Conceptual on constructing a communication mechanism for rowing culture empowered by smart media

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ABSTRACT

This conceptual paper explores the challenges of public perception gaps that limit the dissemination and societal engagement with rowing culture. In addressing these issues, the paper proposes a communication mechanism for rowing culture grounded in the empowerment of smart media technologies. Anchored in the theory of Social Ecology, it presents a four-dimensional integrated model comprising culture, curriculum, community, and smart media. This model aims to facilitate the revitalization of cultural resources, educational inclusion, community engagement, and technological innovation within the context of rowing culture. Rather than reporting empirical findings, this study constructs a theoretical framework that synthesizes insights from cultural capital theory and policy feedback theory. The paper argues that smart media can function as both a dissemination tool and a participatory platform, enabling broader access and cultural sustainability for niche sports like rowing. The conceptual model highlights the dynamic interaction between digital technologies, institutional support, and local communities in building a more inclusive and resilient cultural communication system. It contributes to the academic discourse on sports culture, digital communication, and participatory governance by suggesting an adaptable and scalable framework for empowering marginalized cultural practices through intelligent media ecosystems.

Contribution/ Originality: This study proposes a novel evaluation method based on a four-dimensional integrated model encompassing cultural resources, physical education, community education, and modernization factors. Drawing from social-ecological theory and cultural capital theory, its core contribution lies in identifying pathways through which smart media integration can transform niche sports communication into sustainable, inclusive ecosystems.

1. INTRODUCTION

1.1. Background of Study

The widespread application of smart media technology has opened up new opportunities for the dissemination and cultural continuity of niche sports (Li, 2022). Smart media (including social platforms, video media, AI-driven recommendation systems, etc.) have become key intermediaries for sports cognition, participation, and dissemination. Rowing culture has been confined to niche communities, with cultural continuity disrupted and its social value limited. By constructing a "cultural cognition-behavioral participation" pathway model, this study provides theoretical

support and empirical evidence for the intelligent promotion of sports culture, as well as an experiential framework for digital dissemination strategies for non-mainstream sports.

1.2. Research Questions

This paper is guided by the following questions:

H_1: How does smart media technology change the logic of traditional sports culture communication?

H_2: What are the core obstacles in the current communication of rowing culture?

H_3: How to design a promotable and sustainable rowing culture communication mechanism model?

1.3. Research Significance

This study aims to construct a model of rowing culture dissemination mechanism based on intelligent media empowerment to respond to the current dilemma of traditional sports culture dissemination and expand new perspectives on sports culture dissemination research. By proposing a new paradigm of cultural dissemination mechanisms applicable to the digital dissemination environment, this study helps to construct a cultural dissemination path with contemporary characteristics, enhances the public's, especially young people's, understanding and participation in rowing culture, and promotes its sustainable development.

1.4. Research Methods

This study employs a library research approach, focusing on the collection, analysis, and synthesis of existing literature related to smart media, cultural communication, and rowing culture. The method involves a critical examination of scholarly publications, policy documents, case studies, and theoretical contributions that address the dissemination of marginal sports and the role of digital technologies in cultural empowerment. Through a structured literature review, the study identifies core concepts and constructs a theoretical framework that integrates cultural capital theory and multi-stakeholder collaboration theory.

Although this paper does not include empirical data, it outlines a potential direction for future research, which may adopt a quantitative approach using purposive sampling. The intended sample would include individuals directly involved in rowing culture, such as officers, coaches, referees, student athletes, and professional rowers, to explore their perceptions of smart media engagement and cultural participation.

By anchoring the analysis in scholarly sources and exemplary cases of digital rowing culture promotion, the conceptual model developed in this study aims to offer a theoretical foundation for subsequent empirical investigations and practical applications in policy and community outreach.

2. THEORETICAL FRAMEWORK

2.1. Theoretical Support System

2.1.1. Social-Ecological Theory

Social-Ecological Theory provides a comprehensive framework for understanding the interactions between sports, culture, and community dynamics. It emphasizes the multi-level impacts of sports participation and the integration of sports culture within communities. It is particularly useful in designing interventions to increase youth sports participation and promote sports activities across different social strata. The importance of politics, culture, and sports in shaping sustainable sports environments (Trendafilova & Ziakas, 2022). Participation in sports is influenced by multiple levels: school (the most influential), family, and community. Social ecological theory also considers how social institutions, cultural practices, and social norms influence individual and community well-being, advocating for social justice and sustainability (Takona, 2025). Culture shapes sports behavior and organizations, while social capital promotes participation and network building. Integrating different sociological methods can enhance understanding and cooperation in the field of sports research. Social ecology theory provides a comprehensive

framework for understanding how sports, culture, and the environment interact. It reveals that cultural values, social structures, and environmental factors collectively shape sports participation, development, and well-being, emphasizing the necessity of adopting holistic, collaborative, and sustainable approaches in sports and sports culture.

2.1.2. Cultural Capital Theory

Cultural capital theory explains how social class differences are maintained through the transmission of cultural knowledge, skills, and practices. Sports are both a reflection of social stratification and cultural identity and an important factor in their formation. Rowing can foster a sense of belonging and pride, and participatory sports events bring intangible benefits in terms of social development and human capital. Sports participation reflects physical cultural capital (skills, taste, physical habits), material capital (equipment, membership), and institutionalized capital (qualifications, awards) (Goodall, Morse, & Howard, 2024). Enhancing cultural capital through education, policy, and increased accessibility can increase participation and reduce inequality (Zhang, Shi, Jiang, Xu, & Shah, 2023).

2.2. Independent Variable Analysis

2.2.1. Policy and Cultural Orientation

Intelligent media and sports culture, such as digital platforms and artificial intelligence, are being used to protect and promote sports culture. Relevant initiatives include short video platforms, intelligent campus systems, and resource-sharing models, which are shifting from traditional inheritance to intelligent leadership in cultural dissemination (Yunhao, 2024). Intelligent systems for sports and cultural centers (Luo, 2022).

With cultural resources and characteristics as its core attraction (Chen, Wang, Sun, Ye, & Zhang, 2023), intelligent media communication has been clearly identified as a strategic focal point for cultural promotion. Efforts should be made to accelerate the development of digital sports and enhance the communication power of intelligent sports, and sports organizations and platform companies should be encouraged to work together to create an online communication matrix. Closely integrate intelligent media technology with sports culture (Yunhao, 2024) using interdisciplinary approaches to promote new knowledge, intercultural understanding, harmony, and cooperation (Zhang et al., 2023).

2.2.2. Intelligent Teaching

Artificial intelligence improves learning outcomes. New intelligent media technologies accelerate the realization of sports culture promotion, which has important practical significance for development (Yunhao, 2024). Precise targeting of potential sports users through tag dissemination, community management, and short video marketing (Wang et al., 2024). Education plays a certain role (Kumar, Singh, Sharm, & Arora, 2023). Students' cultural and background differences are applied in teaching in a variety of ways. Enabling students to utilize various learning resources for further study reduces individual differences and cultural background differences among students, and promotes a broader background and mutual integration of physical education, human movement, and games. The use of AR as an educational tool has been the focus of recent research, and the gamification of teaching can enhance students' learning experiences.

2.2.3. Social Organizations

Social media platforms offer fans new ways to interact with sports clubs and athletes. The motivations for interaction include obtaining information, entertainment, personal identity, and empowerment through self-presentation (Ramon & Rojas-Torrijos, 2022). When individuals feel empowered, they are more likely to actively participate in community activities and contribute to social development and cohesion (Nordin, Jamal, Hussin, Abdullah, & Saadun, 2023). Distinguishing oneself from lower classes through these activities (Goodall et al., 2024). Community sports activities and traditional sports competitions promote cooperation and friendship among

neighbors, enhancing community cohesion and centripetal force (Orphanidou, Efthymiou, & Panayiotou, 2024). The importance of new media in sports communication and education. Athletes and organizations can use social media to raise their profile and interact with fans, thereby fostering a sense of community and belonging. This also attracts potential sponsors and volunteers (Herli & Tjahjadi, 2022).

2.2.4. Intelligent Media Empowerment

The most influential countries and gaps in the field of artificial intelligence education and cultural promotion research (Kumar et al., 2023). While ensuring the integrity of sports culture, integrate modern science and technology. How smart communities can use technology to achieve social empowerment and sustainable development. Modern urban concepts and ideal recreational activities promote sports culture. Smart media (Yunhao, 2024). Develop distinctive projects such as sports IP, smart sports events, sports culture, and tourism. Maintain cultural diversity and promote unity and cooperation (Soori, Arezoo, & Dastres, 2023). Online platforms can serve as repositories for training resources, best practices, and success stories, enabling rowing organizations to learn from each other and adapt to changing circumstances. Digital platforms can facilitate communication and collaboration among stakeholders, enabling rowing clubs to share information effectively and efficiently (Mrindoko & Issa, 2023).

2.2.5. Summary

The current rowing culture faces multiple development challenges: cultural content has not been effectively transformed into educational resources, remaining at the surface level of dissemination; educational programs lack the necessary cultural foundation and practical platforms, making it difficult to engage students deeply; and the weakening of community organizations has led to the loss of grassroots support for rowing culture, trapping it in a self-perpetuating "small circle." Based on theories of collaborative governance and cultural reproduction, this paper proposes to address these issues by focusing on cultural resources. Starting from the three elements of physical education and community participation, this study explores the impact of their integration mechanism on the sustainable development of rowing culture. Existing research has largely overlooked the role of digital platforms in the dissemination of rowing culture, particularly their potential in participant mobilization, community building, and event promotion. Therefore, further analysis of how social media enhances communication and participation within the rowing community is crucial for understanding the evolutionary path of its cultural system.

2.3. Model Construction Logic

Combining theoretical analysis and current situation diagnosis, the model takes "smart media empowerment" as its starting point and builds a complete communication loop around four levels, aiming to enhance the awareness, participation, and sustainable communication capabilities of rowing culture.
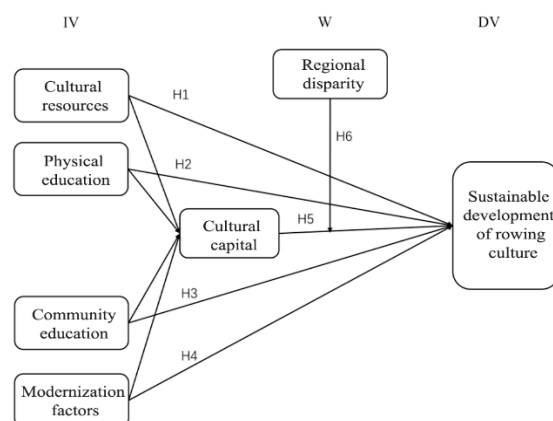

Figure 1. An integrated model for empowering rowing culture communication through smart media.

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Based on cultural capital theory and policy feedback theory, this study constructed a model for the sustainable development of rowing culture (Figure 1). The model is based on cultural resource endowments, driven by smart media technology. Table 1 presents the relationship between various dimensions and the pathways and policies for wisdom empowerment within the model's framework. Regulated by policy, it breaks through traditional communication barriers through four-dimensional synergy. Its feasibility has been fully verified in local practice.

Table 1. Core dimensions and mechanisms of the model.

Dimension	Core elements	Intelligent media empowerment pathway	Policy adjustment cases
Revitalization of cultural resources	Traditional values/Historical heritage	AR recreates ancient canal rowing scenes	Shanghai's "One River, One River" cultural regulations support the digitization of waterborne cultural heritage.
Course design innovation course	Experiential learning/Practical training	VR simulator teaching + AI motion capture correction	The Education Bureau of Shenyang Hunnan District has included rowing in the elective physical education curriculum for primary and secondary schools.
Community collaboration	Public awareness/Social organization collaboration	Social media viral marketing	The Chinese rowing association's "three-year action plan for rowing in communities" provides funding and venue support.
Intelligent media technology-driven	Data visualization/Immersive communication	Real-time NFC event analysis + generative AI multilingual commentary	The Hangzhou Asian Games Organizing Committee's "Smart Event Guidelines" require the provision of accessible viewing services.

3. DISCUSSION

3.1. The Current State of Rowing in China

Rowing, as a visually dynamic and culturally rich sport, has lagged significantly behind in its dissemination on China's smart media platforms, with the public's perception of it still stuck in the stereotypes of "high-end competition" or "obscure sport." Technology is creating smart cultural tourism, smart events, and smart teaching systems (Yunhao, 2024).

By 2024, the annual average viewership for content related to "basketball," "soccer," and 'skateboarding' on the Douyin and Weibo platforms will exceed 12 billion, 9.6 billion, and 1.2 billion views, respectively, while the total viewership for content related to "rowing" will remain below 140 million views. This disparity indicates that the dissemination of rowing culture has failed to effectively integrate into the mainstream logic of smart media, resulting in sparse content presentation and extremely low public awareness. This suggests that the cultural empowerment roles of traditional and digital media have not yet been fully realized. In terms of national-level competitions, the 2024 National Rowing Championships featured 23 teams and 911 participants.

Rowing has become increasingly popular in China, with Shanghai and Shenyang leading the way. By 2022, the number of rowing enthusiasts in Shenyang had exceeded 40,000, with teenagers forming the main contingent. In Hunnan District alone, nearly 40 primary and secondary schools have introduced rowing programs and formed rowing teams.

In 2023, Shenyang plans to host 390 rowing-themed cultural events, driving revenue from rowing-related tourist attractions to exceed 10 million yuan (approximately 1.41 million USD). Currently, 41 primary and secondary schools across the city have introduced rowing courses.

3.2. The Depth of Specialization and Breadth Limitations of Institutionalized Communication

The rapid development of technology has enabled people to access all information on the Internet without restrictions based on national borders or time zones (Basir, Ismail, Othman, & Hassan, 2021). Promote sports participation and infrastructure development through public-private partnerships with sponsors and organizations (Zhang et al., 2023). Sports analytics and digital platforms improve training and resource allocation. Sports networks, conferences, and knowledge sharing can share proven efficiency and productivity strategies. These measures will help athletes, supporters, and Chinese sports development authorities (Cui, Ma, Tao, & Zhang, 2022).

Institutionalized communication entities in Chinese rowing, such as the Chinese Rowing Association and university rowing clubs, have established a vertical communication system based on their authoritative content and technical expertise. However, they face significant bottlenecks in reaching the general public.

The official website of the Chinese Rowing Association has launched a "Resource Library" section, uploading textbooks such as the "Rowing Referee Training Manual" and the "Youth Training Guidelines," as well as over 200 professional videos, including recordings of International Rowing Federation championships and lectures on physical training. Such content has become a core learning resource for coaches and athletes, but access by ordinary users accounts for less than 15% of the total. The association's WeChat official account (China_Rowing) provides live text and image coverage of domestic events, such as the 2024 "Run, Youth!" Taiyuan Station event, which released training data comparison charts and paddle frequency curve analyses, precisely serving the families of participating youth. However, the average readership of these posts is only 3,000-5,000, significantly lagging behind general sports accounts. The Xi'an Jiaotong University Rowing Culture Study Camp collaborated with 13 universities to offer online courses on "Rowing Technology History" and "Sports Biomechanics," with a pass rate of 92% among participants. However, these courses are only accessible to camp participants and are not open to the public.

Associations and universities have overly focused on closed platforms such as WeChat and official websites. Official WeChat accounts only repost text updates and have not integrated short video resources. Institutional content is concentrated on technical explanations and performance reports, lacking in the exploration of humanistic stories. In contrast, the series of short videos created by self-media platforms invited by Shangrao City, titled "Olympic Champions and Local Rowers" (with over 2 million views on Douyin), had an average view count for rowing training vlogs posted by university clubs that was less than 8,000. Xi'an Jiaotong University's live stream of the "Baohe Dragon Boat Race" event attracted 10,500 views, but it did not include interactive features like chat streams or challenge topics, limiting user engagement to mere viewing. Meanwhile, the concurrent Douyin topic "Land Rowing Challenge" (where users uploaded videos of themselves rowing at home) surpassed 120 million views.

3.3. Innovative Practices in Smart Media Communication for Chinese Rowing

3.3.1. Event Comparison

As shown in Table 2, the comparison between the Shanghai and Shenyang events reveals that, for the first time, the Shanghai event integrated NFC scanning with a real-time data visualization system, allowing spectators to access professional parameters such as stroke rate, pace, and wind speed via their mobile devices. Combined with AI commentary to lower the barrier to understanding, this enabled even novices to grasp the intricacies of the sport in just one minute. Short videos of the event have accumulated over 500,000 views on Douyin and WeChat Video, with the "Half Marathon Suzhou River Rowing" topic generating over 24,000 interactions. In 2025, the Suzhou River will pilot regular water sports (rowing, paddleboarding, dragon boat racing), with an expected annual service capacity of over 100,000 people, catalyzing a "one river, multiple points" industrial network (Morning Post, 2025). The Shenyang event centers on the Hun River, dubbed "China's most beautiful urban calm-water course," to reinforce the city's "course aesthetics" image. Breaking free from the "elite niche" limitation: In the Suzhou River event, 15-year-old teenagers competed alongside 60-year-old enthusiasts, shifting rowing promotion from performance-oriented to a cultural experience embraced by "urban explorers."

Oxford and Cambridge Universities in the UK not only rely on campus education to preserve rowing traditions but also integrate them with community rowing festivals, museum narratives, and BBC documentaries; Melbourne, Australia, has institutionalized the integration of youth water education, urban water management, and community club systems, forming a "public cultural ecosystem." Through online live streaming, event broadcasts, interactive quizzes, and virtual experiences (such as VR rowing simulators), smart media has expanded public participation pathways with "low barriers to entry and high immersion." The UK's "Go Row Indoor" project is a successful example: users can participate in virtual rowing events online and compete in real-time with physical venues, significantly increasing public engagement.

Improve learning experiences related to tourism and cultural heritage by creating fun within the gaming process. Developing a rowing simulation game using VR (Shoib et al., 2020). Short videos are popular among people of all ages (Yunhao, 2024), and sports-related short videos that introduce historical development, rule explanations, and highlights are highly favored on short video platforms for their "storytelling," "localization," and "character-driven" content. Preserving culture through digital means while optimizing sustainable development through the management and respect of heritage.

Table 2. Comparison of smart media communication strategies for the sea and Shenyang rowing events.

Dimension	Shanghai Rowing Open	Shenyang rowing open
Core technology application	NFC digital smart viewing platform, real-time data visualization	Drone aerial photography, cultural and tourism AR guided tours
Communication matrix	Mainstream media, social media, and cross-border tax refund scenarios	Cultural and tourism special report + athlete social media viral marketing
User interaction mode	Scan to interpret tactics, joint ticket consumption, night economy market	Cultural check-ins, folk customs experiences, and live streaming of delicious food
Economic multiplier effect	Peripheral consumption increased by 42%, and passenger flow increased by 43.7%.	Bathhouse/barbecue business traffic increased by 30%.

3.3.2. Feasibility of the Model

Smart media technology has redefined the communication mechanisms of rowing culture through data visualization, immersive scenarios, and shared meaning. Empirical evidence from Shanghai and Shenyang indicates that the Suzhou River's digital intelligence platform must be integrated with urban consumption scenarios to unlock the closed-loop value of "sports-driven economic conversion." Shenyang's transformation of industrial waterways into symbols of "still water aesthetics" demonstrates that local culture is the core driving force for breaking through cultural boundaries. Future exploration should focus on directions such as VR/AR virtual tracks and generative AI personalized commentary to advance rowing communication from "information transmission" toward "relationship building."

As shown in Table 3, local governments provide basic support for empowering smart media through institutional provision (such as subsidies for cultural digitization) and scenario opening (such as the renovation of waterfront spaces), while technological iteration accelerates the conversion of cultural value.

Table 3. The practical effectiveness of policy and technology coordination.

Policy instruments	Intelligent media technology	Efficiency improvement
Cultural heritage digitization project	R scene reproduction + blockchain rights confirmation	Viewership of historical footage of rowing on the Suzhou River increases by 300%.
Sports and education integration subsidy	VR training systems enter schools	Participation in youth rowing increases by 15% annually.
Community sports facility standards	Mini program appointment + AI coach guidance	The reuse rate of community rowing clubs rose from 41% to 67%.

3.3.3. The Theoretical and Practical Value of Integrating Models

This model aims to increase cultural capital and achieves three breakthroughs through smart media technology: from the perspective of resource accessibility, it transforms closed professional knowledge (such as rowing technical manuals) into short videos/interactive games; from the perspective of participatory inclusiveness, under policy protection, the Shenyang Hunhe AR tour allows low-income groups to enjoy cultural experiences free of charge; from the perspective of development sustainability, the Hangzhou Qiantang River case demonstrates that the smart media-driven "event training consumption" closed-loop can reduce operational costs by 32%.

In the current context where cultural heritage faces generational gaps and sports communication encounters social barriers, this model provides a measurable, replicable, and adjustable development framework for rowing culture. Its core value lies in revealing that only by deeply embedding technology-enabled solutions into the institutional environment of policy design can the modern transformation of traditional cultural resources be achieved.

4. CONCLUSION

This study is the first to systematically integrate the Technology Acceptance Model, Participatory Culture Theory, Cultural Reproduction Theory, and Communication Mechanism Model, thereby expanding the theoretical boundaries of sports culture communication research. The constructed communication mechanism model demonstrates strong operability, scalability, and replicability; it provides implementable communication strategies for governments, universities, platforms, and content creators, offering practical pathways and policy references for the promotion of rowing culture and the digital transformation of traditional sports culture. In the future, with the development of technologies such as artificial intelligence and data mining, this model can also provide new communication practice guidelines for fields such as cultural governance, brand building, and youth education, demonstrating the vast potential for the integration and development of intelligent communication technology in the humanities.

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