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Policy Tool Innovation and Collaborative Mechanism for the Integrated Development of "Sports + Tourism" in Qingyuan from the Perspective of the Digital Economy

Dongjin He [1], Jinpeng Zeng [2], Haiting Shao [1, *]

[1] Department of Physical Education, Guangdong University of Finance, Guangzhou, China
[2] School of Credit Management, Guangdong University of Finance, Guangzhou, China
*Corresponding Author: Haiting Shao

ABSTRACT

The digital economy has become a core driving force in reshaping industrial forms and regional competitiveness. The deep integration of "sports + tourism," as a vital path to meeting the people's needs for a better life, is facing a critical moment of digital transformation. However, traditional industrial policy tools and governance mechanisms exhibit significant "failure" and "mismatch" when addressing the new characteristics brought by the digital economy, such as rapid iteration, cross-border integration, and data-driven approaches. This paper, focusing on Qingyuan City—an ecological barrier and leisure tourism destination in the Guangdong-Hong Kong-Macao Greater Bay Area—addresses the practical policy challenges faced by its integrated "sports + tourism" development. Utilizing policy tool theory and collaborative governance theory, this paper first analyzes the empowering logic of the digital economy on "sports + tourism" integration. It then diagnoses the core dilemmas in Qingyuan, including the imbalanced supply of policy tools, the "fragmentation" of departmental collaboration, and the "time-lag" in policy execution. Building on this, the paper systematically constructs an innovative policy toolbox adapted to the digital economy from four dimensions: environmental, supply-side, demand-side, and governance. Furthermore, it designs a "five-in-one" policy collaborative governance mechanism covering target, organizational, resource, process, and information collaboration. This research aims to provide a policy framework and governance plan that is both theoretically forward-looking and practically operable for Qingyuan and similarly-situated cities to promote the high-quality development of the "sports + tourism" industry in the digital age.

KEYWORDS

Digital Economy; Sports + Tourism; Industrial Integration; Policy Tools; Collaborative Mechanism; Qingyuan City

1. INTRODUCTION

The "14th Five-Year Plan" outline explicitly proposes to "promote the quality upgrading and expansion of consumption such as culture, tourism, and sports," "promote the high-quality development of the sports industry," and "accelerate digital development." The historical convergence of the "Healthy China," "Digital China," and "Sports Power" strategies has opened an unprecedentedly broad space for the development of the "sports + tourism" deeply integrated industry. As significant components of the modern service industry and strategic pillars of the national economy, the deep integration of the sports and tourism industries is not only an inevitable choice for expanding industrial boundaries and cultivating new business formats and models but also a vital

grasp for building a new development pattern and promoting high-quality regional economic development [1]. Concurrently, digital technologies represented by big data, artificial intelligence, the Internet of Things (IoT), and 5G are permeating the entire economic and social process with unprecedented breadth and depth. The digital economy is becoming a key force in restructuring factor resources, reshaping the economic structure, and changing the competitive landscape.

Against this backdrop, the "digital economy" and "sports + tourism" integrated development are at a historical intersection. On the one hand, digital technology provides new empowering paths for "sports + tourism." From VR/AR-based immersive experiences, big data-based personalized customization, and IoT-based intelligent management to algorithm-based precision marketing, digital technology is comprehensively, multi-dimensionally, and system-wide reconstructing the industry's value chain and ecosystem [2]. On the other hand, the deep integration and digital transformation of the industry pose new and urgent challenges to the government's governance capacity and policy supply. Traditional "factor-driven" policy tools, mainly focused on land supply, financial and tax incentives, and project approval, are increasingly revealing their limitations when faced with new industrial forms characterized by cross-border integration, data-driven processes, and platform dominance. The "mismatch" of policy supply, the "fragmentation" of departmental governance, and the "time-lag" of policy response have become key bottlenecks constraining the high-quality development of regional "sports + tourism."

As the "back garden" and northern ecological barrier of the Guangdong-Hong Kong-Macao Greater Bay Area, Qingyuan City possesses unique sports tourism resources, represented by the "Hometown of Rafting in China," and an excellent ecological foundation. Its "sports + tourism" industry has already established a certain footing. However, in the face of the digital economy wave, Qingyuan also faces severe transformation pressure: the digitization level of its product formats is not high, still lingering in the traditional "sightseeing + experience" model; the industrial chain is relatively short, and the value of data factors is severely under-utilized; regional brand influence is limited to specific projects (like rafting) and urgently needs to be enriched and disseminated through digital means. How to transform Qingyuan's "ecological advantages" and "sports characteristics" into "industrial advantages" and "economic advantages" in the digital era is a major issue for achieving "lane-changing and overtaking" in the new development stage. Promoting the deep integration of "sports + tourism" in Qingyuan urgently requires a profound and systematic innovation and reconstruction on the policy supply side.

Reviewing existing research, academia has paid increasing attention to the digital economy, sports industry, and tourism industry. Related studies mainly focus on three levels: First, research on the empowering mechanisms of the digital economy on a single industry (tourism or sports), exploring how technologies like big data and AI reshape industrial value chains, optimize resource allocation, and enhance consumer experience [3]. Second, studies on the dynamic mechanisms and development models of "sports + tourism" industrial integration, focusing on the analysis of industrial organization, spatial layout, and integration barriers. Third, discussions on smart tourism or digital governance, paying attention to the application of new governance tools such as the "City Brain" [4], platform governance, and data property rights.

However, existing research still has obvious theoretical gaps and fails to fully respond to the policy demands of "sports + tourism" integrated development in the digital age: First, few studies have placed the "digital economy" perspective, the "sports + tourism" integration field, and the "policy governance" domain within the same analytical framework, failing to fully reveal the systematic challenges posed by the digital economy to cross-border industrial integration policies. Second, much research leans towards describing technology-empowered paths or listing macro-level countermeasures, lacking a refined, systematic, and innovative design of "policy tools" themselves, and failing to answer the nuanced questions of "which policy tools should be used" and "how to innovate them." Third, there is a lack of in-depth mechanism construction and theoretical exploration on how to crack the core governance dilemma of cross-departmental "collaborative failure" in the

digital age; the understanding of "collaboration" often remains at a superficial level, such as "joint meetings."

Therefore, this paper, using Qingyuan City as an analytical blueprint and applying policy tool theory and collaborative governance theory, focuses on the core issue of "digital economy empowering the deep integration of 'sports + tourism' in Qingyuan." It aims to answer two key questions: First, what innovative policy toolbox is needed for "sports + tourism" integrated development that adapts to the characteristics of the digital economy? Second, how to construct a cross-departmental, cross-level, and multi-actor policy collaborative mechanism to ensure the effective implementation of these policy tools? This paper seeks to provide a systematic policy solution for Qingyuan through an in-depth analysis of these issues, while also offering theoretical mirrors and practical references for other similarly-situated (resource-dependent) cities.

2. THEORETICAL FOUNDATIONS AND ANALYTICAL FRAMEWORK

2.1. The Evolution and Application of Policy Tool Theory

Policy instruments are the management tools and behavioral methods chosen by the government to achieve specific public goals [5]. The selection and combination of policy tools reflect the government's governance philosophy, technological level, and cognition of policy problems. Traditional policy tool research is often based on a supply-demand dichotomy or classified by the degree of government intervention (e.g., compulsory, mixed, voluntary). However, with the increasing complexity of the governance environment and the advancement of "digital government" construction, the forms of policy tools have become increasingly diverse.

The theoretical evolution of policy tools has transitioned from the "first generation" (dominated by direct regulation and mandatory orders), through the "second generation" (focused on market-based incentives and contractual outsourcing), to the "third generation" (centered on information, networks, and collaborative governance). The digital economy era is precisely the period where "third-generation" policy tools (i.e., "informational," "empowering," and "networked" tools) are burgeoning and increasingly dominant.

In the digital economy era, the connotation and extension of policy tools have undergone profound changes. First, with data as a new factor of production, the importance of "informational" and "empowering" tools (such as data-opening platforms, public data empowerment centers, digital skills training) has become increasingly prominent. The government's role is shifting from a "direct provider" to a "platform builder" and "capability enabler." Second, the rise of the platform economy has given birth to new governance tools like "regulatory sandboxes" [6], "algorithmic regulation," and "data trusts," posing severe challenges to traditional "ex-ante approval" regulatory tools. Third, the target of policy tools has shifted from single "enterprises" or "industries" to complex "industrial ecosystems" and "digital platforms," demanding that policy tools possess higher precision, agility, and synergy.

Therefore, this paper argues that studying "sports + tourism" integration policies under the digital economy must transcend the traditional "give-regulate" unidimensional perspective and construct a more three-dimensional and dynamic analytical framework. Drawing on modern policy tool classification theories and integrating the characteristics of the digital economy, this paper divides policy tools into four dimensions:

(1) Environmental Tools: Aimed at creating a favorable external environment for industrial integration, focusing on infrastructure, institutional norms, and factor supply. In the digital economy, this includes not only the traditional "hard environment" (transportation, ecology) but, more critically, the "soft environment," such as digital new infrastructure (5G, IoT, computing centers), data governance standards (data property rights, circulation, security), data security regulations, digital

talent cultivation systems, and an institutional space that embraces innovation (e.g., intellectual property rights protection).

(2) Supply-side Tools: Aimed at incentivizing market actors to innovate "sports + tourism" products and services, focusing on direct support for producers and innovators. In the digital economy, this manifests as subsidies for corporate digital transformation (intelligent transformation, cloud adoption), incentives for digital content (IP) incubation and R&D (e.g., VR/AR applications), support for "sports tech" startups, and guidance for building industrial internet platforms.

(3) Demand-side Tools: Aimed at cultivating and stimulating the digital "sports + tourism" consumption market, focusing on guiding and protecting consumers. This includes using big data for precision marketing, issuing targeted digital consumption vouchers, constructing digital consumption scenarios (e.g., "cloud-based events"), and establishing sound online consumer rights protection and trust mechanisms (e.g., blockchain-based credit evaluation).

(4) Governance Tools: Aimed at enhancing the government's governance effectiveness in response to industrial integration and digital transformation, focusing on innovating regulatory models and governance technologies. This includes building collaborative regulatory platforms, constructing an "Industrial Brain" to achieve data-driven decision-making, implementing "regulatory sandboxes" to cope with new format innovations, and using technological means to improve the agility and precision of market supervision.

2.2. The Core of Collaborative Governance Theory

Synergy theory, originating from physics, emphasizes that subsystems within a system interact to produce synergistic effects in spatio-temporal structure, leading to qualitative changes in the system [7]. When introduced into the field of public governance, Collaborative Governance emphasizes that multiple actors (government departments, markets, society) establish formal or informal interaction mechanisms based on common goals, sharing resources and information to achieve a governance performance of "1+1>2."

The occurrence of collaborative governance requires a series of preconditions, such as high interdependence, a shared vision, leadership support, and institutionalized trust. At the same time, collaborative governance faces significant obstacles, such as conflicts of interest among different actors, power asymmetries, information asymmetry, and the deep-rooted "silo effect" or "departmentalism."

The deep integration of "sports + tourism" is itself a cross-border governance challenge, involving multiple departments such as sports, culture and tourism, industry and information technology, transportation, market supervision, natural resources, and agriculture. In the context of the digital economy, this collaborative challenge is further magnified. The cross-departmental flow and sharing of data become the "lifeline" of collaboration, and "data silos" become a more difficult barrier to overcome than "information silos." The traditional governance model of "vertical fragmentation" (Tiaokuai Fenge) and "nine dragons managing the water" (Jiulong Zhishui) inevitably leads to policy "fragmentation" and "compositional fallacies." For example, the culture and tourism department promotes smart scenic spot construction, but the 5G base station planning by the industry and information technology department fails to keep pace; the sports department holds online events, but the market supervision department has no rules for regulating virtual prizes.

Therefore, constructing an efficient policy collaborative mechanism is the prerequisite and guarantee for the innovation of policy tools. This paper will draw on collaborative governance theory to build a "sports + tourism" integration development collaborative governance framework adapted to the digital economy, based on five dimensions: target collaboration (strategic alignment), organizational collaboration (clear rights and responsibilities), resource collaboration (factor sharing), process collaboration (business closed-loop), and information collaboration (data interconnection).

3. THE RESHAPING OF "SPORTS + TOURISM" INTEGRATION AND POLICY LOGIC BY THE DIGITAL ECONOMY

The empowering effect of the digital economy is fundamentally changing the integration logic of the "sports + tourism" industry, thereby posing a comprehensive challenge to the traditional policy supply paradigm.

3.1. The Empowering Logic of the Digital Economy on "Sports + Tourism" Integration

(1) Experience Reshaping: From "Sightseeing" to "Immersion" and "Interaction"

Digital technology has completely changed the service delivery and experience model of sports tourism. Traditional "sports + tourism" often remained at the "sightseeing" level (e.g., visiting stadiums) or "participation" level (e.g., experiencing rafting once). Digital technology, however, creates entirely new experiential dimensions. VR/AR technology allows tourists to gain simulated experiences before rafting in Qingyuan, greatly expanding pre-decision and marketing scenarios; smart wearable devices provide real-time health monitoring, activity tracking, and safety alerts during outdoor sports like hiking, thus digitizing "sports" and "health"; 5G + 4K/8K live streaming, and even holographic projection, make the online viewing experience of sports events (like the Qingyuan Marathon) comparable to being on-site, or even better (e.g., multi-angle switching). This immersive, interactive, and intelligent experience becomes the core value of industrial integration. For instance, Qingyuan's rafting attractions can use VR to let tourists "test-raft" different difficulty levels before departure and use 5G + drone follow-cam technology to provide personalized, event-level video services.

(2) Supply-Demand Reconfiguration: From "Standardization" to "Personalization" and "Precision"

The underlying logic of the digital economy is data-driven. In the traditional model, the supply side (scenic spots, event organizers) mostly provided "one-size-fits-all" standardized products, and the demand side (tourists) passively accepted them. In the digital economy, the supply-demand relationship is reversed [8]. Through big data analysis of user portraits (based on social media interest tags), consumption behavior (based on OTA and payment data), search preferences (based on search engines), and social media trajectories (based on geo-location check-ins), enterprises can accurately discern the potential needs of different circles and individuals. This enables a shift from standardized supply to "one-thousand-faces-for-one-thousand-people" personalized and customized services. For example, customizing a Qingyuan sports tourism route for families that integrates fun sports, science education, and ecological sightseeing; or providing a digital solution for young "backpackers" that includes extreme challenges (like river tracing, rock climbing), smart route planning, AR navigation, and drone rescue support.

(3) Boundary Reshaping: From "Industrial Chain" to "Ecosystem" and "Value Network"

Digital platforms (such as OTAs, short video platforms, sports & health apps) have become the organizational hubs of the industry. In the traditional model, "sports + tourism" was formed by the "chain-like" superposition of two industries (e.g., travel agency + scenic spot + hotel). In the digital economy, traditionally separate elements—such as sports events, tourist attractions, accommodation, transportation, equipment manufacturing, content creation, and financial insurance—are efficiently integrated and dynamically configured through platforms. This forms a cross-border integration ecosystem of "platform + content + service + hardware + finance." Qingyuan's rafting attractions are no longer isolated "dots" but are integrated into a broader digital cultural tourism ecosystem. Their value is realized not only through ticket sales but also through online traffic (short video exposure), content payment (VR experience), IP licensing (co-branded products), and data value-added (tourist

behavior analysis reports). This reshapes the industry's value creation logic, shifting from the linear value-added of a "value chain" to the ecological co-creation of a "value network."

3.2. The Challenge of the Digital Economy to Traditional Policy Logic

(1) The Challenge of Shifting from "Factor-Driven" to "Data-Driven"

The core of traditional industrial policy is the allocation of tangible factors of production such as land, capital, and labor—for example, building stadiums, giving financial subsidies to scenic spots, and offering tax reductions. In the digital economy, however, data has become the crucial "fifth factor." This poses a fundamental challenge to policy logic: How to define the property rights of data generated during the "sports + tourism" integration process (e.g., tourist trajectories, sports health data)? How to promote the sharing and circulation of this data among different actors (government, enterprises, citizens) while ensuring security and privacy? How to tap into the multiplier effect of data factors to empower industrial innovation? The traditional policy toolbox is almost "silent" on these issues. The government faces a "data paradox": on the one hand, data is growing massively; on the other, the problem of data being "unusable, not dared to be used, or not known how to be used" is widespread.

(2) The Challenge of Shifting from "Sectoral Management" to "Cross-Border Governance"

The deep integration of "sports + tourism" has already blurred traditional industry boundaries, and digitization further exacerbates this ambiguity. An "online virtual marathon" event might simultaneously involve the Sports Bureau (event approval), the Culture and Tourism Bureau (promotion), the Industry and Information Technology Bureau (technical support), the Communications Administration (network assurance), the Market Supervision Bureau (market order), the Cyberspace Administration (content security), and the Financial Regulatory Bureau (if virtual currency or prizes are involved). The traditional vertical management system and "approval-based" logic, which are based on "sectoral" divisions, are ill-suited to this "cross-border" new format, easily leading to "regulatory gaps" (no one is in charge), "redundant regulation" (everyone is in charge), or "regulatory arbitrage" (exploiting rule differences to evade supervision).

(3) The Challenge of Shifting from "Static Approval" to "Dynamic Regulation"

Business model innovation in the digital economy iterates extremely fast. For example, new models like "sports + tourism + live-streaming e-commerce," "sports + tourism + digital collectibles (NFTs)," and "sports + tourism + metaverse" are emerging one after another. The traditional "ex-ante approval" regulatory model is characterized by stability but also by lag. By the time a policy or regulation (e.g., for virtual events) goes through the long cycle of research, demonstration, and issuance, market practice may have already shifted to a new form. The government urgently needs to shift to "in-event and ex-post" dynamic regulation, using technological means (such as big data monitoring, algorithmic analysis) to enhance regulatory agility and precision, and adopting a more inclusive and prudent regulatory attitude towards new formats, such as the "regulatory sandbox" [9].

4. DIAGNOSIS OF POLICY DILEMMAS IN QINGYUAN'S "SPORTS + TOURISM" INTEGRATION DEVELOPMENT

As a key ecological tourism city in the Greater Bay Area, Qingyuan's "sports + tourism" integration development faces a series of policy dilemmas that urgently need to be cracked under the wave of the digital economy. These dilemmas are a concentrated expression of the "structural mismatch" between the traditional governance paradigm and the new requirements of the digital economy.

4.1. Policy Tool Imbalance: Reliance on Traditional Supply-side Tools and Absence of New Tools

Examining Qingyuan's existing industrial policies, it is not difficult to find a significant structural imbalance in its policy toolbox, characterized by a "path dependency" on traditional tools and an "insufficient supply" of new ones.

First is the over-reliance on traditional supply-side tools. Policy resources are disproportionately concentrated on investment in large-scale sports facilities (like stadiums), subsidies for hardware upgrades in key tourist attractions (like rafting spots), and financial support for hosting large-scale events. While these "heavy-asset" and "strong-intervention" supply-side tools certainly played a foundational role in the early stages of development, their marginal utility is diminishing in the digital age. Mere hardware investment can no longer meet tourists' demands for intelligent and personalized experiences and may instead lead to the dilemma of "having venues but no operations" or "having attractions but no content."

Second is the severe absence of new types of policy tools. In terms of environmental tools, there is a lack of planning and unified standards for digital new infrastructure (e.g., deep 5G coverage in scenic areas, smart trail sensors) for "sports + tourism" scenarios. Critically, in the area of data factors, there is a lack of unified data sharing standards, open platforms, and incentive mechanisms; data property rights are vaguely defined. In terms of demand-side tools, efforts to cultivate and guide new digital consumption scenarios are insufficient, often stuck in the traditional "advertising" model, and lacking policy design that uses big data for precision marketing. In terms of governance tools, "regulatory sandboxes" or agile governance mechanisms adapted to new formats have not yet been established, leading to a situation where enterprises "dare not innovate" and the government is "unwilling to delegate power."

4.2. Collaborative Policy Failure: Departmental "Silos" and Data "Islands"

The digital integration of "sports + tourism" is essentially a cross-departmental, cross-level, and cross-regional systematic project. However, Qingyuan's current governance structure has not fully adapted to this demand, and collaborative failures are common.

First is the lack of horizontal departmental collaboration, leading to "nine dragons managing the water." Departments such as sports, culture and tourism, industry and information technology, transportation, agriculture (rural tourism), natural resources (ecological protection), and the data bureau (or government affairs data bureau) lack normalized and institutionalized collaborative mechanisms in industrial planning, project layout, data standards, and joint enforcement. For example, a event IP pushed by the sports department may not effectively connect with the tourism route planning of the culture and tourism department; the digital transformation promoted by the industry and information technology department may conflict with the smart scenic spot standards of the culture and tourism department; the government data platform built by the data bureau may struggle to incorporate commercial data like real-time tourist flow from scenic spots. The policies of each department are often "fighting their own battles," or even mutually constraining, making it difficult to form a policy synergy.

Second is the prominent effect of vertical data "islands," leading to "decision-making blindness." Departments, districts, counties, and even major scenic spots—out of self-interest ("data as an asset"), technical barriers (incompatible systems), or security concerns—find it difficult to interconnect and comprehensively utilize key information they hold, such as tourist data, traffic data, consumption data, and meteorological data. This "data silo" effect prevents the government from forming a panoramic insight into industrial operations, let alone achieving scientific decision-making and precise governance based on big data analysis.

4.3. Policy Implementation Obstruction: "Time-Lag Effect" and "Last Mile" Problem

Even if policy tools are well-designed and collaborative mechanisms are initially established, obstructions at the policy implementation level remain a prominent pain point.

First is the significant "time-lag effect," causing "policy to lag behind the market." The digital economy is ever-changing, but policy-making and implementation have a natural lag. A support or regulatory policy for a new digital sports tourism format (like esports hotels or smart gyms) often requires a long cycle of research, demonstration, issuance, and execution. By the time the policy is finally implemented, the market window may have already passed, or the new format may have evolved new problems.

Second is the "last mile" obstruction, causing "policy to be suspended in mid-air." Qingyuan has a vast territory, and development among its districts and counties is uneven. Municipal-level digital strategies and policy plans may face problems when sinking to the county, town, or even specific scenic spot level, such as insufficient grassroots capacity (lack of professionals who understand digital tech and operations), lack of supporting resources (insufficient financial funds), and deviations in understanding and execution (still using old methods to manage new things). This prevents the city's grand blueprint from being effectively translated into vivid practices at the grassroots level, greatly reducing policy effectiveness. Moreover, large enterprises (like major rafting attractions) have strong digital transformation capabilities, while SMEs (like B&Bs, farm-to-table restaurants) "don't know how to transform, dare not transform, or cannot afford to transform," potentially widening the digital divide.

5. INNOVATION OF POLICY TOOLS FOR "SPORTS + TOURISM" INTEGRATION IN QINGYUAN FROM THE PERSPECTIVE OF THE DIGITAL ECONOMY

Facing the above dilemmas, Qingyuan must reconstruct its policy toolbox for "sports + tourism" integration development, achieving a systematic shift from "traditional factor-driven" to "digital empowerment-driven." This toolbox should be three-dimensional, diversified, and dynamic, achieving a fundamental shift from "giving money and materials" to "creating an environment, stimulating vitality, enhancing capabilities, and optimizing governance."

5.1. Innovating Environmental Tools: Solidifying the New Foundation for Digital Integration

Environmental tools are the "soil" of the industrial ecosystem, determining the depth and breadth of industrial integration. Qingyuan should focus on creating an open, secure, efficient, and inclusive digital integration environment.

(1) Constructing "Sports-Tourism Connect" Digital New Infrastructure. Changing the past "point-based" investment and scattered construction model, a unified city-wide special plan for "sports + tourism" digital infrastructure should be formulated. This plan should be jointly developed by the municipal bureaus of Industry and Information Technology, Culture and Tourism, Sports, and Data, and be coordinated with plans from Transportation and Natural Resources. Priority should be given to the deep 5G network coverage, Internet of Things (IoT) sensor deployment (e.g., smart trails, hydrological monitoring, meteorological monitoring), and edge computing center construction in key scenic spots (like Gulong Gorge, Huangteng Gorge), key sports parks, major rural tourism belts, and characteristic sports towns. This will ensure a smooth basic network for applications like HD live streaming, VR/AR experiences, intelligent monitoring, and drone inspections.

(2) Establishing Data Governance and Opening Standards. This is the core of environmental tools. Issue a "Qingyuan 'Sports + Tourism' Public Data Resource Open Directory" and data sharing standards. Clarify the specifications for data collection (who collects, what is collected), storage (where to store, what format), usage (who can use, how to use), trading, and security protection. The focus is on breaking down data barriers between departments like culture and tourism, sports, transportation, public security, and health (sports health data), establishing a "negative list" system to achieve "shared by default, not shared by exception." Concurrently, explore the establishment of mechanisms for data property rights registration, value assessment, and benefit distribution to lay the legal and technical foundation for the subsequent construction of an "Industrial Brain."

(3) Implementing a "Digital Sports-Tourism" Special Talent Program. Traditional tourism service staff and sports coaches can hardly adapt to digital operational needs. A special program should be established to build a multi-level talent supply system. On the one hand, through "government-school-enterprise" cooperation, encourage local institutions (especially in the Provincial Vocational Education City) to offer interdisciplinary majors and micro-majors like digital cultural tourism, smart sports operation, and sports live-streaming & content creation, to cultivate local digital talent for Qingyuan who will "stay and be useful." On the other hand, introduce flexible talent policies to attract professionals and "digital nomads" [10] from core Greater Bay Area cities who are familiar with big data analysis, digital marketing, and algorithm design to settle in or serve Qingyuan through project outsourcing, part-time consulting, or "migratory" work. At the same time, large-scale rotational training for incumbent staff should be carried out, especially "digital literacy" and "capability enhancement" training for SME owners and grassroots managers.

(4) Fostering an Inclusive and Prudent Institutional Environment. Clearly articulate an inclusive and prudent regulatory attitude towards new "sports + tourism" integration formats to "leave enough room" for innovation. In particular, establish intellectual property protection workstations to provide fast-tracking for copyright confirmation and rights protection for sports event IPs and digital content IPs (like short videos, VR games), protecting innovators' enthusiasm. For new formats not yet clearly defined by law, prioritize a "probation period" to avoid "killing them with regulation."

5.2. Innovating Supply-side Tools: Igniting New Momentum for Digital Integration

Supply-side tools are the "accelerators" of industrial innovation. Market actors should be guided to shift from "resource dependency" to "innovation-driven," enriching the supply of high-quality digital "sports + tourism" products.

(1) Establishing a "Digital Transformation" Special Support Fund. Targeting the characteristic that many sports tourism enterprises in Qingyuan are small or medium-sized with weak digital foundations, a special fund should be set up. Shifting from "flood irrigation" subsidies, it should adopt "precision drip irrigation" methods, such as "post-subsidy," loan interest subsidies, and equity investment, to support enterprises in intelligent transformation (e.g., smart ticketing, smart guidance, smart security), service process reengineering (e.g., AI customer service, smart queuing), and online platform construction (e.g., official apps, mini-programs). Focus on supporting SMEs to "use the cloud and data"; the government can procure SaaS (Software as a Service) tools and provide them to SMEs in the form of "service vouchers."

(2) Cultivating a "Qingyuan IP" Digital Content Ecosystem. Qingyuan's "Rafting," "Yao Ethnic Sports," "Yingde Black Tea (Outdoor Sports)," etc., are unique cultural IPs. Policies should be introduced to encourage enterprises, universities, and MCN (Multi-Channel Network) agencies to develop new digital content products around these IPs, such as short videos, web live streams, VR games, digital collectibles (NFTs), and online challenges. Through activities like the "Qingyuan Sports Tourism Digital Content Creation Competition," stimulate the vitality of UGC (User-Generated Content) and PGC (Professional-Generated Content), building a "content-traffic-

consumption" conversion loop, and enhancing the cultural added value and online voice of Qingyuan's sports tourism.

(3) Supporting the Construction of "Sports-Tourism Integration" Digital Platforms. Change the situation of enterprises "fighting alone." Encourage local leading enterprises or attract external capital to build a comprehensive service platform (or super-app) vertical to Qingyuan's sports tourism. This platform should not only be a transaction portal but also an ecological hub integrating information release, smart itinerary planning, event registration, health management, equipment rental, and a content community. The government should provide support in data interfaces and public service access, and guide the platform to connect with the municipal "Industrial Brain," thereby integrating scattered supply-side resources and achieving a "clenched fist" effect.

(4) Incentivizing "Sports Tech" R&D and Application. Establish a "Sports + Tourism + Technology" fusion innovation project pool. Encourage enterprises to cooperate with universities and research institutions to develop smart wearable devices, drone rescue systems, AR navigation applications, and real-time water quality monitoring systems suitable for Qingyuan's specific mountain and water scenarios, and provide policy incentives for the first (set of) applications.

5.3. Innovating Demand-side Tools: Cultivating New Digital Integration Consumption

Demand-side tools are the "traction engine" for industrial development. Precise policies must be implemented to activate consumption potential and guide consumption upgrading in the digital age.

(1) Issuing "Sports-Tourism Integration" Digital Consumption Vouchers. Drawing on the experience of advanced domestic cities, issue targeted "sports + tourism" digital consumption vouchers through government-enterprise cooperation (government funding, platform operation) on mainstream OTA platforms, short video platforms, and local life apps. The vouchers should have specific usage scenarios (e.g., "scenic spot ticket + sports item," "hotel + wellness service," "event registration + transportation/accommodation") and be precisely delivered to specific customer groups (like young people in the GBA, families) through big data analysis. The issuance and redemption process should be fully digitized for real-time effect evaluation and strategy adjustment, using "small subsidies" to leverage "large consumption."

(2) Building a Big Data Precision Marketing System. The government should take the lead in integrating data from city-wide tourism, operator signaling, OTA platform consumption, and social media sentiment to build user portraits and potential customer pools for Qingyuan's sports tourism. Through big data analysis, precisely target customer groups in core GBA cities and conduct intelligent, scenario-based precision pushes through social media matrices (Douyin, Kuaishou, Xiaohongshu), information flow ads, and KOL/KOC (Key Opinion Leader/Key Opinion Consumer) cooperation, shifting from "casting a wide net" to "precision fishing."

(3) Improving Digital Consumption Rights Protection. New consumption models are accompanied by new types of disputes. A rapid-response "sports + tourism" digital consumption dispute resolution mechanism should be established for new models like online booking, virtual experiences, live-stream sales (exaggeration), and "big data-enabled price discrimination." Explore the use of blockchain technology to establish enterprise "credit portraits" and consumer "blacklists," implementing joint punishment for untrustworthy actors to create a
safe and secure digital consumption environment.

(4) Supporting "Cloud-based" Sports Tourism Festivals. Encourage and support Qingyuan's traditional sports events (like the Rafting Festival, Marathon) and tourism festivals to "go online," launching "cloud live streams," "cloud events" (e.g., online rafting challenges), and "cloud experiences" (e.g., VR tours of Yao villages). This breaks time and space constraints, attracts online traffic, and converts online traffic into offline visitors, achieving online-offline linkage.

5.4. Innovating Governance Tools: Constructing a New Paradigm for Digital Integration Governance

Governance tools are the "steering wheel" for policy implementation. Qingyuan should explore agile and smart governance models adapted to the digital economy.

(1) Establishing an "Industrial Brain" as the Smart Governance Hub. This is the core of policy tool innovation and the technical foundation for collaborative governance. Construct a "Qingyuan 'Sports + Tourism' Industrial Brain". This "brain" should have at least four functional modules:

Panoramic Monitoring Module: Aggregate multi-dimensional data including industrial operations (revenue, employment), tourist flow dynamics (source, distribution, portrait), traffic conditions (congestion, capacity), meteorological environment (alerts), and online public opinion (hotspots, complaints) to achieve "one screen to view the whole domain."

Intelligent Warning Module: Conduct intelligent analysis and provide early warnings for risks such as tourist overload, extreme weather, safety accidents, and negative public opinion, automatically pushing alerts to relevant departments.

Decision Support Module: Simulate the pulling effect of different policies (e.g., issuing vouchers, hosting competitions) on the industry, assess the environmental carrying capacity for project site selection, and provide data support for scientific government decision-making.

Collaborative Command Module: Serve as a unified command and dispatch platform for cross-departmental joint enforcement and emergency response, enabling one-click command issuance and unified resource allocation.

This "brain" is not only a "one-code-pass" service platform for tourists but also an "integrated management" decision-making platform for the government.

(2) Implementing a "Regulatory Sandbox" to Encourage Format Innovation. Facing the continuous emergence of new formats in the "sports + tourism" field (like low-altitude flying, smart trail racing, sports NFTs), traditional approval thresholds are high and cycles are long. "Regulatory sandboxes" should be set up in specific areas (e.g., certain scenic spots, sports towns, or industrial parks). Within the "sandbox," new products and services are allowed to "go first and try" under the premise of "notification-commitment" and controllable risks. An evaluation committee composed of government, experts, enterprises, and consumer representatives dynamically observes, assesses risks, and adjusts regulatory rules during the process. For mature and reliable innovations, they are timely "graduated" from the sandbox and promoted; for uncontrollable risks, they are immediately halted. This "flexible" governance tool both stimulates market vitality and maintains the bottom line of safety.

6. CONSTRUCTION OF A POLICY COLLABORATIVE MECHANISM FOR "SPORTS + TOURISM" INTEGRATION IN QINGYUAN

An innovative policy toolbox must rely on an efficient collaborative mechanism to maximize its effectiveness. Qingyuan should break traditional governance inertia and build a "five-in-one" policy collaborative governance new system to provide institutional guarantees for the implementation of policy tools.

6.1. Target Collaboration: Establishing an "Integrated" Top-Level Strategy

Collaboration begins with consensus. If departments have inconsistent goals (e.g., Department A focuses on economic benefits, Department B on safety and stability, Department C on ecological protection), policy execution will inevitably be mutually restrictive.

First is to establish a high-level leading group. It is recommended that a main city leader chairs a "Qingyuan 'Sports + Tourism' Digital Integration Development Leading Group," with the heads of relevant departments such as Sports, Culture and Tourism, Industry and Information Technology, Development and Reform, Finance, Natural Resources, Transportation, Market Supervision, and the Data Bureau as members. The core duty of this group is to "set strategy, solve difficult problems, and coordinate," ensuring that integrated development becomes a "number one project" for the entire city.

Second is to draw "one blueprint." Break the situation where sports industry planning, tourism development planning, and digital economy planning are all separate. The leading group's office should take the lead in compiling a "Qingyuan 'Sports + Tourism' Digital Integration Development Special Plan (2026-2030)." This plan must clarify the overall goals, spatial layout, key projects, data standards, and departmental responsibility lists for integrated development, and include key indicators (e.g., proportion of digitally transformed enterprises, digital consumption share, data sharing rate) in the performance assessments of various departments, ensuring all relevant parties "work towards the same goal."

6.2. Organizational Collaboration: Building a "Matrix" Execution Structure

The establishment of goals requires strong organizational guarantees. A "matrix-style" collaborative structure that is "horizontal to the edge, vertical to the bottom" should be built to solve the "who does what, who is responsible" problem.

First is to establish a permanent coordination agency. Under the leading group, it is recommended to set up a permanent "'Sports + Tourism' Digital Integration Promotion Office" (or Center), relying on the Culture, Radio, Television, Tourism, and Sports Bureau or the Data Bureau. This agency must be fully empowered—possessing the right to advise on relevant project funds, the right to coordinate on cross-departmental matters, the right to operate the "Industrial Brain," and the right to supervise and assess the implementation by various departments. This ensures "matters are managed by dedicated personnel, responsibilities are borne by dedicated personnel," avoiding the formalization of "joint meetings."

Second is to establish cross-departmental "project-based" working groups. For specific integration projects, such as "Rafting IP Digitization," "Smart Scenic Spot Construction," or "Large-scale Digital Events," backbone forces should be drawn from relevant departments to form agile, temporary "Project-based" Teams (Task Forces). Such teams are project-oriented, break down departmental hierarchies, achieve flat communication and efficient promotion, and are disbanded upon project completion, maintaining organizational flexibility and combat-effectiveness.

6.3. Resource Collaboration: Achieving "One-Chessboard" Factor Allocation

The essence of policy collaboration is the collaboration of resource allocation. Departmental barriers to factor allocation must be broken to ensure "good steel is used on the knife's edge."

First is to coordinate the use of fiscal funds. Integrate existing special funds for the sports industry, tourism development, technological innovation, and digital transformation to establish a "'Sports + Tourism' Digital Integration Special Guidance Fund." Change the previous "sprinkling pepper" allocation method; the leading group should coordinate and implement "project pool" management, concentrating resources on major tasks, focusing investment on leading digital new infrastructure, "Industrial Brain" construction, core IP incubation, and public service platform projects.

Second is to promote data resource sharing. This is the top priority of resource collaboration. With the "Industrial Brain" as the hub, mandate the "unconditional collection, conditional use" of public data from all departments. Establish a performance appraisal and incentive mechanism for data sharing, incorporating the data sharing rate and data quality into departmental annual assessments, and even linking them to fiscal allocations. At the same time, explore "government-enterprise" data

cooperation models. Under the premise of ensuring security and compliance, the government can "exchange data for services" (e.g., using public data in exchange for industry analysis reports from OTA platforms) or purchase services to introduce data from operators and OTA platforms, achieving a "fusion" effect of data factors.

Third is to promote the sharing of talent resources. Establish a "Qingyuan Digital Sports-Tourism Expert Database," incorporating flexibly introduced talents, local university experts, and enterprise technical backbones, to achieve city-wide "intelligence sharing" and provide "point-to-point" consulting and technical support for SMEs.

6.4. Process Collaboration: Reengineering the "Full-Cycle" Governance Chain

Collaborative mechanisms must be embedded in the entire process of policy-making, execution, and feedback, forming a closed-loop management.

(1) Horizontal Process Collaboration: Departmental Linkage.

Establish a "parallel approval" mechanism. For new "sports + tourism" projects (especially new formats involving multiple-department approvals), implement "one-stop acceptance, online circulation, parallel approval, and time-limited completion," completely changing the dilemma of enterprises "running all over the city, getting approved one by one," and shortening the innovation cycle. Establish a "joint enforcement" mechanism. For cross-border market violations (such as online false advertising, virtual event fraud), departments such as culture and tourism, sports, market supervision, and cyberspace administration should carry out normalized joint enforcement to avoid regulatory vacuums and redundant labor.

(2) Vertical Process Collaboration: City-County Linkage.

Establish a linkage mechanism for municipal-level coordination and differentiated development in counties (cities). The municipal level is responsible for top-level design, "Industrial Brain" construction, unified data standards, and regional brand marketing; counties (cities) undertake municipal planning based on their own resource endowments (e.g., Lianzhou's Yao ethnic sports, Yingde's outdoor sports, Fogang's hot spring wellness), developing characteristic and differentiated digital sports-tourism projects. Through the "Industrial Brain," achieve data connection and command linkage between city and county levels; the municipal platform empowers counties (cities), and data from counties (cities) feeds back to the municipal platform, avoiding homogeneous competition and the "last mile" obstruction.

(3) Government-Society Process Collaboration: Government-Enterprise Interaction.

Establish a normalized government-enterprise consultation mechanism. Regularly hold "sports + tourism" digital integration government-enterprise round-table conferences to timely listen to the difficulties and policy demands encountered by enterprises (especially SMEs and digital startups) in digital transformation, making policy-making more "grounded." Encourage industry associations and industrial alliances to deeply participate in governance links such as data standard formulation, industry self-discipline, and credit evaluation, building a new pattern of "government-market-society" multi-actor co-governance.

6.5. Information Collaboration: Activating the "Intelligent" Decision-Making Hub

Information collaboration is the core of collaborative governance in the digital age. The other four types of collaboration (target, organization, resource, process) all require the efficient flow of information as a prerequisite. Its technical carrier is the "Industrial Brain."

The "Industrial Brain" is not only an environmental tool (infrastructure) and a governance tool (regulatory platform) but also the "central nervous system" of the entire collaborative mechanism.

Through real-time data aggregation and intelligent analysis, it provides strong support for the other four collaborations:

Supporting Target Collaboration: Through real-time monitoring and situational awareness of industrial data, dynamically assess the progress of strategic goals, provide warnings for indicators deviating from targets, and offer a scientific basis for top-level decision-makers to dynamically adjust strategies.

Supporting Organizational Collaboration: Through collaborative office modules and task distribution systems, make the collaboration of cross-departmental project teams online, visual, and traceable, clarifying task nodes and responsible persons.

Supporting Resource Collaboration: Display the investment direction and use-effectiveness of fiscal funds (e.g., voucher leverage ratio) in real-time, assisting resource allocation decisions; it is itself the core platform for data resource sharing.

Supporting Process Collaboration: The "one-stop-shop" (Yiwang Tongban) module simplifies approval processes; the "integrated management" (Yiwang Tongguan) module supports joint enforcement and emergency command, achieving "data runs more, departments run less," and greatly improving the efficiency of governance processes.

7. CONCLUSION AND OUTLOOK

The digital economy provides a historical opportunity for Qingyuan's "sports + tourism" industry to "change lanes and overtake," but it also poses systematic challenges to its traditional policy system and governance model. This study finds that Qingyuan's "sports + tourism" integration development faces profound policy dilemmas from the perspective of the digital economy, manifested as: "policy tool imbalance" dominated by traditional supply-side tools, "policy collaborative failure" characterized by departmental "silos" and "data islands," and "policy implementation obstruction" represented by the "time-lag effect" and the "last mile" problem.

To crack these dilemmas, this paper argues that Qingyuan's policy innovation should not be "piecemeal" patching but must be a "systematic reconstruction." The study proposes:

First, at the policy tool level, there must be a shift from reliance on traditional supply-side tools to building a four-dimensional innovative toolbox covering "environmental, supply-side, demand-side, and governance" tools. The innovative focus of this toolbox lies in: solidifying the industrial foundation with "environmental tools" such as digital new infrastructure and data governance; igniting innovation momentum with "supply-side tools" like IP incubation and platform construction; activating market potential with "demand-side tools" like precision marketing and digital consumption vouchers; and boldly introducing new "governance tools" like the "Industrial Brain" and "regulatory sandboxes" as breakthroughs for agile governance.

Second, at the collaborative mechanism level, there must be a shift from the governance inertia of "vertical fragmentation" to building a "five-in-one" collaborative governance new system covering "target, organization, resource, process, and information." The core of this system is: achieving "target collaboration" through high-level top-level design (leading groups and special plans); achieving "organizational collaboration" through a "matrix" structure of permanent agencies and project teams; achieving "resource collaboration" through coordinated funds and data sharing; achieving "process collaboration" through "parallel approval" and "city-county linkage"; and finally, using the "Industrial Brain" as the technical hub to achieve efficient "information collaboration," which in turn empowers the other four collaborative links.

The "four-dimensional toolbox" and "five-in-one collaborative mechanism" analytical framework constructed in this study not only provides a concrete policy action plan for Qingyuan but also offers a theoretical reference and governance paradigm of universal significance for other cities with unique

resources (such as ecological, cultural) in promoting deep industrial integration and digital transformation in the digital age.

Of course, as a qualitative study focusing on policy framework and mechanism design, the actual effectiveness of the tools and mechanisms proposed in this paper still needs to be dynamically adjusted and empirically tested in Qingyuan's future practice. Future research could further explore: the synergistic effects and substitution relationships of different policy tool combinations at different development stages; how to effectively resolve interest conflicts among multiple actors and establish long-term incentive-compatible mechanisms in the process of collaborative governance; and the data security risks that the "Industrial Brain" may encounter in practice and their evasion strategies.

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