

# AN ECONOMIC ANALYSIS OF THE IMPACT OF DIGITAL ECONOMY DEVELOPMENT ON THE INHERITANCE OF JIAMA WOODBLOCK PRINTING

Tong Wu<sup>1\*</sup>, RongQi Yu<sup>1</sup>, JinPeng Lin<sup>1</sup>, YuXuan Bi<sup>2</sup>, CuiYu Wu<sup>3</sup>

<sup>1</sup>*School of Mathematics and Statistics, Yunnan University, Kunming 650504, Yunnan, China.*

<sup>2</sup>*School of History and Archives, Yunnan University, Kunming 650091, Yunnan, China.*

<sup>3</sup>*School of Art and Design, Yunnan University, Kunming 650091, Yunnan, China.*

*Corresponding Author: Tong Wu, Email: [longchendktd@163.com](mailto:longchendktd@163.com)*

**Abstract:** With the rapid development of the digital economy, the protection and transmission of intangible cultural heritage (ICH) have encountered both new opportunities and challenges. This paper focuses on Jiama woodblock printing, a traditional carrier of folk culture, and explores the impact mechanisms of digital economy development on its inheritance through a questionnaire-based empirical study. The research findings indicate: first, the development of the digital economy significantly promotes the inheritance of Jiama woodblock printing; second, such promotion occurs through enhancing the dissemination of Jiama art and expanding its audience base. Based on these findings, the paper proposes several strategies: deep integration of digital technologies with ICH, improved digital literacy training for inheritors, and the establishment of a government-led, multi-stakeholder support mechanism. These measures aim to achieve the dynamic inheritance and sustainable development of Jiama woodblock printing. This study expands the research perspective on the empowerment of ICH protection by the digital economy and provides both theoretical insights and practical references for addressing intergenerational transmission gaps and enhancing market competitiveness.

**Keywords:** Digital economy; Intangible cultural heritage; Jiama woodblock printing inheritance; Mediation effect

## 1 INTRODUCTION

### 1.1 Research Background

In recent years, China's digital economy has grown rapidly, permeating sectors such as finance, education, and cultural dissemination. Technologies like big data, cloud computing, and the Internet of Things have driven new industries and reshaped consumer behavior through livestream e-commerce and short video marketing[1]. This transformation offers new opportunities for the protection and inheritance of intangible cultural heritage (ICH). Jiama woodblock printing, as a vital bearer of traditional Chinese folk culture, stands to benefit from digital empowerment by overcoming traditional limitations and enabling broader, more innovative dissemination.

However, challenges remain. Traditional ICH transmission relies on oral and manual teaching, now threatened by aging inheritors and limited youth engagement. While digital tools have enhanced visibility, content often lacks depth and cultural authenticity. Most digital museums remain static and underutilize immersive technologies like VR and AI. Moreover, local governments often prioritize recognition over sustainable support, and insufficient marketization hinders innovation. The gap between ICH and modern urban life continues to widen, with public awareness and participation remaining low[2].

To address this, the paper constructs a framework linking digital economy development, Jiama dissemination, audience expansion, and heritage transmission, and proposes corresponding hypotheses. Compared to previous research, this study contributes in two key ways. First, it integrates the digital economy perspective into ICH studies, highlighting how digital tools enhance dissemination and audience engagement using Jiama as a case. Second, it proposes targeted strategies—such as IP-based development, cross-sector collaboration, and youth-oriented digital outreach—to address commercialization barriers and intergenerational transmission challenges[3].

### 1.2 Research Status

#### 1.2.1 Research status of digital economy development

The digital economy plays a pivotal role in China's socialist modernization and represents a strategic choice to seize the opportunities presented by the new wave of technological revolution and industrial transformation. Li Sanxi (2021) [4] points out that China's digital economy has entered the global leading tier, as evidenced by the steady advancement of digital industrialization, the accelerated development of industrial digitalization, the significant progress in digital governance, and the ongoing improvement of the data factor market. In addition, the author summarizes several key factors behind China's success in developing its digital economy, including the decisive role of the market in resource allocation, the government's leading role in the construction of digital infrastructure, and a regulatory approach

characterized by inclusiveness and prudence.

Although China has made remarkable achievements in digital development, its digital economy still faces several challenges, including the lack of core underlying technologies, insufficient integration of the digital and real economies, the need for further improvement in the development of a digital society and digital government, and the relatively early-stage construction of a digital ecosystem. As noted by Yang Zhaoxia[5], the current development of the digital economy is constrained by the absence of foundational core technologies, thereby limiting its potential to drive high-quality economic growth. Li Sanxi et al.[6] further emphasize that the digital economy continues to encounter problems such as weak integration between digital technologies and real industries, underdeveloped digital governance systems, and an immature digital ecosystem. Therefore, moving forward, it is essential to strengthen innovation in foundational technologies and enhance the construction of digital infrastructure to ensure the sustainable development of the digital economy.

### **1.2.2 Research status of Jiamia Woodblock Printing**

As an important component of Chinese folk woodblock printing, Jiamia woodblock printing has long played a significant role in folk beliefs, religious rituals, and cultural transmission. Studies have shown that Jiamia printing not only embodies a wealth of ethnic cultural symbols but also reflects regional variations in social beliefs and artistic styles. Wan Huiling[7] points out that Jiamia printing and zhima art both belong to China's woodblock print heritage, integrating traditional beliefs and folk customs, and possess substantial cultural, educational, and aesthetic value. Li Jing[8] further analyzes the historical background of Jiamia art in Yunnan, arguing that it gradually developed into a unique form of folk printmaking under the influence of Han culture from the Central Plains, while continuously evolving through intercultural exchanges among different ethnic groups. In addition, recent research has addressed the challenges and directions for the inheritance and innovation of Jiamia printing in contemporary society, including issues such as intangible cultural heritage protection, market-oriented application, and digital dissemination. However, existing studies remain relatively fragmented, and further systematic and in-depth exploration is still needed.

### **1.2.3 Research status of the influence of digital economy development on intangible cultural heritage**

Although digitization offers new pathways for the protection and dissemination of intangible cultural heritage (ICH), its practical implementation still faces multiple challenges. One of the foremost issues is the tension between technological application and cultural attributes. Song Junhua et al. (2023) [9] point out that current ICH digitization tends to emphasize technology over culture, neglecting the living and localized nature of heritage practices, which results in a loss of cultural meaning. Bai Jinxiang et al. (2023)[10], using traditional sports heritage as an example, reveal issues such as overly simplistic preservation methods and an imbalanced transmission system. While digitization has alleviated some of these problems, it has not fundamentally resolved them.

Secondly, the lack of institutional support restricts the long-term development of ICH digitization. Yi Ling et al. [11] emphasize that the digitization of intangible cultural heritage involves complex intellectual property issues, such as unclear ownership and the absence of effective transaction mechanisms, highlighting the urgent need for a tiered protection system and the development of dedicated trading platforms. At the same time, Gao Jiesong et al. [12] argue that although intelligent technologies have improved the construction of ICH databases, the limited participation and discourse power of heritage bearers in technological applications weakens the sustainability of the cultural ecosystem.

The rapid development of the digital economy has provided technical tools and innovative approaches for the preservation of intangible cultural heritage (ICH). However, the transmission of ICH remains constrained by technological alienation, institutional deficiencies, and regional disparities. Going forward, it is essential to promote the deep integration of technology and culture, improve mechanisms for rights protection, and address the digital divide in order to achieve the living transmission and value regeneration of ICH.

### **1.2.4 Literature review**

Existing research indicates that the digital economy plays a significant role in driving industrial transformation and improving social governance. However, it still faces challenges such as deficiencies in key technologies and the underdevelopment of the digital ecosystem. Studies on Jiamia Woodblock Printing have largely focused on its cultural value, historical evolution, and challenges in transmission, but the research remains fragmented and lacks systematic analysis. Moreover, while the digital economy offers new technological tools for the preservation of intangible cultural heritage (ICH), the digitization process often prioritizes technology over culture, weakening the living nature of ICH. At the same time, issues such as insufficient institutional safeguards and the diminished discourse power of inheritors remain unresolved. Overall, current research provides theoretical support for the role of the digital economy in ICH preservation, but there is still a need to deepen the integration of digital technologies with cultural transmission and to improve related policy frameworks to promote the sustainable development of ICH.

## **2 THEORETICAL MECHANISMS AND RESEARCH HYPOTHESES ON THE IMPACT OF DIGITAL ECONOMY DEVELOPMENT ON THE TRANSMISSION OF JIAMA WOODBLOCK PRINTING**

### **2.1 The Influence of the Development of Digital Economy on the Inheritance of Jiamia Woodblock Printing**

In the context of the digital economy, the modes of intangible cultural heritage (ICH) production are shifting from traditional handicrafts to digitalized processes. The production of Jiamia Woodblock Printing can leverage technologies

such as digital engraving, AI-assisted design, and 3D printing to enhance production efficiency, lower the barriers of manual craftsmanship, and ensure high-precision reproduction of techniques. These advances also strengthen the creative transformation and product upgrading capabilities of Jiama Woodblock Printing, thereby promoting its transmission. Based on this, the following hypothesis is proposed:

Hypothesis 1: The development of the digital economy significantly promotes the transmission of Jiama Woodblock Printing.

## 2.2 The Mediating Effect of the Spread of Jiama Woodblock Printing

Traditional modes of intangible cultural heritage (ICH) dissemination have largely relied on localized displays, making it difficult to reach a broader audience. In the digital economy era, platforms such as short videos, livestreaming, and e-commerce have created new opportunities for the promotion and transmission of Jiama Woodblock Printing. For instance, short video platforms can enhance public awareness of its cultural value by narrating the historical background and technical details of Jiama Woodblock Printing. In addition, online education and digital museums offer more accessible channels for the transmission of its craftsmanship. Based on this, the following hypothesis is proposed:

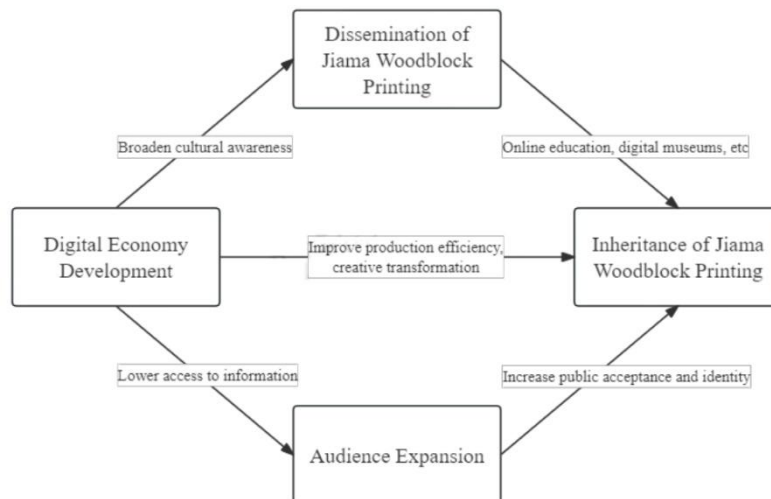
Hypothesis 2: The development of the digital economy facilitates the dissemination of Jiama Woodblock Printing and further promotes its transmission and preservation by enhancing public awareness and interest in learning.

## 2.3 The Mediating Effect of Expanding Audience Group

Driven by the digital economy, the dissemination and consumption channels of Jiama Woodblock Printing have continuously expanded, offering more people the opportunity to access and understand this form of intangible cultural heritage. Platforms such as short videos, social media, and e-commerce have lowered the threshold for information acquisition, enabling Jiama Woodblock Printing to reach a wider audience—including younger consumers and international markets. Furthermore, its integration with modern design and cultural and creative industries has aligned it more closely with contemporary aesthetic trends, enhancing public acceptance and cultural identification. Based on this, the following hypothesis is proposed:

Hypothesis 3: The development of the digital economy can effectively broaden the audience base for Jiama Woodblock Printing, thereby further promoting its transmission and development.

The theoretical framework illustrating the impact of digital development on the transmission of Jiama Woodblock Printing is shown in the Figure 1 below:



**Figure 1** Theoretical Mechanism Diagram

## 3 AN EMPIRICAL ANALYSIS OF THE IMPACT OF DIGITAL ECONOMY DEVELOPMENT ON THE INHERITANCE OF JIAMA WOODBLOCK PRINTING

### 3.1 Basic Information of the Questionnaire

This study employed a random sampling method to conduct a nationwide survey through online questionnaires. After excluding responses with more than one-third of the items left blank, evident patterned answers, and significant missing basic information, a total of 203 valid questionnaires were retained.

Descriptive statistical analysis was used to validate the collected data, including frequencies and corresponding proportions. The overall characteristics of the sample were analyzed based on the respondents' gender, age, educational background, and occupation.

As shown in Table 1, male respondents accounted for 51.72%, while female respondents accounted for 48.28%,

indicating a relatively balanced gender distribution. The respondents represented a wide range of age groups, with the largest proportion aged 26–35 (33.50%), followed by those aged 36–45 (23.65%). Respondents under 18 and over 60 were relatively few, accounting for 11.33% and 9.85% respectively. A high proportion of respondents held a bachelor's degree or higher, with undergraduates comprising 36.45% and those with a master's degree or above accounting for 17.73%. The respondents' occupations were diverse. The largest group was general employees (27.09%), followed by business managers (11.82%) and commercial/service workers (6.90%). Students also accounted for a significant share, at 17.24%.

This survey covered respondents of different genders, ages, educational levels, and occupational backgrounds, providing comprehensive data support for studying the inheritance and development of Jiama Woodblock Printing in the context of the Digital Economy.

**Table 1** Basic Information of the Questionnaire

Variable	Category	Frequency	Percentage	Cumulative Percentage
Gender	Male	105	51.72%	51.72%
	Female	98	48.28%	100%
Age	Under 18	23	11.33%	11.33%
	18–25 years	12	5.91%	17.24%
	26–35 years	68	33.50%	50.74%
	36–45 years	48	23.65%	74.39%
	46–60 years	32	15.76%	90.15%
	Over 60	20	9.85%	100%
Educational Background	Junior high school or below	17	8.37%	8.37%
	High school	29	14.29%	22.66%
	Associate degree	47	23.15%	45.81%
	Bachelor's degree	74	36.45%	82.26%
	Master's degree or above	36	17.73%	99.99%
	Student	35	17.24%	17.24%
	Government/Agency Official/Public Servant	13	6.40%	23.64%
Occupation	Business Manager	24	11.82%	35.46%
	General Employee	55	27.09%	62.55%
	Professional Technician	9	4.43%	66.98%
	Commercial/Service Industry Worker	14	6.90%	73.88%
	General Worker	9	4.43%	78.31%
	Agriculture/Forestry/Animal Husbandry/Fishery Worker	7	3.45%	81.76%
	Freelancer	15	7.39%	89.15%
	Unemployed	5	2.46%	91.61%
	Other Occupation	17	8.37%	99.98%

## 3.2 Questionnaire Reliability and Validity Test

### 3.2.1 Reliability test results

**Table 2** Reliability Test

Cronbach's alpha	Normalized Cronbach's alpha	Number of terms
0.890	0.793	13

This study conducted a reliability test on the questionnaire, and the results are shown in Table 2. The overall Cronbach's Alpha coefficient was 0.890, indicating a high level of internal consistency reliability. Additionally, the standardized item Cronbach's Alpha was 0.793, further confirming the reliability of the questionnaire. The measurement items demonstrated good consistency within the overall structure, and the data exhibited high stability, making it suitable for subsequent statistical analysis.

### 3.2.2 Validity test results

The Kaiser-Meyer-Olkin (KMO) test is used to measure the adequacy of the correlation among variables for further analysis. The KMO value ranges from 0 to 1, and it is generally considered that  $KMO \geq 0.6$  indicates a reasonable data

structure. Bartlett's test of sphericity is used to examine whether the correlations among variables are significant; if  $p < 0.05$ , it suggests strong correlations among variables, indicating a reasonable questionnaire structure suitable for further analysis.

As shown in Table 3, In this study, the KMO measure of sampling adequacy was 0.699, which is close to 0.7, indicating good internal consistency and a well-designed questionnaire. The approximate chi-square value of Bartlett's test of sphericity was 192.223, with 6 degrees of freedom and a significance level of  $p < 0.001$ , suggesting significant correlations among variables and supporting the validity analysis of the questionnaire. Therefore, the questionnaire demonstrates good validity and is appropriate for subsequent research analysis.

**Table 3** Validity Test

	KMO	0.699
Bartlett's Test of Sphericity	Approximate chi-square	192.223
	Degree of freedom	6
	Significance	0.000

### 3.3 Regression Analysis

This study employs a regression analysis method, taking Digital Economy Development as the independent variable and the Inheritance of Jiam Woodblock Printing as the dependent variable, to empirically examine the relationship between them. The regression results Table 4 show that Digital Economy Development has a significant positive impact on the Inheritance of Jiam Woodblock Printing, with a regression coefficient of 7.035 and passing the 1% significance level ( $p < 0.01$ ). This suggests that the development of the digital economy can effectively promote the inheritance of Jiam Woodblock Printing. The model's  $R^2$  is 0.239, indicating that it explains 23.9% of the variation in inheritance, and the adjusted  $R^2$  is 0.235, showing a relatively stable model fit. The F-value is 63.09 with a significance level of 0.000, further proving the model's overall statistical significance. Thus, it can be concluded that Digital Economy Development plays a positive role in advancing the Inheritance of Jiam Woodblock Printing.

**Table 4** Regression Analysis Table

VARIABLES	Inheritance of Jiam Woodblock Printing
Digital Economy Development	7.035*** (7.94)
Constant	68.065*** (13.25)
Observations	203
R-squared	0.239
F test	0
r <sup>2</sup> _a	0.235
F	63.09

The regression equation model is as follows:

$$y = 7.035x + 68.065 \quad (1)$$

### 3.4 Intermediate Effect Test

To further explore the mechanism through which Digital Economy Development influences the Inheritance of Jiam Woodblock Printing, this study takes Digital Economy Development as the independent variable and the Inheritance of Jiam Woodblock Printing as the dependent variable. The Bootstrap method is employed to test the mediating paths, focusing on the mediating effects of Dissemination of Jiam Woodblock Printing and Audience Expansion.

**Table 5** Results of Mediation Effect Test

		Bootstrap test				
		coefficient	Standard error	z	Statistical level	95% confidence interval
Dissemination of Jiam Woodblock Printing	Indirect effect	0.177	0.048	3.68	1%	[0.082748, 0.271612]
Audience Expansion	Indirect effect	0.281	0.038	7.47	1%	[0.20747, 0.3551386]
		Sobel test				
Dissemination of Jiam Woodblock Printing	Indirect effect					0.119755
	Direct effect					0.17718
	Total effect					0.296935
Audience Expansion	Indirect effect					0.015631

Direct effect	0.281304
Total effect	0.296935

As shown in Table 5, the indirect effect coefficient of the Dissemination of Jiamia Woodblock Printing is 0.177, with a standard error of 0.048, a z-value of 3.68, and a 95% confidence interval of [0.082748, 0.271612]. The total effect coefficient is 0.296935. This indicates that Digital Economy Development significantly promotes the Dissemination of Jiamia Woodblock Printing, and that dissemination, as a mediating variable, has a significant impact on the dependent variable—Inheritance of Jiamia Woodblock Printing. The indirect effect coefficient of Audience Expansion is 0.281, with a standard error of 0.038, a z-value of 7.47, and a 95% confidence interval of [0.20747, 0.3551386]. The total effect coefficient is also 0.296935. This indicates that Digital Economy Development significantly promotes Audience Expansion, and that audience expansion, as a mediating variable, also has a significant impact on the Inheritance of Jiamia Woodblock Printing.

In the process of promoting the Inheritance of Jiamia Woodblock Printing, both the Dissemination of Jiamia Woodblock Printing and Audience Expansion play important mediating roles. Therefore, future efforts should focus more on the dissemination effect of digital platforms and social media to further enhance the influence of Jiamia Woodblock Printing.

#### 4 CONCLUSION AND DISCUSSION

This article is based on questionnaire surveys and literature analysis, systematically sorting and in-depth discussing the current situation and future development path of the inheritance of Jiamia Woodblock Printing under the background of the digital economy. The research finds that with the widespread application of digital technologies and the rapid development of the digital economy, the transmission and inheritance methods of traditional intangible cultural heritage are undergoing profound changes. Jiamia Woodblock Printing, as a traditional craft with deep national cultural connotations and religious belief backgrounds, is also facing new opportunities and challenges in the digital age.

The survey shows that the digital economy has expanded the transmission channels of Jiamia Woodblock Printing through online education, digital museums, and other platforms, lowering the barriers to information access, broadening the audience, and increasing public attention and market influence, providing new opportunities for commercialization. However, currently, the integration of digital technology and Jiamia art is not deep enough, and there is a lack of a systematic re-creation mechanism. The digital literacy of inheritors is relatively low, making it difficult for them to actively participate in transmission. In addition, relevant policy support is still inadequate, and there is a lack of a protection mechanism for the digitalization of intangible cultural heritage, which affects the depth and sustainability of its inheritance.

In response to the above conclusions, this article proposes the following three recommendations:

First, promote the deep integration of digital technology and intangible cultural heritage, enhancing the transmission and influence of Jiamia Woodblock Printing. This involves digitizing the image styles, craft processes, and cultural connotations of Jiamia Woodblock Printing, and re-creating them to increase their attractiveness and expressiveness.

Second, strengthen the digital literacy training for inheritors to improve their initiative and ability to participate in digital transformation. Help inheritors acquire basic information technology skills and enhance their awareness of transmission on new media platforms, as well as their content creation abilities.

Third, improve the policy support system for the digital protection and development of intangible cultural heritage. Establish a transmission mechanism guided by the government, with social participation and multi-party collaboration, creating a positive ecosystem where diverse participants work together to promote the inheritance of cultural heritage.

#### COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

#### REFERENCES

- [1] Y Huang. Protection and utilization of intangible cultural heritage in the context of digitization. *Cultural Heritage*, 2015(01): 1–10+157.
- [2] S Tao. Current research on China's paper horse art. *Ethnic Art*, 2010(01): 72–76. DOI: 10.16564/j.cnki.1003-2568.2010.01.014.
- [3] M Xing, C Gong, H G Moon, et al. Digital economy, dual innovation capability and enterprise labor productivity. *International Review of Financial Analysis*, 2025, 101104005–104005.
- [4] S Li. The main characteristics and outstanding advantages of China's digital economy development. *National Governance*, 2021(05).
- [5] Z Yang. The role of digital economy in high-quality economic development. *Shanxi University of Finance and Economics Journal*, 2025, 47(S1): 1–3.
- [6] S Li, Y Wu, J Li. Digital economy and Chinese-style modernization: significance, opportunities, challenges, and path exploration. *Economic Review*, 2023(02): 3–14.
- [7] H Wan. A review of the cultural value of paper horse art. *Library and Information*, 2020(01): 140–144+2+145.

- [8] J Li. Jiaama art in Yunnan. *Fine Arts*, 2019(09): 134–135. DOI: 10.13864/j.cnki.cn11-1311/j.005611.
- [9] J Song, M Wang. Analysis of the current situation and problems of digital protection of intangible cultural heritage in China. *Cultural Heritage*, 2015(06): 1–9+157.
- [10] J Bai, P Zhu. Protection and dissemination of traditional sports culture heritage from a digital perspective. *Beijing Sports University Journal*, 2024, 47(06): 40–49. DOI: 10.19582/j.cnki.11-3785/g8.2024.06.004.
- [11] L Yi, M Ji. Intellectual property protection of intangible cultural heritage in the digital age: foundations, dilemmas, and responses. *Science and Law*, 2024(02): 53–63. DOI: 10.19685/j.cnki.cn11-2922/n.2024.02.006.
- [12] J Gao, J Kang. Intelligent empowerment of intangible cultural heritage protection and dissemination. *People's Forum: Academic Frontiers*, 2024(02): 102–106. DOI: 10.16619/j.cnki.rmltxsqy.2024.02.010.