



Research on the Innovative Development Model of Leisure Sports Organizations Driven by Digital Literacy

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Abstract

Background and Aim: Digitalization has emerged as a major driver of innovation within the contemporary sports industry, particularly in the leisure sports sector. As organizations increasingly adopt digital technologies to enhance operational efficiency and service quality, digital literacy has become a critical factor in supporting organizational transformation and competitiveness. This study aims to examine the extent to which digital literacy drives organizational innovation in leisure sports organizations and to explore its role as a strategic organizational capability within the digital transformation process.

Materials and Methods: This study employed a mixed-methods research design. Qualitative data were collected through expert interviews and case studies to develop a conceptual framework for digital literacy and organizational innovation. Subsequently, quantitative data were obtained from 286 employees and managers across 48 leisure sports organizations through a large-scale survey. The study integrated the Technology Acceptance Model (TAM), Resource-Based View (RBV), and Open Innovation Theory to construct and validate the conceptual framework. Structural Equation Modeling (SEM) was applied to analyze the relationships between digital literacy, organizational innovation, and competitive advantage.

Results: The findings indicate that digital literacy significantly enhances organizational innovation, integration capability, and sustainable competitive advantage within leisure sports organizations. Quantitative analysis confirmed positive relationships between digital literacy and innovation performance, while qualitative findings revealed several challenges, including generational digital skill gaps, uneven implementation of digital strategies, and insufficient structured transformation programs. The study reconceptualizes digital literacy from an individual competency into a strategic organizational capability that supports digital transformation and long-term innovation in the leisure sports industry.

Conclusion: This study highlights the importance of digital literacy as a core organizational capability rather than merely an individual skill set. By integrating technological readiness, organizational resources, and innovation strategies, the research provides a comprehensive framework for guiding digital transformation in leisure sports organizations. The findings offer practical implications for policymakers, managers, and industry practitioners in developing training programs, strategic planning initiatives, and collaborative innovation systems to support sustainable growth and competitiveness in the digital sports economy.

Keywords: Digital Literacy; Leisure Sports; Organizational Innovation

Introduction

1. Significance of the Study

In the era of digital transformation, information technology is deeply reshaping social structures, economic models, and organizational behavior across sectors. The leisure sports industry, once traditionally rooted in physical space and interpersonal interaction, is now rapidly adapting to digital innovations. In this context, digital literacy—the ability to effectively acquire, process, evaluate, and utilize digital information—has emerged as a foundational competency for both individuals and organizations (Gilster, 1997; Bawden, 2008; Choi & Kim, 2023). Consider the unique aspects of Chinese social media and influencer marketing when developing a digital strategy. Explore opportunities in sectors like healthcare, education, and finance, which are seeing significant digital transformation in China.

Digital literacy is not merely a personal skillset but a critical driver of institutional innovation, strategic management, and service transformation. As the leisure sports industry undergoes a digital metamorphosis, enhancing digital literacy within organizations can serve as a strategic lever to improve competitiveness, service quality, and sustainable development (Guo, 2024).



2. Real-World Problems Addressed Despite the sector's potential, many leisure sports organizations face serious challenges during digital transformation. These include a lack of technical know-how, inefficient digital infrastructures, fragmented user engagement channels, and resistance to change among employees due to limited digital competencies (Jenkins et al., 2020; Duggan & Smith, 2023). In China, where the leisure sports industry is growing rapidly, these challenges are compounded by uneven digital literacy levels among practitioners and varying degrees of technological integration across regions and organizational scales (Guo, 2024). Consequently, organizations struggle with innovation fatigue, low customer retention, and ineffective operational models. This study seeks to directly address these pain points by developing a digital literacy-driven innovation model for leisure sports organizations.

3. Current Research Landscape

Research on digital literacy has matured significantly over the past two decades. Scholars have expanded the definition beyond technical skill to include critical thinking, media interpretation, online communication, and ethical digital behavior (Andretta, 2020; Hobbs & Jensen, 2021). In parallel, literature in the field of sports management has explored the implications of digitization in fitness tracking, virtual training, e-sports, and customer engagement (Pellegrini et al., 2020). Domestically, researchers have begun to recognize the transformative value of digital literacy in the leisure sports sector (Jiang Yabin et al., 2022; Lin Zhiqin, 2024), with studies exploring how digital tools such as AI, VR, and online platforms can enrich service offerings and improve market competitiveness.

Despite growing scholarly interest, three major gaps remain. First, existing studies often isolate digital literacy as an individual attribute, failing to conceptualize it as a systemic capability that drives organizational innovation (Bodolica et al., 2020; Smith & Brown, 2024). Second, empirical studies specifically examining how digital literacy enhances the performance and transformation of leisure sports organizations are still scarce, especially in the Chinese context (黄海燕, 2022). Third, while global research has focused on macro-level impacts or case studies from developed economies, there is a lack of context-sensitive models that reflect the industrial structure, policy environment, and user characteristics in developing economies like China (Radovanović et al., 2020).

4. Research Objectives, Scope, and Limitations

The objective of this study is to construct and validate an innovative development model for leisure sports organizations driven by digital literacy. The study covers five thematic areas: (1) the impact of digital literacy on organizational innovation, (2) collaborative models among upstream and downstream stakeholders in the leisure sports value chain, (3) emerging trends in technology integration, (4) practical strategies for overcoming digital transformation challenges, and (5) policy recommendations for sustainable industry growth.

The research is scoped geographically within China but draws upon international perspectives for comparative analysis. Methodologically, it uses a mixed-method approach including expert interviews, questionnaire surveys, and case studies. One limitation is that the rapidly evolving nature of digital technologies may render specific strategies time-sensitive. Another is the generalizability of findings beyond the Chinese context, which requires further validation in different national or organizational settings.

This study contributes to both theory and practice. Theoretically, it extends the concept of digital literacy from an individual competency to an organizational capability. It bridges gaps between digital literacy theory and leisure sports management by proposing an integrated innovation framework. Practically, it offers concrete strategies for enhancing digital literacy, optimizing internal operations, and improving customer engagement in leisure sports organizations. The proposed model and findings are expected to provide a foundation for future research and a blueprint for policymakers, practitioners, and educators seeking to promote innovation in the digital era.

Research Objectives



This study aims to construct an innovative development model for leisure sports organizations driven by digital literacy. Specifically, it seeks to address current gaps in research and practice by investigating how digital literacy influences organizational transformation, stakeholder collaboration, and sustainable innovation. The specific research objectives are as follows:

1. To examine how digital literacy plays a key role in innovation and operational performance in leisure sports organizations.
2. To identify the practical challenges and barriers that leisure sports organizations face during digital transformation and organizational structures, particularly in the Chinese context, and how digital literacy can overcome these issues.
3. To assess the current level and structure, assess the digital capabilities of different actors, and analyze their influence on user engagement and service satisfaction.
4. To propose a digital literacy-driven innovation model tailored to personnel development and organizational strategies to support sustainable innovation and competitiveness.
5. To explore collaborative development strategies along the value chain of the sports and recreation industry and study how digital literacy can facilitate collaboration between upstream and downstream organizations.
6. To propose policy and management recommendations.

Based on the empirical findings, evidence-based recommendations are provided to improve digital literacy training systems and enhance digital operations.

Literature Review

AI-powered recreational sports applications offer exciting opportunities to enhance recreational activities and improve the overall experience of the participants. Here are some ideas and tips for personal coaching and training: AI can analyze working patterns and techniques, and provide health and performance advantages to individuals across different sports. It can benefit exercisers by providing personalized feedback and customizable training plans to help them improve their skills.

1. Digital Literacy: Definitions and Evolution

Digital literacy has undergone a significant conceptual evolution since Gilster (1997) first introduced it as the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers. Bawden (2008) later expanded the definition to include not only technical skills but also cognitive and ethical dimensions, such as information evaluation, media literacy, and digital citizenship. More recently, Andretta (2020) and Hobbs and Jensen (2021) emphasized that digital literacy also involves critical thinking, collaborative learning, and responsible participation in digital environments.

Information literacy: the ability to locate, evaluate, and effectively use information (Sundar & Marathe, 2022), Media literacy: understanding and analyzing media content critically (Hobbs & Jensen, 2021), Technical literacy: operational knowledge of digital tools and platforms (Jenkins et al., 2020), Digital communication: effective and ethical participation in online communities (Duggan & Smith, 2023). Choi and Kim (2023) and Smith and Brown (2024) highlight that high levels of digital literacy are linked to improved employability, innovation potential, and adaptive capacity in organizations.

2. Application of Digital Literacy in Leisure Sports Organizations

The integration of digital literacy into the management and service delivery of leisure sports organizations has attracted increasing scholarly attention. Domestically, Jiang Yabin et al (2022) and Lin Zhiqin (2024) demonstrated that organizations with stronger digital capacities tend to perform better in marketing, operations, and customer experience. Technologies such as big data analytics, AI-driven personalization, and digital fitness platforms have revolutionized the delivery of leisure sports, enabling tailored services and expanded market reach.

Internationally, Pellegrini et al. (2020) and Bodolica et al. (2020) observed similar trends in Europe and the Middle East, where sports organizations leverage digital tools for customer acquisition, performance tracking, and fan engagement. The application of VR and AR technologies in virtual fitness

and immersive sports experiences further illustrates how digital literacy is central to innovation in this sector.

3. Value Chain Collaboration and Digital Innovation

Innovation in leisure sports organizations is increasingly dependent on collaboration along the industry value chain. According to Radovanović et al. (2020), effective integration of upstream suppliers, platform providers, and downstream service entities can accelerate technological adoption and service innovation. In China, Guo (2024) notes that coordination among equipment manufacturers, digital service firms, and venue operators is crucial to sustaining innovation and addressing fragmented operations.

However, current collaboration models often lack strategic alignment due to differing levels of digital competence across entities. Research by Huang Haiyan (2022) points out that while many firms have adopted digital tools independently, cross-enterprise integration is weak, leading to inefficiencies and redundant investment. This study responds by investigating how shared digital literacy across organizations can foster cooperation, knowledge exchange, and joint innovation.

4. Gaps in the Existing Literature

Although scholars have examined digital transformation and digital literacy in isolation, their intersection within the leisure sports industry remains underexplored. Key research gaps include:

Lack of empirical studies on organizational-level digital literacy: Most research focuses on individuals or educational institutions (Andretta, 2020; Radovanović et al., 2020), overlooking how digital competencies shape organizational innovation.

Insufficient context-specific models: Much of the international research derives from Western economies (Pellegrini et al., 2020), with limited attention to the policy, cultural, and infrastructural context of China's leisure sports industry. Limited investigation into value chain integration: Existing studies rarely address how digital literacy facilitates inter-organizational coordination in complex industry ecosystems (Guo, 2024).

5. Contribution of This Study to the Literature

This study contributes to the literature in three ways: It redefines digital literacy as an enabler of organizational innovation, extending beyond personal competence. It introduces a context-sensitive innovation model for Chinese leisure sports organizations, integrating local institutional and market characteristics. It offers a new framework for analyzing how digital literacy promotes collaboration along the leisure sports value chain, filling a key gap in both national and international research.

Conceptual Framework

The conceptual framework of this study is designed to explain how digital literacy acts as a strategic driver for innovation and transformation within leisure sports organizations. It integrates core theoretical concepts from digital literacy studies, innovation management, and organizational behavior, forming a holistic model that addresses both internal and external dimensions of organizational development.

1. Core Constructs of the Framework

(1) Digital Literacy

Digital literacy is positioned as the independent variable and foundational capability influencing multiple domains of organizational performance. It is conceptualized along three dimensions.

① Technical Competency: The ability to operate digital tools and systems efficiently. Information and Media Literacy: The capacity to access, evaluate, and apply digital content critically and ethically. Strategic Application: The ability to integrate digital knowledge into decision-making, innovation, and stakeholder engagement (Bawden, 2008; Choi & Kim, 2023).

(2) Organizational Innovation

As a mediating construct, organizational innovation reflects how digital literacy translates into: New product or service development, Operational efficiency improvements, Marketing transformation and customer personalization, Data-driven decision-making (Gibson et al., 2021; Bodolica et al., 2020). Collaborative Integration across the Value Chain

Digital literacy also affects external collaboration, such as:

Supplier and partner integration, Information-sharing platforms, Joint ventures and innovation alliances in the leisure sports ecosystem (Guo, 2024; Pellegrini et al., 2020).

(4) Sustainable Competitive Advantage

The dependent variable of the framework is the organization's long-term competitiveness, reflected in:

Enhanced user experience and digital service quality, Brand differentiation and market positioning, Talent retention and adaptive capacity (Smith & Brown, 2024; Radovanović et al., 2020).

2. Hypothetical Relationships

H1: Higher levels of digital literacy among staff and leaders positively influence organizational innovation.

H2: Organizational innovation mediates the relationship between digital literacy and competitiveness.

H3: Digital literacy facilitates more effective upstream–downstream cooperation in the value chain.

H4: The integration of digital innovation and collaboration drives sustainable competitive advantage.

3. Visual Representation

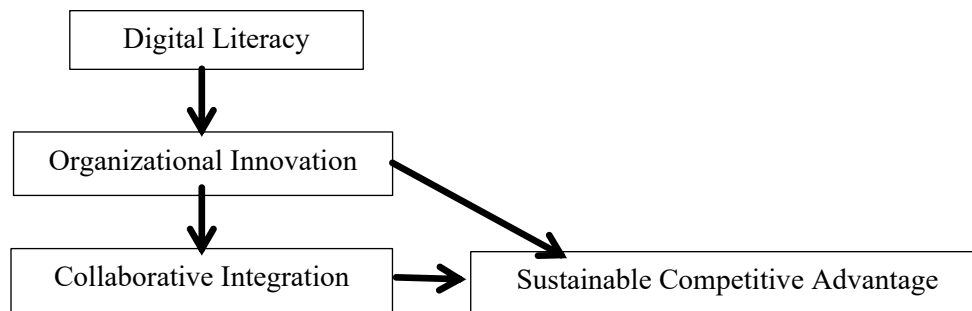
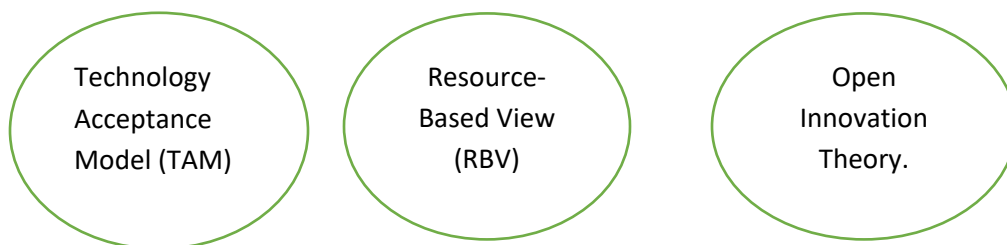


Figure 1 Direct and indirect ways in which digital literacy changes the organization of leisure sports
This diagram reflects both the direct and indirect pathways through which digital literacy transforms leisure sports organizations.

Here are some ideas for visually summarizing key points related to digital literacy and organizational innovation: Create a table with the following columns: digital literacy skills, organizational benefits, innovation outcomes; rows might include topics such as data analytics capabilities, digital collaboration tools, awareness of emerging technologies, cybersecurity literacy, and digital creation. Design a concept map using “digital literacy” as the central node, expanding to: Data literacy skills, digital communication, critical thinking, and innovation, then connect these to organizational outcomes such as better decision-making, faster product development, and improved customer experience, New business models, and Operational efficiency. Develop a circle diagram that shows how digital literacy impacts innovation: Digital skills acquisition, technology adoption process, improves product ideas, market expansion, competitive advantage, and additional to digital investment.

4. Theoretical Foundations

Technology Acceptance Model (TAM) – which explains how users adopt technology (Davis, 1989), Resource-Based View (RBV) – viewing digital literacy as a strategic intangible asset (Barney, 1991), Open Innovation Theory – emphasizing external collaboration for value co-creation (Chesbrough, 2006).





The Technology Acceptance Model (TAM) is a widely used framework for understanding how users accept and use new technologies. It is not far-fetched and requires a clear understanding of the technology. Some key concepts and tips related to TAM are as follows: Perceived Benefits: Focus on demonstrating the positive practical benefits of the technology to potential users who are changing society. Emphasize how technology can improve productivity, efficiency, and overall performance in their work.

The Resource-Based View (RBV) is a strategic management approach that focuses on a company's internal resources as the primary driver of competitive advantage. The following key concepts and tips are related to the RBV: Valuable Resources. Identify and develop resources that are valuable to the organization appropriately. These resources can include tangible assets, such as equipment and facilities, as well as intangible assets, such as brands, intellectual property, and organizational culture. The Open Innovation Theory suggests that companies can and should use external as well as internal thinking, covering both internal and external routes to the market, to develop their technologies and products to a standard. Some key concepts and tips related to open innovation theory encourage organizations to collaborate with external partners, such as customers, suppliers, efficiencies, and even competitors. This collaboration can lead to new perspectives and innovative solutions that actually work.

Methodology

The mixed-methods design is sound and directly addresses the objectives. The population was 286 respondents from 48 organizations, sampling strategy, instruments (12-, 8-, 6-item scales), and analytical techniques (EFA, CFA, SEM, mediation analysis) are clearly described. To improve rigor, report sampling frame details, response rates, and pilot test reliability statistics.

To explore the mechanisms through which digital literacy drives the innovative development of leisure sports organizations, this study adopts a mixed-methods research design, combining both quantitative and qualitative approaches. This integrative methodology ensures comprehensive insights into the conceptual framework and allows for the triangulation of findings across multiple sources of evidence.

Research Design

The study follows a sequential exploratory design, wherein qualitative data collection (expert interviews and case studies) is first used to refine the theoretical framework and inform the development of a structured survey instrument. Subsequently, a large-scale quantitative survey is administered to validate the model and test the hypothesized relationships between digital literacy, innovation, collaboration, and competitiveness.

Data Collection Methods

Expert Interviews: Semi-structured interviews are conducted with 15 industry experts, including senior managers from leisure sports organizations, government policymakers, and scholars in sports management and digital technology. The interview questions focus on:

Perceptions and practices of digital literacy in organizational settings, Challenges and drivers of digital transformation, Real-world innovation and collaboration cases in the sector. These qualitative insights are used to identify context-specific variables and adjust the operational definitions of the constructs in the conceptual model.

Case Studies

Three representative leisure sports organizations are selected as case study units based on their digital maturity and innovation performance: A public sports service agency, A medium-sized private fitness chain, and A technology-driven sports startup.

Data are collected through document analysis, field observation, and interviews with internal stakeholders. These cases help illustrate how digital literacy manifests in different organizational contexts and serve as preliminary validation for the framework.

Questionnaire Survey

A structured questionnaire is developed based on the themes emerging from the qualitative phase and existing validated scales from the literature (Bawden, 2008; Choi & Kim, 2023). The survey consists of five parts: Demographics and organizational background, Digital literacy assessment, Organizational innovation practices, Value chain collaboration intensity, and Indicators of sustainable competitiveness. The questionnaire is distributed to 300 managers and staff across various leisure sports organizations in China. A stratified sampling method ensures diversity in region, organization size, and ownership structure.

3. Measurement and Operationalization



Table 1 Operations on core variables

Construct	Measurement Method	Source/Reference
Digital Literacy	12-item scale (Likert 5-point)	Adapted from Bawden (2008)
Organizational Innovation	8-item scale	Based on Gibson et al. (2021)
Collaborative Integration	6-item scale	Developed from Pellegrini et al. (2020)
Sustainable Competitive Advantage	6-item composite index	Adapted from Radovanović et al. (2020)

A pilot test (N=30) is conducted to ensure the reliability and clarity of the questionnaire.

4. Data Analysis Techniques

(1) Qualitative Analysis

Thematic coding is used for interview transcripts to extract recurring concepts and form the theoretical categories. Cross-case synthesis compares findings across different organizations to identify patterns and divergences.

(2) Quantitative Analysis

Descriptive statistics summarize the demographic and baseline data. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) validate the construct structure. Structural Equation Modeling (SEM) is used to test the relationships among the variables and to validate the conceptual framework. Mediation analysis explores the role of organizational innovation as a linking mechanism between digital literacy and competitiveness.

5. Validity and Reliability Assurance

Content validity is ensured through expert consultation in the instrument design phase. Construct validity is tested using CFA. Internal consistency reliability is assessed using Cronbach's alpha (threshold > 0.70). Triangulation across qualitative and quantitative results enhances the robustness and generalizability of findings.

Research Results

This section presents the key findings of the study based on data collected from expert interviews, case studies, and a large-scale questionnaire survey. Results are organized around the core components of the conceptual framework, including digital literacy levels, their influence on organizational innovation, collaborative integration, and the impact on sustainable competitive advantage. Quantitative data are supplemented by qualitative insights to provide contextual interpretation.

1. Descriptive Statistics

A total of 286 valid survey responses were collected from staff and managers across 48 leisure sports organizations in 10 provinces in China. The respondents included 58.7% from private organizations, 31.5% from public institutions, and 9.8% from hybrid entities. Among them, 72% held managerial roles and 28% were frontline or technical staff.

Digital literacy scores were distributed as follows: High digital literacy: 23.1%, Moderate digital literacy: 56.4%, Low digital literacy: 20.5%

These results indicate that while digital awareness exists across the sector, there is significant room for improvement, particularly in smaller and traditional organizations.

2. Factor Analysis and Reliability

Exploratory Factor Analysis (EFA) revealed a four-factor structure aligned with the conceptual model: digital literacy, organizational innovation, collaborative integration, and sustainable competitiveness. Confirmatory Factor Analysis (CFA) demonstrated good model fit ($\chi^2/df = 2.11$, RMSEA = 0.062, CFI = 0.935, TLI = 0.921). Reliability tests showed Cronbach's alpha values above 0.80 for all constructs, indicating high internal consistency.

3. Structural Equation Modeling (SEM)

Table 2 The SEM results

Hypothesis	Path Relationship	Standardized β	p-value	Result
H1	Digital Literacy → Organizational Innovation	0.64	<0.001	Supported

Hypothesis	Path Relationship	Standardized β	p-value	Result
H2	Org. Innovation $\rightarrow$ Competitive Advantage	0.51	<0.001	Supported
H3	Digital Literacy $\rightarrow$ Collaborative Integration	0.58	<0.001	Supported
H4	Collaboration + Innovation $\rightarrow$ Competitiveness	0.48	<0.001	Supported

The SEM results confirmed the hypothesized relationships.

4. Mediation Analysis

Mediation analysis using the bootstrap method (5,000 samples) showed that: Organizational innovation partially mediates the effect of digital literacy on competitiveness (indirect effect $\beta = 0.32$, $p < 0.001$). Collaborative integration also mediates this relationship ($\beta = 0.27$, $p < 0.001$), especially in organizations with external partnerships. This supports the conceptual claim that digital literacy not only enhances internal innovation but also facilitates strategic partnerships that drive performance.

5. Qualitative Findings (from Interviews and Case Studies)

Strategic Gap in Digital Planning. Most leaders acknowledged the importance of digital tools but lacked clear roadmaps or dedicated staff for digital development. Skill Asymmetry Among Staff Younger employees demonstrated high digital adaptability, while older staff struggled with digital platforms, affecting service consistency. Successful Practices in Digital Transformation High-performing organizations reported using

6. Sector-Specific Observations

Public institutions showed relatively lower digital innovation scores but higher collaboration with local governments. Private enterprises were more agile in applying digital solutions, especially in marketing and mobile apps, but faced challenges in system integration and workforce upskilling.

Research Discussion

This section interprets the empirical results in light of the proposed conceptual framework and the broader literature on digital literacy and organizational innovation. It examines how the findings confirm, extend, or challenge existing theories and explores their implications for leisure sports organizations undergoing digital transformation in the Chinese context.

1. Digital Literacy as a Catalyst for Organizational Innovation

The findings confirm that digital literacy serves as a critical driver of internal innovation within leisure sports organizations. The significant positive relationship ($\beta = 0.64$, $p < 0.001$) between digital literacy and organizational innovation supports earlier propositions by Bawden (2008) and Choi and Kim (2023), suggesting that organizations with higher digital capabilities are better equipped to innovate in service design, user experience, and operational efficiency.

This validates the theoretical assumption that digital literacy should be conceptualized not just as an individual skill but as a collective organizational capability. The qualitative evidence further shows that organizations that integrated digital thinking into strategic planning, rather than treating it as a supplementary tool, were more likely to realize measurable innovation outcomes (Guo, 2024).

2. The Mediation Role of Innovation and Collaboration

The results reinforce the dual mediation model proposed in the conceptual framework. Organizational innovation and collaborative integration both serve as important mechanisms through which digital literacy leads to enhanced competitive advantage.

This finding extends the Resource-Based View (RBV) and Open Innovation Theory, indicating that digital literacy not only provides an internal resource advantage but also fosters openness, adaptability, and value co-creation with external partners (Barney, 1991; Chesbrough, 2006; Radovanović et al., 2020). Moreover, the partial mediation suggests that the effectiveness of digital literacy is context-dependent—organizations that strategically combine internal innovation with external collaboration realize the most significant performance improvements.

3. Cross-Organizational and Sectoral Implications

The variation in digital literacy and innovation performance across organization types reflects structural disparities within the sector. Public leisure sports institutions, while more resource-stable, are



often hindered by bureaucratic inertia and insufficient digital expertise. In contrast, private organizations display stronger innovation momentum but face scalability challenges (Pellegrini et al., 2020).

These findings underscore the need for differentiated digital strategies tailored to organizational characteristics. For example, public institutions could benefit from inter-agency digital knowledge sharing and joint platform development, while private organizations might focus on rapid technology adoption and digital workforce training.

4. Human Capital and Intergenerational Digital Gaps

The qualitative interviews revealed clear digital skill gaps between younger and older employees. This intergenerational divide presents both a challenge and an opportunity. While younger staff bring digital fluency, their institutional experience may be limited; conversely, senior staff hold valuable operational knowledge but often lack digital competence (Duggan & Smith, 2023).

This calls for hybrid talent development models that emphasize cross-generational digital mentoring, blended training programs, and inclusive technology adoption to minimize internal friction and maximize organizational synergy.

5. Practical Implications

Organizational leaders should invest in structured digital literacy assessments and long-term digital capability development. Policymakers should support digital transformation initiatives in the leisure sports sector through funding, platform integration, and public-private partnerships. Industry associations can play a role in standardizing digital practices, benchmarking performance, and facilitating collaborative innovation across the sector.

Foster a culture of continuous learning and provide valuable resources for employee development, including positive diversity and inclusion in the workplace, to tap into a broader talent pool for workplace benefits to improve employee engagement through better communication, recognition, and work-life balance initiatives.

New Knowledge

This research provides a significant contribution to both academic theory and practical management by generating new knowledge in the emerging intersection between digital literacy and the innovative development of leisure sports organizations.

1. Reconceptualizing Digital Literacy as an Organizational Capability

Unlike most prior studies that view digital literacy primarily as an individual-level skill, this research redefines it as a strategic organizational capability.

2. Development of a Digital Literacy-Driven Innovation Model

A novel and empirically validated digital literacy-driven innovation framework was proposed, revealing the pathways through which digital literacy influences Internal innovation dynamics, External collaboration along the value chain, and Sustainable competitive advantage.

3. Identification of Dual Mediating Mechanisms

The study uncovered and confirmed a dual mediation mechanism, whereby organizational innovation and collaborative integration jointly mediate the relationship between digital literacy and organizational performance.

4. Integration of Mixed Methods for Model Validation

By applying a sequential mixed-methods approach, this research not only confirmed quantitative relationships among key variables but also contextualized them.

5. Sector-Specific Insight for Digital Transformation in Leisure Sports

The study offers pioneering empirical data on digital transformation practices in China's leisure sports sector, a field still in the early stages of digital maturity.

Research Suggestions

1. Strengthen Digital Literacy Training Systems

Develop tailored training programs for different employee groups, especially bridging intergenerational skill gaps between younger and older staff. Incorporate digital literacy standards into professional certification systems for leisure sports practitioners.

2. Institutionalize Digital Strategy in Organizational Planning



Leisure sports organizations should integrate digital transformation roadmaps into their long-term strategic plans. Establish internal digital transformation teams tasked with driving digital upgrades in operations, marketing, and service delivery.

3. Promote Industry-Wide Collaboration and Ecosystem Building

Foster collaborative networks among upstream (equipment providers, digital service developers) and downstream partners (distribution platforms, community organizations) to co-create digital services. Encourage public-private partnerships to support infrastructure sharing, digital platform development, and community-based fitness innovation.

4. Provide Policy and Institutional Support

Government authorities should design policy incentives and subsidies to encourage digital adoption among small and medium-sized leisure sports enterprises.

Formulate national guidelines on digital literacy standards for the sports sector to unify skill development and evaluation.

5. Enhance Research and Data Monitoring Mechanisms

Develop longitudinal studies to assess the evolving role of digital literacy over time and across technology generations. Encourage cross-national comparative research to understand cultural and policy differences.

References

- Andretta, S. (2020). *Information literacy and digital literacy: Exploring the interplay*. Information Research, 25(2), 300–320.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Bawden, D. (2008). Digital literacy and information literacy: What's the difference? *Journal of Documentation*, 64(2), 209–226.
- Bodolica, V., Spraggon, M., & Saleh, N. (2020). Innovative leadership in the leisure and entertainment industry: The case of the UAE as a global tourism hub. *International Journal of Islamic and Middle Eastern Finance and Management*, 13(2), 323–337.
- Chesbrough, H. W. (2006). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press.
- Choi, J., & Kim, D. (2023). The impact of digital literacy on job market competitiveness. *Journal of Career Assessment*, 31(1), 45–60.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- Duggan, M., & Smith, A. (2023). Digital citizenship and social media: An exploration of digital literacy in online communities. *Media and Communication Studies*, 18(3), 123–140.
- Gibson, H., Lee, Y., & Brown, R. (2021). Digital literacy and agile leadership in global service organizations. *Journal of Organizational Change Management*, 34(6), 1091–1108.
- Gilster, P. (1997). *Digital literacy*. Wiley.
- Guo, D. (2024). Research on the innovative development model of leisure sports organizations driven by digital literacy. *Krirk University*.
- Hernandez, L. (2021). The impact of digital literacy on career advancement. *Journal of Career Assessment*, 29(4), 568–583.
- Hobbs, R., & Jensen, A. (2021). *Teaching and learning media literacy: Principles and practices*. Routledge.
- Huang, H. (2022). New stage, new situation: Prospects of my country's sports industry development strategy. *Journal of Shanghai Institute of Physical Education*, 46(1), 20–31.
- Jenkins, H., Clinton, K., Purushotma, R., Robinson, A. J., & Weigel, M. (2020). *Confronting the challenges of participatory culture: Media education for the 21st century*. MIT Press.
- Jiang, Y., Zhang, E., Ren, B., & Wang, M. (2022). Dilemma and response to the digital transformation of my country's sports industry. *Sports Science*, 42(6), 3–10.
- Lin, Z. (2024). Innovative thinking on the innovation model of Chinese circulation enterprises in the background of e-commerce. *Environment and Development*, 6(4).
- Meng, Q., & Zhang, Q. (2024). Research on sports industry management and an innovation model based on artificial intelligence technology. *Sports Science*, 4(2), 130–134.



- Pellegrini, M. M., Rialti, R., Marzi, G., & Caputo, A. (2020). Sport entrepreneurship: A synthesis of existing literature and future perspectives. *International Entrepreneurship and Management Journal*, 16(3), 795–826. <https://doi.org/10.1007/s11301-019-00175-7>
- Radovanović, D., Holst, C., Belur, S. B., Srivastava, R., Hounbonon, G. V., Le Quentrec, E., ... & Noll, J. (2020). Digital literacy key performance indicators for sustainable development. *Social Inclusion*, 8(2), 151–167. <https://doi.org/10.17645/si.v8i2.2585>
- Smith, R., & Brown, A. (2024). Bridging the digital divide: The importance of digital literacy in promoting educational equity. *Educational Technology Review*, 29(1), 50–65.
- Tannenbaum, S., & Zinn, M. (2023). Effective information management in the digital era. *Information Technology & People*, 36(2), 215–230.
- Zhang, J. (2024). Integration and development of information systems in sports organization management. *Sports Economic Research*, 18(1), 55–62.