical Education, Chongqing College of International Business and Economics, Chongqing, China

<https://orcid.org/0009-0000-5875-0523>

### **Abstract**

In the digital era, the symbiotic development of sports-characteristic towns and digital technology is an essential means to solve the "bottleneck" of the development of sports characteristic towns. This paper discusses how sports-characteristic towns use digital technology to achieve their breakthroughs and expand the application fields of digital

technology. This paper's research methods use the field survey method and the literature data method to carry out research from the three dimensions of the symbiotic unit, symbiotic mode and symbiotic environment. The study finds the relationship between the symbiotic unit and symbiosis in the symbiotic development of sports-characteristic towns and digital technology and the best symbiotic mode. It proposes to improve the stickiness of sports-characteristic towns and symbiotic Internet units, build an ideal symbiotic model of sports-characteristic towns and the Internet, and enhance the stability of sports-characteristic towns and the symbiotic Internet environment.

**Keywords:** Sports-characteristic towns; Digital technology; Symbiosis theory; Mode; Sport

## **Introduction**

Big data, artificial intelligence, block chain, cloud computing and other new digital technologies are developing rapidly and accelerating their integration into all aspects of the economy and society, and have become an important driving force for the high-quality development of the industrial economy. The accelerated integration of the digital economy with the sports industry based on digital technology has led to the transformation of the sports manufacturing industry into service-oriented manufacturing ( Liu,2021 ), empowering the sports service industry to generate new business models(Shen,2020) and improve the digital governance of the sports industry(Ren,2021), drive the high-quality development of the sports industry and accelerate the progress of the sports industry to a pillar industry (Ren,2020). As a

concrete embodiment of the sports industry, sports-characteristic towns are inextricably linked to the development of digital technology. Nowadays, there are various names for sports-characteristic towns, mainly sports characteristic towns, sports and leisure characteristic towns, sports event towns, sports rehabilitation towns and so on. The concept is also the focus of debate in all circles, but in academic circles, the name and concept proposed by Professor Shen Keyin are more widely accepted. Professor Shen Keyin calls it a "sports town" and defines it as a spatial area with a sports industry as its orientation, integrating culture, health, ecology and science and technology, which is different from the industrial park and administrative division (Shen,2018). On September 27, 2021, China's National Development and Reform Commission and other ten ministries and commissions "Notice on the issuance of the national characteristic town standardized and healthy development guidelines" means that the construction and development of sports characteristic towns gradually high-quality standardized development, so how the Internet and sports characteristic town can be closely linked to achieving standardized development is an urgent problem to be solved at present. Therefore, based on symbiosis theory, this study explores the mechanism and research path of the symbiotic development of sports-characteristic towns and digital technology.

Nowadays, as the interdisciplinary phenomenon becomes more prominent, symbiosis theory has been gradually improved and developed, and is widely used in many fields and is known as a theoretical system with unique logical thinking, resulting in social symbiosis theory, financial symbiosis theory, industrial symbiosis theory and so on. Symbiosis theory generally consists of a symbiotic unit, a symbiotic model and a symbiotic environment, and these three components are important pillars that support the formation of symbiosis.

## **Methods**

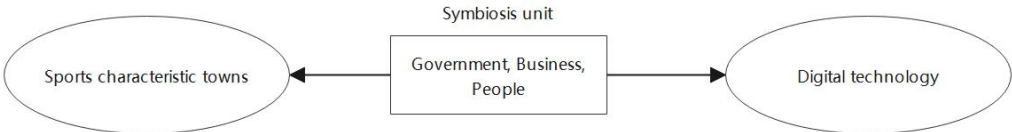
This paper adopts the literature and field survey methods to conduct an in-depth study of sports characteristic towns in some Chinese cities. Using the literature method to analyse the development history of sports characteristic towns at home and abroad, it provides a theoretical reference for how to deepen the connection between sports characteristic towns and digital technology, and at the same time, draws on the experience of successful countries and applies it to its own construction. Using the field survey method, it summarizes the current situation of the development of some sports-characteristic towns, provides a practical

basis for the symbiotic development of sports-characteristic towns and digital technology, and proposes corresponding countermeasures.

**Results**

**A symbiotic unit for sports characteristic towns and digital technology**

Symbiotic units, which constitute the basic unit of material information exchange between symbioses, the stronger the correlation between symbiotic units, the higher the degree of dependence, and the more stable the symbiotic relationship. As shown in Figure 1, the symbiotic development of the sports town and digital technology plays an important role in the transfer and exchange of information and materials between the two through the government, enterprises, the public and other relevant factors. On the government side, the local government provides financial support and policy support for the co-development of sports town and digital technology according to its functions of economic regulation, market supervision, social management and public service, and strives to achieve higher quality, more efficient, fairer and more sustainable modernization of sports town; on the enterprise side, the sports industry, as the most promising and promising sunrise industry at the present stage, and the digital technology industry, plays an important role in the symbiotic development of sports town and digital technology. On the enterprise side, the sports industry is the most promising and promising industry at this stage, and digital technology is becoming more and more perfect, providing important technical support for the high-quality development of the sports town, as well as providing a better direction for the development of enterprises to obtain benefits. According to the current stage of economic development, enterprises provide advanced technical support for the exchange of material information on sports characteristic towns and digital technology, and provide elites in related fields to provide efficient and high-quality guidance and management of sports characteristic towns and digital technology.



**Figure 1. Schematic diagram of the sports characteristic town and internet symbiosis unit**

## A symbiotic model for sports characteristic towns and digital technology

Symbiosis patterns are divided into organisational and behavioural patterns. Within the organisational model, there are point symbiosis, intermittent symbiosis and continuous symbiosis; the behavioural model is divided into parasitism, deviant symbiosis and reciprocal symbiosis (Table 1). Symbiosis mode, also known as a symbiotic relationship, refers to how mutualistic subjects interact and combine. The different symbiotic patterns of the two symbiotic subjects, sports town and digital technology, will also have an impact on both the symbiotic unit and the symbiotic environment. Digital technology, as a more mature technical means, has been playing an important role in the construction of sports characteristic towns in the early stage of publicity and construction of hardware facilities, and digital technology has made a remarkable contribution to the modernization of sports characteristic towns. In the early stages of construction, the town absorbed resources from various sources to strengthen its construction; after the construction of the town was gradually improved, the symbiotic mode of digital technology and the town changed from parasitism to mutual symbiosis. Promoting the sports town to the public and thus earning advertising fees, also greatly enhances the visibility of the sports town.

Table 1. Specific types of behavioural patterns, role characteristics and interactions

	Specific types	Characteristics of action	Interaction
Behavioural patterns	Parasitic	A unidirectional flow of energy; no new energy is generally generated.	Proactive - Reactive
	Preferential symbiosis	Two-way flow of matter and energy; generally beneficial to only one side, but with an increase in total energy.	Proactive - Reactive
	Mutually beneficial	New energy is generated based on	Proactive

co-existence

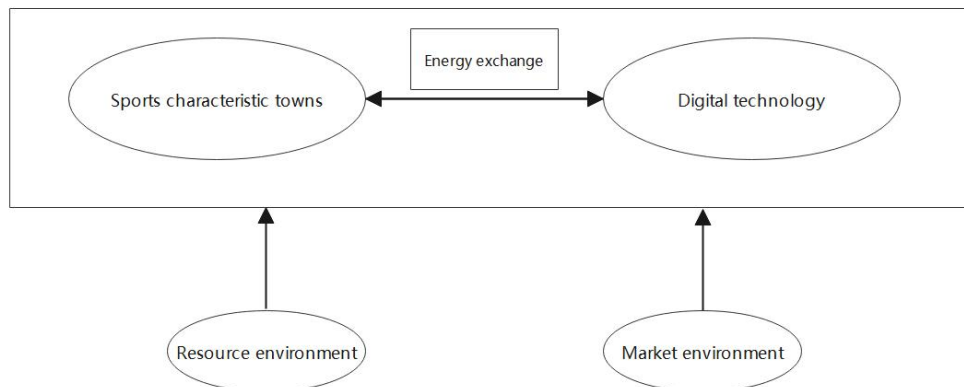
the division of labour and - Active cooperation, and the new energy is more evenly distributed.

---

### **A symbiotic environment for sports characteristic towns and digital technology**

The symbiotic environment is the sum of all external factors that affect the operation of the symbiotic system, such as policy environment, institutional environment, resource environment, market environment, etc. All of them can be part of the symbiotic environment. In order to achieve a mutually beneficial and symbiotic development, the sports town and the digital technology cannot be achieved in isolation from the external environment, as shown in Figure 2. Under the joint guarantee of the resource environment and the market environment, the sports town and the digital technology can achieve the ideal effect of a win-win situation.

In the resource environment, the choice of the construction site of a sports town is combined with the local characteristic environment to form a digital technology sports town with local characteristics. For example, Huizhou City, Guangzhou Province, relies on the 4000 mu vast lake as the ecological core of the landscape and the construction of the White Heron Lake sports and health town, based on environmental resources, industry resources and scientific, industrial operation and management, while building water sports centre, parent-child sports park, outdoor sports base and other ecological leisure projects, to create an ecological, popular "big sports, big health" sports and health town. Health" sports and health characteristics of the town. The construction process is inseparable from the support of digital technology, which uses the sports town as a carrier to highlight the concept of breaking the constraints of time and space. Through the social function, people can communicate with different people about their experience of the town and reflect on the shortcomings of the town's construction to the staff through this function. The shopping function allows staff to recommend the equipment needed to experience the town.



**Figure 2. Schematic diagram of the symbiotic environment of a sports characteristic town and digital technology**

In the market environment, socialism with Chinese characteristics has entered a new era, the main contradiction of China's society has transformed into the contradiction between the people's growing need for a better life and unbalanced and insufficient development, and China's economy has shifted from the stage of high-speed growth to the stage of high-quality development, putting forward higher requirements for the improvement of the socialist market economy system. In May 2020, the State Council of the Central Committee of the Communist Party of China promulgated the Opinions on Accelerating the Improvement of the Socialist Market Economy System in the New Era. Yin Hot Spring, Director of the Institute of Economic System and Management of the National Development and Reform Commission, said: "The Opinions firstly address a focal point by making it clear that direct government allocation of market resources and direct intervention in micro-economic activities should be minimised. It means that the government is required to respect more the laws of the market economy, not to overstep or interfere excessively in the market, and to give full play to market dynamics. Digital technology has been increasing in scale and popularity of digital users under the socialist economic market. Digital technology, with its characteristics of openness, equality, collaboration and sharing, has penetrated into all areas of contemporary social and economic life, providing great convenience for people's daily work, study and life, and playing a positive role in promoting global informatization and economic and social prosperity. Under the socialist market economy system, sports characteristic towns have transformed government functions, allowing enterprises to become real market players and

the main body for allocating resource factors. The construction of sports characteristic town fully embodies the phenomenon of the government being active and the market being effective, with the government proposing relevant policy support and a supervisory role in the construction of sports characteristic town, with enterprises contracting for the construction of sports characteristic town, while providing human, material and financial support.

## **Discussion**

### **Improving the adhesion of symbiotic units**

The town of sports characteristics and digital technology are natural symbiosis, there are many symbiotic units for energy and material exchange between the two, often the more symbiotic units, the more frequent the exchange is, the stickiness is also high, so in order to make the symbiotic units play energy together need to mention to improve the degree of association. To promote the leading role of the government in the symbiotic development of sports special town and digital technology, only by playing a good role in government decision-making can the right path be pointed out for the symbiotic development of sports special town and digital technology. For example, the General Office of the Hunan Provincial People's Government promulgated on 24 November 2020 "Several Opinions on Continuing to Promote the High-Quality Development of Mobile Internet Industry to Accelerate the Strengthening and Expansion of Digital Industry" clearly states that it will promote the digital transformation of agriculture and service industries, accelerate the construction of digital agriculture and rural areas, implement the digital countryside strategy, vigorously develop digital agriculture, encourage the digital transformation of agricultural production, and help promote revitalisation of the countryside. The promulgation of the policy points the way for the symbiotic development of sports characteristic towns and digital technology, and also adds momentum to help revitalise the countryside. The government should also provide the guarantee of human, material and land resources in the process of symbiotic development of sports featured towns and digital technology, while in the process of promoting digital industry, the government should strongly support the training and absorption of relevant talents and the construction of digital facilities, etc., to greatly enhance the stickiness of their symbiotic development.

### **Creating the idealisation of the symbiosis model**



There are various symbiotic development models between sports characteristic towns and digital technology, and the reciprocal symbiotic development model is based on the division of labour and cooperation to generate new energy, with a more even distribution of new energy and a stable symbiotic relationship, so the reciprocal symbiotic model is the best development path for digital technology and sports characteristic towns. In order to achieve mutual symbiosis between the two, it is necessary to take "prosperous industry, ecological livability, civilized countryside, effective governance and affluent living" as the guide to realize the symbiotic development of the two. 1) Prosperous industry is the economic foundation of rural revitalization and the goal of mutual symbiosis between the two. In recent years, the environment for innovation and entrepreneurship in rural areas has been improving, and new industries and new business models have emerged in large numbers, injecting constant vitality into the development of rural industries and providing a good symbiotic environment and atmosphere for the mutual symbiotic development of sports characteristic towns and digital technology. 2) Ecological livability is the environmental foundation for rural revitalization and the basic guideline for the mutual symbiosis of the two. The symbiotic development of sports town and digital technology should be guided by the concept of "green" development, and should firmly implement the concept that green trees and green mountains are golden mountains, and adhere to the green development of sports town and digital technology to add bricks to the construction of rural ecology for the people. For example, Hangzhou Chun'an County Shilin Harbor Sports Town, firmly implement the development concept of "two mountains" theory, actively explore the green development model, adhering to the principle of "big protection, small development", making full use of local resources, while adhering to the The town is committed to the "Two Mountains" theory of development, actively seeking a green development model, adhering to the principle of "big conservation, small development", making full use of local resources, while adhering to the core guiding principle of "conservation is development", and constantly expanding the influence of ecological conservation. This is of great significance to local construction and sustainable development (Zhou, 2020). 3) Rural culture civilization is the cultural foundation of rural revitalization and an important support for the reciprocal and symbiotic development of the two. On the basis of profound cultural heritage, advanced ideas and traditional ideas collide and exchange until they merge, forming an ideological culture with distinctive characteristics, which provides strong support for the symbiotic development of sports

characteristic towns and digital technology in terms of ideology.4) Effective governance is the social foundation of rural revitalization and an important guarantee for the mutually beneficial symbiotic development mode of the two. It is necessary to strengthen and improve the rule of law system to correct errors for the development of sports characteristic towns and promote the healthy and standardized development of sports characteristic towns, such as the Notice on the Issuance of National Guidelines for the Standardized and Healthy Development of Characteristic Towns jointly promulgated by ten departments including the National Development and Reform Commission, the Ministry of Natural Resources and the General Administration of Sports on September 27, 2021 implies higher requirements on the style and shape of characteristic towns, innovation and vitality, etc. (5) Living affluence is the fundamental purpose of rural revitalization, moreover, it is the ultimate outcome of the mutual symbiosis between the two.

### **Enhancing the stability of the symbiotic environment**

The stability of the symbiotic environment, which is the external environment of the symbiosis, determines the fluidity of the energy and information transfer and the durability of the symbiotic mode of the symbiotic unit. On 8 October 2021, the State General Administration of Sports issued the "14th Five-Year Plan for Sports Development", which clearly states that it supports the innovative use of new technologies such as big data, block chain, Internet of Things, cloud computing and artificial intelligence in the field of sports, creates intelligent fitness scenarios and accelerates the development of related products. It fully illustrates the irreversible trend of synergistic development of digital technology and sports industry, and the inevitable result of mutually beneficial symbiotic development of digital technology and sports town. The launch of the policy is not only conducive to strengthening the symbiotic relationship between the two, but also creates a more stable and harmonious environment for the symbiosis of the two. With today's highly developed digital technology, the high popularity of smartphones and the leap forward in people's thinking, and the construction of a mobile platform for sports characteristic towns with digital technology, services such as enquiry routes, online booking experiences, online ticketing and related activities are becoming more and more complete. This is the inevitable result of the

development of the times, which allows people to enjoy the convenience brought by digital technology. The development of the times has brought a strong guarantee to strengthen the stability of the symbiotic environment.

## **Conclusion**

The symbiotic development of sports characteristic towns and digital technology is an unstoppable trend. As an important part of the sports industry, sports characteristic towns are an important carrier for the sports industry to improve its quality. With the support of digital technology, sports characteristic towns are bound to make great breakthroughs in the future, and the application of digital technology in the field of sports will be even better. The convenience of digital technology today will bring a better sporting experience to people. Therefore, the symbiotic development of sports characteristic towns and digital technology will guarantee a quality sports experience for the people.

## **References**

Gu Zhiping. Research on the development strategy of sports characteristic town under the perspective of rural revitalization[J]. Journal of Guangzhou Institute of Sports, 2019, 39(03):58-61.

Zhang Lei. Sports and leisure characteristic town: concept, types and development path[J]. Sports Science, 2018, 38(01):18-26+41.

Hua Zhengwei. Sports town with characteristics: empowerment, integration and optimization of new economic space[J]. Academic Exchange, 2022(02):86-96+191.

Li Long. The realistic observation and development path of symbiotic relationship between national fitness and sports industry[J]. China Sports Science and Technology, 2017, 53(02):93-99.

Liu Zhiyong. Service-oriented manufacturing: A study on the path of high-quality development of China's sporting goods manufacturing industry[J]. Journal of Xi'an Sports College, 2021, 38(1):47-54.

Ren Bo, Huang Haiyan. Theoretical logic, practical dilemma and implementation path of high-quality development of sports industry driven by digital economy[J]. Journal of Shanghai Institute of Sports, 2021, 45(7):22-34.

Ren Bo, Huang Haiyan. Dynamics, mechanisms and models of integration of digital economy and sports industry in China[J]. Studies in Sports, 2020, 34(5):55-66

Si Jingmei. Research on the development of sports industry clusters in China's sports and leisure towns under the perspective of rural revitalization[J]. Journal of Xi'an Sports College, 2021, 38(06):713-718.

Shen Ke-Yin, Kou Mingyu, Wang Jianxun, et al. Value dimensions, scenarios and strategic initiatives for the digitalization of sports services [J]. Sports Studies, 2020, 34(3):53-63.

Shen Keyin, Dong Qinqin. The local exploration and cultivation path of sports characteristic town construction: taking Keqiao Cool Play Town in Zhejiang Province as an example[J]. Journal of Wuhan Institute of Sports 2018, 52(9):25-31.

Wang Wenlong, Cui Jiaqi, Xing Jinming. Synergistic supply of public sports services in new rural communities under the perspective of symbiosis theory[J]. Journal of Physical Education, 2022, 38(02):34-39.

Zhou Jin, Zhong Liping. Small towns with sports characteristics to help rural revitalization: the inner mechanism and development path--an analysis based on four typical cases[J]. Sichuan Sports Science, 2020, 39(04):103-106+128.