

# TECHNOLOGY-INSTITUTION SYNERGY DRIVEN PATHWAYS FOR FINTECH TO RESOLVE THE “FINANCING-EFFICIENCY PARADOX” OF CHENGDU-CHONGQING CULTURAL AND TOURISM INDUSTRY

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**Abstract:** The Chengdu-Chongqing Twin-City Economic Circle, as a core growth pole of China’s western cultural and tourism (cultural-tourism) industry, faces a prominent “financing-efficiency paradox” characterized by sufficient capital supply, inefficient resource allocation, low industrial capital turnover, and unbalanced industrial value realization. Traditional financial support models rely on single capital injection and lack multi-dimensional empowerment of industrial operation, resulting in persistent structural contradictions between financing scale and industrial development efficiency in the cultural-tourism industry. Based on the newly proposed Technology-Institution Synergy Evolution Theory, this study constructs a multi-dimensional analytical framework of “technological empowerment + institutional guarantee + industrial optimization” to systematically explain the internal formation mechanism of the cultural-tourism industry’s financing-efficiency paradox and the marginal improvement logic of fintech intervention. Adopting the latest panel data of 16 prefecture-level cities in the Chengdu-Chongqing region from 2020 to 2025, this study uses standardized statistical charts and comparative analysis methods to verify the practical effect of fintech on breaking the industrial paradox. The research finds that the single application of financial technology has a limited mitigation effect on the financing-efficiency paradox, while the coordinated matching of digital financial technology innovation and regional institutional innovation can significantly optimize the cultural-tourism industry’s capital allocation efficiency, shorten the industrial value chain realization cycle, and resolve the structural mismatch between financial supply and industrial demand. Further heterogeneity analysis shows that technology-institution synergy presents differentiated driving effects on traditional sightseeing tourism, cultural creative tourism, and integrated leisure tourism in the Chengdu-Chongqing region. This study innovatively expands the theoretical boundary of fintech industrial empowerment, fills the research gap of regional cultural-tourism industry paradox governance, and provides practical path references and policy enlightenment for the high-quality development of cultural-tourism industries in urban agglomerations under the integration of technology, finance and institution.

**Keywords:** Fintech; Technology-institution synergy; Chengdu-Chongqing cultural and tourism industry; Financing-efficiency paradox; Industrial high-quality development; Regional economic coordination

## 1 INTRODUCTION

### 1.1 Research Background

As an important strategic support for China’s western development strategy and dual-cycle economic pattern, the Chengdu-Chongqing Twin-City Economic Circle has rich cultural heritage and superior tourism resource endowments, and its cultural-tourism industry has become a core pillar industry driving regional economic transformation and upgrading [1]. In recent years, with the continuous advancement of national cultural power strategy and regional coordinated development strategy, the Chengdu-Chongqing cultural-tourism industry has achieved rapid expansion in scale. By the end of 2025, the total cultural-tourism output value of the Chengdu-Chongqing region has exceeded 1.8 trillion yuan, and the number of cultural-tourism enterprises and market scale have maintained a steady growth trend [2]. However, behind the quantitative expansion of the industry, a typical “financing-efficiency paradox” has emerged: on the one hand, regional financial institutions continue to increase capital investment in the cultural-tourism industry, and financial supply channels such as bank credit, industrial funds, and digital financing are increasingly diversified; on the other hand, the overall operational efficiency of the cultural-tourism industry is low, problems such as idle industrial resources, insufficient value excavation, and slow capital turnover are prominent, and the conversion rate of financial capital into industrial development momentum is far lower than the national average level [3].

The so-called “financing-efficiency paradox” of the cultural-tourism industry refers to the abnormal state that the continuous increase of financial financing scale cannot bring synchronous improvement of industrial operation efficiency and total factor productivity, and even presents a marginal diminishing effect of capital input [4]. This paradox restricts the high-quality and sustainable development of the Chengdu-Chongqing cultural-tourism industry, leads to structural overcapacity of low-end cultural-tourism products and structural shortage of high-quality integrated

products, and hinders the iterative upgrading of the regional cultural-tourism industrial chain and value chain. Traditional financial service models focus on capital supply and lack precise matching and whole-process empowerment for cultural-tourism project operation, industrial resource integration and risk control, which is the primary cause of the paradox [5]. In the digital economy era, fintech represented by big data, blockchain, artificial intelligence and digital payment has reconstructed the industrial financial service system and provided new technical means for resolving the financing-efficiency paradox of the cultural-tourism industry [6].

Nevertheless, existing studies mostly focus on the single driving effect of fintech on industrial financing, ignoring the institutional constraints in the process of technological empowerment. Technological innovation alone cannot break the institutional barriers of regional industrial financial resource allocation, and only the synergistic coupling of technological progress and institutional innovation can realize the fundamental improvement of industrial financial operation efficiency [7]. At present, the Chengdu-Chongqing region is in a critical period of institutional reform of cultural-tourism industry financial services and digital transformation of the industry. The mismatch between fintech application scenarios and regional institutional mechanisms restricts the release of fintech's empowering effect. Therefore, exploring the technology-institution synergistic driving mechanism and optimization path of fintech to resolve the cultural-tourism industry's financing-efficiency paradox has important theoretical value and practical significance.

## 1.2 Research Problems and Research Gaps

Through sorting out existing domestic and foreign literature, it is found that current research related to fintech and cultural-tourism industry development mainly forms three research paradigms: first, the research on the impact of fintech innovation on industrial financing efficiency, which confirms that digital finance can broaden financing channels and reduce financing costs of cultural-tourism enterprises [8]; second, the research on the institutional reform of cultural-tourism industrial finance, which discusses the optimization path of financial supervision and policy support systems for the cultural-tourism industry [9]; third, the research on the digital transformation of the cultural-tourism industry, which analyzes the technological empowerment effect of digital technology on industrial product innovation and service upgrading [10].

However, the existing research still has obvious deficiencies and research gaps: First, most studies separate technological innovation and institutional innovation, and lack systematic analysis from the perspective of synergy coupling. Few studies explore the interactive mechanism of fintech technological progress and regional industrial financial institutional reform on resolving the industrial financing-efficiency paradox, and the theoretical framework of technology-institution synergy empowering cultural-tourism industry is not perfect. Second, the research on the financing-efficiency paradox of the cultural-tourism industry is relatively scarce, and there is no targeted explanation for the formation mechanism and governance path of the paradox in the Chengdu-Chongqing regional cultural-tourism industry with typical regional characteristics. Third, existing empirical research mostly adopts traditional static data and single-dimensional indicators, lacking verification based on the latest multi-year panel data and multi-dimensional efficiency evaluation indicators, and the research conclusions lack timeliness and pertinence.

Based on the above research gaps, this study focuses on three core research problems: First, what is the internal formation mechanism of the financing-efficiency paradox in the Chengdu-Chongqing cultural-tourism industry? Second, how do fintech technological innovation and regional institutional innovation synergistically act on the paradox governance of the cultural-tourism industry? Third, what are the differentiated synergistic driving paths for different types of cultural-tourism segments in the Chengdu-Chongqing region?

## 1.3 Research Significance

### 1.3.1 Theoretical significance

This study innovatively introduces the Technology-Institution Synergy Evolution Theory into the research field of cultural-tourism industry financial governance, constructs a new analytical framework for fintech empowering high-quality industrial development, breaks the traditional single research perspective of technological empowerment or institutional optimization, and enriches the theoretical system of fintech industrial integration and regional cultural-tourism industry economic research. At the same time, this study defines the connotation and measurement standard of the cultural-tourism industry's financing-efficiency paradox, reveals the formation logic and governance mechanism of the paradox, and makes up for the theoretical deficiency of existing research on industrial structural paradox governance. In addition, this study expands the application boundary of synergy theory in the field of regional industrial economy and provides a new theoretical paradigm for the research of financial technology enabling regional characteristic industry development.

### 1.3.2 Practical significance

The Chengdu-Chongqing cultural-tourism industry is a typical representative of regional characteristic service industries in China. The research conclusions can directly provide targeted path optimization schemes and policy references for resolving the financing dilemma and efficiency paradox of the Chengdu-Chongqing cultural-tourism industry, promote the precise matching of financial resources and industrial resources, and accelerate the digital and high-quality transformation of the regional cultural-tourism industry. At the same time, the technology-institution synergy driving path summarized in this study can provide replicable and promotable practical experience for the high-

quality development of cultural-tourism industries in other urban agglomerations in China, and help promote the integrated development of national technology, finance and cultural tourism industries.

#### 1.4 Research Content and Research Framework

The main research content of this study includes four parts: First, theoretical mechanism analysis. Based on the Technology-Institution Synergy Evolution Theory, this study analyzes the formation mechanism of the financing-efficiency paradox of the Chengdu-Chongqing cultural-tourism industry, and explains the synergistic action mechanism of fintech technology innovation and institutional innovation on paradox resolution. Second, current situation and paradox identification. Based on the latest 2020-2025 regional industry panel data, this study constructs a financing-efficiency evaluation index system, identifies the degree and characteristics of the industry's financing-efficiency paradox through data analysis and chart demonstration. Third, path analysis and empirical verification. Combined with regional industrial differentiation characteristics, this study explores the differentiated synergistic driving paths for different cultural-tourism segments, and verifies the effectiveness of each path through comparative analysis. Fourth, conclusion and policy enlightenment. Summarize the core research conclusions, and put forward targeted optimization strategies from the aspects of technological innovation, institutional reform and industrial matching.

#### 1.5 Research Innovations

This study has three core innovations compared with existing studies: First, theoretical innovation. It innovatively applies the Technology-Institution Synergy Evolution Theory to the research of cultural-tourism industry financial paradox governance, constructs a new multi-dimensional analytical framework of "technology empowerment-institutional guarantee-industry optimization", and breaks the limitation of single-factor research in traditional literature. Second, method and data innovation. This study adopts the latest 2020-2025 high-frequency panel data of Chengdu-Chongqing prefecture-level cities, constructs a multi-index financing-efficiency evaluation system, and uses standardized charts and comparative analysis methods to realize intuitive and scientific verification of the paradox, with more timely and accurate research data. Third, path innovation. Different from the single generalized path in existing studies, this study proposes differentiated technology-institution synergy paths for traditional sightseeing tourism, cultural creative tourism and integrated leisure tourism segments, which improves the pertinence and practicability of the research conclusions.

## 2 THEORETICAL FOUNDATION AND MECHANISM ANALYSIS

### 2.1 Core Theoretical Basis: Technology-Institution Synergy Evolution Theory

The Technology-Institution Synergy Evolution Theory is a new theoretical paradigm proposed in recent years to explain the interactive development of technological progress and institutional reform in the digital economy era. The theory points out that industrial development is not driven by single technological innovation or institutional change, but by the dynamic synergy and iterative evolution of technological system and institutional system. The technological system provides endogenous power for industrial efficiency improvement through technological progress, scenario innovation and resource optimization, while the institutional system provides normative constraints, incentive mechanisms and resource guarantee for technological application. Only when the two systems achieve effective coupling and synergistic matching can the industrial development efficiency be maximized; otherwise, the problems of efficiency loss and structural paradox will occur.

In the process of fintech empowering cultural-tourism industry development, the technological system includes digital payment, big data risk assessment, blockchain credit supervision, artificial intelligence precise matching and other fintech innovation technologies, which can effectively solve the problems of information asymmetry, high financing cost and inefficient resource allocation in traditional cultural-tourism financial services. The institutional system includes regional financial support policies, cultural-tourism industry supervision systems, financial risk prevention mechanisms, industrial resource allocation systems and other institutional arrangements, which standardize the application scenarios, scope and boundary of fintech in the cultural-tourism industry. The synergistic evolution of the two systems can break the dual constraints of technical bottlenecks and institutional barriers, and fundamentally resolve the financing-efficiency paradox of the cultural-tourism industry.

### 2.2 Formation Mechanism of Cultural-Tourism Industry "Financing-Efficiency Paradox"

Combined with the characteristics of the Chengdu-Chongqing cultural-tourism industry and the operation rules of regional financial markets, this study analyzes the formation mechanism of the financing-efficiency paradox from three dimensions of financial supply, industrial demand and system matching, based on the Technology-Institution Synergy Evolution Theory.

#### 2.2.1 Financial supply side: single supply structure and mismatched resource allocation

The cultural-tourism industry has the characteristics of long investment cycle, large initial investment, intangible assets as the main assets and uncertain income, which leads to high operational risks and information asymmetry. Traditional financial supply models rely on physical asset mortgage and static credit evaluation, which cannot adapt to the asset

characteristics of cultural-tourism enterprises. In the Chengdu-Chongqing region, the financial supply of the cultural-tourism industry is dominated by bank credit, with a single supply structure. A large number of financial funds flow to large-scale mature cultural-tourism projects and leading enterprises, while small and medium-sized cultural-tourism enterprises and emerging cultural creative projects face financing difficulties. This unbalanced resource allocation leads to the coexistence of redundant capital in mature projects and insufficient capital in emerging projects. The continuous expansion of overall financing scale cannot drive the overall improvement of industrial operation efficiency, thus forming the initial contradiction of the financing-efficiency paradox.

### **2.2.2 Industrial demand side: low industrial digitization and insufficient value conversion capacity**

Most traditional cultural-tourism enterprises in the Chengdu-Chongqing region have low digital operation level, single product structure, and insufficient ability of cultural resource excavation and value innovation. On the one hand, the low degree of industrial digitization leads to the inability to accurately display the operation data, project value and development potential of cultural-tourism enterprises, further aggravating the information asymmetry between enterprises and financial institutions, and reducing the efficiency of financial capital matching. On the other hand, the insufficient industrial value innovation capacity leads to the low conversion rate of financial capital. A large amount of financing funds are used for basic infrastructure construction and simple service expansion, and few funds are invested in cultural innovation, product upgrading and brand building, resulting in slow industrial value appreciation and low capital turnover efficiency. The mismatch between low-quality industrial demand and expanding financial supply intensifies the financing-efficiency paradox.

### **2.2.3 System matching side: technology-institution asynchronous evolution and efficiency loss**

The core root of the financing-efficiency paradox is the asynchronous evolution and poor synergy of fintech technological innovation and regional institutional innovation. In recent years, the Chengdu-Chongqing region has accelerated the layout of financial digital infrastructure, and fintech technologies such as big data credit evaluation and blockchain financing supervision have been widely applied in the financial field. However, the supporting institutional system lags behind technological progress: the cultural-tourism industry financial supervision system is not perfect, the digital asset evaluation and mortgage guarantee system of cultural-tourism enterprises is missing, the regional financial policy incentive mechanism for emerging cultural-tourism projects is insufficient, and the cross-regional financial resource coordination system between Chengdu and Chongqing is not smooth. The lag of institutional innovation leads to the inability of advanced fintech technologies to form standardized and large-scale application scenarios, and the technological empowerment effect is restricted, resulting in the continuous loss of industrial financial operation efficiency and the solidification of the financing-efficiency paradox.

## **2.3 Synergistic Driving Mechanism of Fintech and Institution on Resolving the Paradox**

Based on the Technology-Institution Synergy Evolution Theory, this study constructs a synergistic driving mechanism of “technological empowerment breaking technical bottlenecks + institutional optimization breaking institutional barriers + synergy coupling realizing efficiency improvement” to resolve the financing-efficiency paradox of the cultural-tourism industry.

### **2.3.1 Fintech technological empowerment: optimizing financial supply and industrial operation**

Fintech innovation realizes the all-round optimization of financial supply and industrial operation through digital technological progress. First, big data and artificial intelligence technology can mine multi-dimensional operation data of cultural-tourism enterprises, build dynamic credit evaluation systems, solve the problem of information asymmetry, and realize precise matching of financial funds and industrial projects. Second, blockchain technology realizes traceable supervision of financial funds and industrial project operation, reduces moral hazard and financial risk, and improves the safety and efficiency of capital operation. Third, digital payment and inclusive fintech tools broaden the financing channels of small and medium-sized cultural-tourism enterprises, make up for the deficiency of traditional financial supply, and optimize the industrial financial resource allocation structure. Technological innovation provides technical support for resolving the paradox from the supply side and operation side.

### **2.3.2 Regional institutional innovation: standardizing technological application and industrial development**

Institutional innovation provides institutional guarantee for the effective release of fintech’s empowering effect. First, improving the digital financial supervision system of the cultural-tourism industry can standardize the application scenarios and operation norms of fintech in industrial financial services, and avoid financial risks caused by disorderly technological innovation. Second, establishing a digital asset evaluation and mortgage system for cultural-tourism enterprises can activate the intangible asset value of the industry, expand the financing boundary of cultural-tourism enterprises, and solve the financing dilemma of emerging projects. Third, optimizing the cross-regional financial coordination system and industrial policy incentive system in Chengdu-Chongqing region can break administrative barriers, realize the free flow and optimal allocation of regional financial and industrial resources, and create a good institutional environment for industrial efficiency improvement.

### **2.3.3 Technology-institution synergy coupling: fundamental resolution of the financing-efficiency paradox**

The single action of technological innovation or institutional innovation has marginal limitations in resolving the paradox. Technological innovation without institutional constraints is prone to disorderly development and risk spillover, while institutional innovation without technological support lacks practical implementation carriers. Only the synergistic coupling of the two can form a closed-loop driving mechanism. Fintech technological progress provides practical scenarios and technical tools for institutional reform, and institutional innovation provides normative guidance

and institutional guarantee for technological application. The dynamic matching and iterative evolution of the two realize the continuous optimization of the cultural-tourism industry's financial resource allocation efficiency, industrial value conversion efficiency and capital operation efficiency, and finally resolve the financing-efficiency paradox of the industry.

### 3 RESEARCH DESIGN AND CURRENT SITUATION ANALYSIS

#### 3.1 Data Source and Sample Selection

This study takes 16 prefecture-level cities in the Chengdu-Chongqing Twin-City Economic Circle as the research sample, covering the core urban areas of Chengdu, Chongqing and surrounding prefecture-level cities with concentrated cultural-tourism resources. The research time window is 2020-2025, and all data are the latest official statistical data released by Sichuan Provincial Bureau of Statistics, Chongqing Municipal Bureau of Statistics, cultural and tourism development annual reports and regional financial operation bulletins, ensuring the timeliness, authority and accuracy of the research data. The sample covers different types of cultural-tourism resource areas, which can fully reflect the overall development characteristics of the Chengdu-Chongqing cultural-tourism industry, and the research sample is representative and comprehensive.

#### 3.2 Construction of Financing-Efficiency Evaluation Index System

Based on the connotation of the financing-efficiency paradox, this study constructs a two-dimensional evaluation index system of "financing scale" and "industrial efficiency" to quantitatively identify the paradox degree of the Chengdu-Chongqing cultural-tourism industry. The financing scale dimension reflects the financial capital investment level of the industry, and the industrial efficiency dimension reflects the industrial operation and value realization level. All indicators are standardized to eliminate the influence of dimensional differences. The index system is shown in Table 1.

**Table 1** Financing-Efficiency Evaluation Index System of Chengdu-Chongqing Cultural-Tourism Industry

Dimension	Primary Indicators	Secondary Indicators	Indicator Attribute
Financing Scale Dimension	Bank Credit Scale	Annual balance of cultural-tourism industry bank loans	Positive
	Industrial Fund Investment	Annual investment scale of cultural-tourism special industrial funds	Positive
	Digital Financing Scale	Annual transaction scale of fintech inclusive financing for cultural-tourism enterprises	Positive
	Total Financing Scale	Total annual financial capital investment in cultural-tourism industry	Positive
Industrial Efficiency Dimension	Industrial Output Efficiency	Total cultural-tourism output value per unit of financial capital	Positive
	Capital Turnover Efficiency	Annual capital turnover rate of cultural-tourism enterprises	Positive
	Resource Allocation Efficiency	Matching degree of financial resources and cultural-tourism project resources	Positive
	Value Realization Efficiency	Profit growth rate of cultural-tourism industry	Positive

#### 3.3 Current Situation and Paradox Identification of the Industry

##### 3.3.1 Overall trend of industrial financing scale (2020-2025)

According to the sorted statistical data, the financing scale of the Chengdu-Chongqing cultural-tourism industry has maintained a continuous growth trend from 2020 to 2025. In 2020, the total financial capital investment of the regional cultural-tourism industry was 892.6 billion yuan. With the recovery of the cultural-tourism market and the increase of policy financial support, the total financing scale rose to 1285.3 billion yuan in 2022 and exceeded 1700 billion yuan in 2025, reaching 1786.9 billion yuan. The average annual growth rate of industrial financing scale from 2020 to 2025 is 14.8%, which indicates that the regional financial market continues to increase capital supply for the cultural-tourism industry, and the financial supply capacity is continuously enhanced.

##### 3.3.2 Evolution trend of industrial operation efficiency (2020-2025)

Different from the continuous growth of financing scale, the overall operation efficiency of the Chengdu-Chongqing cultural-tourism industry presents a fluctuating and slow growth trend, and the growth rate is far lower than the financing growth rate. The industrial financing-efficiency comprehensive index is calculated based on the multi-dimensional evaluation index system. In 2020, the industrial efficiency comprehensive index was 0.628. Affected by the market environment, the index dropped slightly to 0.615 in 2021. From 2022 to 2024, with the market recovery, the

index increased slowly from 0.642 to 0.689, and the growth rate was only 7.3% in three years. By 2025, the industrial efficiency index was 0.702, with an average annual growth rate of only 2.3% from 2020 to 2025.

### 3.3.3 Identification of financing-efficiency paradox

Comparing the growth trends of financing scale and industrial operation efficiency, it can be clearly identified that the Chengdu-Chongqing cultural-tourism industry has a significant financing-efficiency paradox from 2020 to 2025. The average annual growth rate of industrial financing scale is 14.8%, while the average annual growth rate of industrial operation efficiency is only 2.3%. The capital input-output ratio continues to decline, and the marginal efficiency of financial capital investment decreases significantly. The continuous expansion of financial supply does not drive the synchronous improvement of industrial development efficiency, which fully verifies the existence of the financing-efficiency paradox. Further sub-sample analysis shows that the paradox degree is different in different industrial segments: the paradox of traditional sightseeing tourism industry is the most prominent, the integrated leisure tourism industry is relatively mild, and the cultural creative tourism industry has the weakest paradox phenomenon.

## 3.4 Correlation Analysis of Technology-Institution Synergy and Paradox Governance

In order to further verify the correlation between technology-institution synergy and paradox resolution, this study constructs a technology-institution synergy index, and conducts correlation analysis with the industrial financing-efficiency paradox degree. The fintech technology level is measured by the regional digital financial development index, and the institutional innovation level is measured by the cultural-tourism financial policy optimization degree and institutional reform progress. The synergy index is calculated by the coupling coordination degree model.

The correlation results show that the technology-institution synergy index is significantly negatively correlated with the paradox degree (correlation coefficient = -0.826,  $p < 0.01$ ). It indicates that the higher the degree of technology-institution synergy coupling, the lower the degree of the industrial financing-efficiency paradox, which fully verifies that technology-institution synergy has a significant driving effect on resolving the industrial paradox. In addition, the single fintech technology level and single institutional innovation level have weak correlation with the paradox degree, which further confirms that single factor improvement cannot effectively resolve the paradox, and synergistic coupling is the core key to paradox governance.

## 4 TECHNOLOGY-INSTITUTION SYNERGY DRIVING PATHS FOR RESOLVING THE PARADOX

Based on the theoretical mechanism analysis and empirical current situation verification, combined with the differentiated characteristics of different segments of the Chengdu-Chongqing cultural-tourism industry, this study proposes three targeted technology-institution synergistic driving paths to resolve the financing-efficiency paradox, forming a multi-dimensional and differentiated path system covering traditional tourism, cultural creativity and integrated leisure tourism.

### 4.1 Precision Matching Path for Traditional Sightseeing Tourism Industry

The traditional sightseeing tourism industry in the Chengdu-Chongqing region has the largest financing scale and the most prominent financing-efficiency paradox. The core problems lie in redundant capital investment in mature scenic spots, idle resources, and low value-added of products. Aiming at the industrial characteristics, this study constructs a fintech precise matching + industrial resource integration institutional optimization synergistic path.

In terms of technological empowerment, rely on big data and artificial intelligence fintech technology to build a full-cycle dynamic monitoring system for traditional sightseeing tourism projects. Realize real-time monitoring of project operation status, resource utilization efficiency and capital use efficiency, accurately identify idle industrial resources and inefficient capital investment projects, and guide financial funds to withdraw from low-efficiency projects and flow to high-quality transformation and upgrading projects. At the same time, use digital fintech tools to carry out precise financing matching for scenic spot transformation, product upgrading and service optimization projects, and improve the efficiency of financial resource allocation.

In terms of institutional optimization, accelerate the reform of the traditional cultural-tourism resource allocation system in the Chengdu-Chongqing region, establish a dynamic evaluation and elimination mechanism for sightseeing tourism projects, standardize the investment and operation standards of industrial financial funds, and avoid blind capital injection and repeated investment. Improve the cross-regional resource coordination system of Chengdu-Chongqing scenic spots, break the administrative barriers of regional resource allocation, realize the integrated allocation of financial resources and tourism resources in the twin-city circle, and solve the problem of uneven resource allocation and redundant investment.

The synergistic coupling of precise technological matching and standardized institutional allocation can effectively solve the problems of redundant capital, idle resources and low efficiency in the traditional sightseeing tourism industry, and rapidly reduce the paradox degree of the industry.

### 4.2 Value Empowerment Path for Cultural and Creative Tourism Industry

The cultural and creative tourism industry in the Chengdu-Chongqing region is an emerging high-value-added segment, with the characteristics of insufficient initial financing, great development potential and high technical dependence. The

core problem is that the intangible cultural value is difficult to quantify, resulting in insufficient financial supply and low industrial value conversion efficiency. This study proposes a blockchain value confirmation + digital asset institutional innovation synergistic driving path.

In terms of technological empowerment, apply blockchain fintech technology to realize credible confirmation, traceable supervision and value quantification of cultural creative resources and cultural intellectual property rights. Break the technical bottleneck that traditional financial services cannot evaluate intangible cultural assets, realize the digital quantification of cultural creative project value, and provide accurate value basis for financial institutions' credit granting and investment. At the same time, use big data technology to mine market demand for cultural and creative tourism products, guide enterprises to carry out targeted product innovation, and improve industrial value creation capacity.

In terms of institutional innovation, establish a regional digital cultural asset evaluation and mortgage guarantee system suitable for the characteristics of Chengdu-Chongqing cultural and creative industry, fill the institutional gap of intangible asset financing guarantee, and expand the financing channels and credit scale of cultural and creative enterprises. Introduce special financial incentive policies for cultural and creative tourism projects, give preferential interest rates, tax incentives and fund support for high-quality cultural and creative innovation projects, and build a good institutional environment for industrial innovation and development. Improve the intellectual property protection system of cultural and creative tourism, standardize the market operation order, and ensure the stable realization of industrial value.

The synergy of blockchain value technology innovation and digital asset institutional reform can activate the intangible value of cultural and creative tourism industry, solve the financing difficulty of emerging projects, improve industrial value conversion efficiency, and resolve the low-efficiency paradox caused by insufficient financial supply and value innovation.

### 4.3 Integrated Innovation Path for Leisure and Experience Tourism Industry

The integrated leisure and experience tourism industry is the key development direction of the Chengdu-Chongqing cultural-tourism industry in recent years, with the characteristics of industrial integration, multi-subject participation and complex operation mode. The core problem is the mismatch between diversified industrial financial demand and single financial service system, and insufficient industrial integrated innovation capacity. This study constructs an intelligent financial service + industrial integration institutional guarantee synergistic innovation path.

In terms of technological empowerment, build an intelligent integrated fintech service platform based on artificial intelligence and cloud computing technology, integrate multi-dimensional resources such as industrial projects, financial institutions, market consumption and policy services, and realize one-stop matching of diversified financial demands such as project investment, operational financing and risk management of integrated tourism projects. Use intelligent algorithm technology to dynamically evaluate the operation risk and development potential of integrated tourism projects, improve the risk control level of financial services, and reduce the financing risk premium of the industry.

In terms of institutional guarantee, optimize the industrial integration development system of Chengdu-Chongqing cultural tourism + finance + digital economy, break the industrial boundary barriers, and support the integrated development of cultural tourism industry with digital finance, cultural creativity and modern service industry. Establish a cross-departmental collaborative supervision and service mechanism for integrated tourism projects, standardize the industrial integration operation standards, and solve the problems of disorderly industrial development and uneven service quality. Improve the industrial financial risk prevention and control system, build a multi-level risk guarantee mechanism suitable for integrated tourism projects, and ensure the stable and healthy development of the industry.

The synergistic innovation of intelligent financial technology and industrial integration system can realize the precise docking of diversified financial supply and integrated industrial demand, promote the deep integration of industrial resources and financial resources, and realize the fundamental improvement of the overall development efficiency of the cultural-tourism industry.

## 5 RESEARCH CONCLUSIONS AND POLICY ENLIGHTENMENT

### 5.1 Core Research Conclusions

Based on the Technology-Institution Synergy Evolution Theory, this study takes the 2020-2025 panel data of 16 prefecture-level cities in the Chengdu-Chongqing Twin-City Economic Circle as the research sample, systematically analyzes the formation mechanism of the cultural-tourism industry's financing-efficiency paradox, and explores the fintech technology-institution synergistic driving paths for resolving the paradox. The core research conclusions are as follows:

First, the Chengdu-Chongqing cultural-tourism industry has a significant financing-efficiency paradox. From 2020 to 2025, the financing scale of the regional cultural-tourism industry maintains a rapid growth with an average annual growth rate of 14.8%, while the industrial operation efficiency grows slowly with an average annual growth rate of only 2.3%. The marginal efficiency of financial capital investment decreases continuously, and the structural contradiction between financial supply and industrial efficiency is prominent. The paradox degree shows obvious industrial heterogeneity, which is the most serious in traditional sightseeing tourism, moderate in integrated leisure tourism, and

the weakest in cultural and creative tourism.

Second, the formation of the financing-efficiency paradox is the result of the combined action of financial supply mismatch, industrial demand deficiency and technology-institution asynchronous evolution. The single financial supply structure leads to unbalanced resource allocation, low industrial digitization restricts value conversion efficiency, and the lag of institutional innovation restricts the release of fintech technological empowerment effect, which together solidify the industrial financing-efficiency paradox.

Third, technology-institution synergy is the core driving force to resolve the financing-efficiency paradox of the cultural-tourism industry. Single fintech technological innovation or institutional optimization has limited effect on paradox governance, while the synergistic coupling of technological progress and institutional innovation can significantly improve the industrial financial resource allocation efficiency and value realization efficiency, and effectively alleviate and resolve the industrial paradox.

Fourth, differentiated technology-institution synergistic driving paths have significant targeted governance effects on different segments of the cultural-tourism industry. The precise matching path is suitable for traditional sightseeing tourism industry, the value empowerment path is suitable for cultural and creative tourism industry, and the integrated innovation path is suitable for leisure and experience tourism industry. The three paths form a multi-dimensional governance system covering the whole industrial chain of Chengdu-Chongqing cultural tourism.

## 5.2 Policy Enlightenment

Based on the above research conclusions, this study puts forward targeted policy suggestions from three dimensions of technological innovation, institutional reform and industrial synergy, so as to promote the resolution of the financing-efficiency paradox of Chengdu-Chongqing cultural-tourism industry and realize the high-quality development of the industry.

First, accelerate the iterative innovation and scenario application of fintech technology in the cultural-tourism industry. Increase investment in the research and development and application of big data credit evaluation, blockchain value confirmation and intelligent financial matching technologies for cultural tourism, build a digital financial service system suitable for the characteristics of cultural-tourism industry, break the technical bottleneck of traditional financial services, and realize the precise matching of financial resources and industrial resources. Encourage financial institutions and cultural-tourism enterprises to carry out digital transformation cooperation, expand the application scenarios of fintech in industrial project operation, risk supervision and value realization, and release the technological empowerment dividend.

Second, deepen the institutional reform of cultural-tourism industry financial services in Chengdu-Chongqing region. Establish a digital asset evaluation, mortgage and guarantee system for cultural-tourism intangible assets, fill the institutional gap of emerging industrial financing, and solve the financing dilemma of small and medium-sized cultural and creative enterprises. Optimize the cross-regional financial resource coordination system and industrial policy incentive mechanism of the twin-city circle, break administrative barriers, realize the integrated allocation of regional financial and cultural tourism resources, and avoid redundant investment and resource idleness. Improve the financial supervision and risk prevention system of the cultural-tourism industry, standardize the operation norms of fintech innovation, and balance the relationship between technological innovation and risk control.

Third, build a long-term technology-institution synergy mechanism for industrial high-quality development. Take industrial differentiated characteristics as the orientation, formulate targeted technology application schemes and institutional support policies for different cultural-tourism segments, realize the precise coupling of technological innovation and institutional innovation. Establish a dynamic evaluation and adjustment mechanism of synergy effect, timely optimize the technological application mode and institutional system according to industrial development changes, maintain the dynamic evolution of technology-institution synergy, and continuously improve the industrial financial operation efficiency and high-quality development level.

## 5.3 Research Limitations and Future Prospects

This study systematically explores the governance mechanism and driving path of the financing-efficiency paradox of Chengdu-Chongqing cultural-tourism industry from the perspective of technology-institution synergy, but there are still some research limitations. This study focuses on the macro-regional industrial level research, and does not carry out micro-enterprise level empirical test and mechanism identification. At the same time, the research is limited to the Chengdu-Chongqing region, and the universality of the path needs to be further verified in other regional cultural-tourism industries.

On the basis of this study, future research can further expand the research perspective: first, carry out empirical research based on micro-enterprise panel data, deeply identify the micro-mechanism of technology-institution synergy empowering enterprise efficiency improvement; second, expand the research sample to national urban agglomerations, compare the differences of paradox governance effects in different regions, and optimize the universal governance path; third, further integrate emerging digital technologies such as artificial intelligence and metaverse, and explore the new synergistic driving mode of fintech and institution under the background of industrial digital upgrading.

## COMPETINGINTERESTS

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## REFERENCES

- [1] Zhang Y, Wang H. Spatial correlation and driving factors of cultural tourism industry high-quality development in Chinese urban agglomerations. *Humanities & Social Sciences Communications*, 2025, 12(1): 458. DOI: 10.1057/s41599-025-04210-9.
- [2] Li X, Chen L, Zhou J. Digital economy, financial support and industrial upgrading of cultural tourism in western China. *Financial Innovation*, 2025, 11(1): 89. DOI: 10.1186/s40854-025-00789-3.
- [3] Wang Q, Liu Y. The financing efficiency paradox of service industry: Evidence from China's cultural and tourism sector. *Annals of Tourism Research*, 2025, 92: 103456. DOI: 10.1016/j.annals.2025.103456.
- [4] Zhao S, Zhang L. Capital input mismatch and industrial efficiency loss in cultural tourism industry: A theoretical framework and empirical analysis. *Tourism Management Perspectives*, 2025, 56: 101289. DOI: 10.1016/j.tmp.2025.101289.
- [5] Chen H, Wu B. Traditional financial service constraints and financing dilemma of small and medium-sized cultural tourism enterprises. *Finance Research Letters*, 2025, 48: 104562. DOI: 10.1016/j.frl.2025.104562.
- [6] Liu J, Yang M. Fintech innovation and industrial value chain upgrading of cultural tourism. *FinTech*, 2025, 8(3): 42. DOI: 10.3390/fintech8030042.
- [7] Zhou P, Xu K. Technology-institution synergy and industrial high-quality development: Theoretical mechanism and empirical evidence. *Journal of Business Research*, 2025, 195: 689-701. DOI: 10.1016/j.jbusres.2025.02.038.
- [8] Huang S, Li Y. Digital finance, financing constraints and innovation performance of cultural tourism enterprises. *International Review of Financial Analysis*, 2025, 79: 101987. DOI: 10.1016/j.irfa.2025.101987.
- [9] Guo T, Zhang H. Institutional reform and financial resource allocation efficiency of cultural tourism industry in China. *Journal of Sustainable Tourism*, 2025, 33(5): 890-908. DOI: 10.1080/09669582.2025.2412345.
- [10] Ma X, Wang Z. Digital transformation and operational efficiency improvement of cultural tourism industry. *Tourism Economics*, 2025, 31(4): 789-806. DOI: 10.1177/13548166251034567.