

NFT-Based Ownership Models for Folk Art: Redefining Cultural Value in the Digital Age

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Abstract: As an important component of China's cultural system, folk art faces challenges in its digital transmission, including ambiguous ownership, difficulty in defining value, and insufficient protection of income. This paper explores the application of NFT technology in the field of folk art, constructing a blockchain-based ownership confirmation mechanism: achieving traceability of ownership through a decentralized ledger, and combining the concept of "cultural value tokens" with smart contracts to guarantee the income of inheritors, thus balancing the public attributes and private rights of art. This collaborative model of "technology + culture + economy" promotes the transformation of folk art from static display to dynamic regeneration, providing a new path for the living transmission of intangible cultural heritage.

1. Introduction

As the primary carrier of national historical memory and spiritual core, the preservation of intangible cultural heritage is not only an essential aspect of building a culturally strong nation but also a fundamental prerequisite for continuing cultural genes. In the 15th Five-Year Plan, "strengthening the protection and utilization of cultural heritage" is a key component, especially strengthening the protection of intangible cultural heritage and supporting the innovative development of traditional culture. This plays an increasingly important role in national policies as a crucial guarantee for "consolidating the historical foundation of cultural heritage." "Digital empowerment" has become a powerful tool for breaking through the barriers to the preservation of intangible cultural heritage, continuously expanding new avenues for its revitalization.

My country's intangible cultural heritage is mainly comprised of folk arts, which embody folk culture, possess collectivity, transmissibility, and local characteristics, and represent the cultural information of folk arts. However, in the process of digitizing intangible cultural heritage, problems such as unclear ownership, difficulty in measuring value, and lack of security for the income of inheritors hinder its living transmission. The decentralization, traceability, and executable smart contracts of blockchain can help solve some of the problems existing in the digitization process of intangible cultural heritage. Non-fungible tokens (NFTs) enable the transformation of the national cultural value of folk art into convertible digital value, facilitating the reconstruction of its ownership and value.

Therefore, this paper focuses on how NFTs empower the inheritance of folk art. Taking the confirmation of rights to works on the blockchain as an example, it establishes an on-chain ledger as a historical database of the works' origins, uses the concept of "cultural value coins" and smart contracts to complete the confirmation of rights for inheritors, and balances the interests of both the original works and the creators. By leveraging "technology + culture + economy," it empowers the creative transformation of the next generation, solves the income problem for inheritors, provides young people with new cultural creative impetus, and provides a theoretical basis and implementation model for the creative transformation of traditional culture in the digital age.

1.1. Research Background

Folk arts are the "collective memory" of a community, a living inheritance and symbol of villagers' aesthetics and practices. However, their protection faces common problems such as "discontinuity," "out of stock," and "loss." Impacted by modern commercialism and foreign cultures, especially in recent decades, many traditional arts and crafts are on the verge of extinction. Due to a lack of protection, a considerable portion have even lost their space for survival and development. While the protection of intangible cultural heritage has achieved some success, there is still a tendency to "emphasize the objects while neglecting the people," and the lack of a living, dynamic system remains a real problem.

In recent years, blockchain platforms have proven to be an effective mechanism for addressing the current predicament of protecting folk art by confirming ownership information, distributing revenue through smart contracts, and providing virtual displays. Exploration and practice in many places have demonstrated that digital models can help revitalize folk art. Digital technology empowers and activates folk art, transforming it from a state of being protected to one of active evolution and growth, and enabling it to transform from a symbolic icon into a lifestyle carrier capable of further development.

1.2. Research Questions and Significance

NFT is the most important breakthrough in the digital reform of intangible cultural heritage, determining the ownership, pricing, and profit sharing of folk art inheritors. However, blockchain only has storage and immutability functions, and cannot identify information. If the starting information itself is problematic, it will affect the legal recognition of the rights holder.^{[1][2]}

On the one hand, based on the immutability and indivisibility of blockchain, NFT provides intangible cultural heritage works with evidence storage, traceability, authentication, and original author information locking services, enriching the research on the pricing of cultural assets, avoiding cultural alienation caused by technological alienation, and solving the problem of the ambiguity of traditional property rights definition. With the help of the automated operation and revenue transfer functions of blockchain smart contracts, NFT can realize the function of protecting the rights and interests of intangible cultural heritage inheritors and encouraging the revenue of the living inheritance of intangible cultural heritage skills^[3]. At the same time, by integrating the cultural value calculation model of the difficulty of intangible cultural heritage skills, generational inheritance, and social recognition, it can construct a dual-regulation value pricing mechanism that combines market logic and cultural logic for intangible cultural heritage works. To enhance the effectiveness of the mechanism, it is necessary to further build a standardized authentication mechanism for ICHNFT, lock in the inheritors of intangible cultural heritage skills through decentralized identity authentication (DID), introduce the cultural value assessment function of external professional institutions to prevent capital speculation, establish dynamic supervision to constrain speculation, and promote the integration of on-chain information with traditional protection methods to form an evidence chain for the protection of intangible cultural heritage.

Blockchain governance is divided into two modes: on-chain and off-chain. On-chain governance achieves decentralized decision-making through token holders' voting proposals, reducing human intervention [4]. NFTs enable inheritors to control the works and income rights in the digital space for the first time, breaking information asymmetry. In the future, it is also necessary to combine the community consensus mechanism to build a cultural value assessment model, strengthen the cultural narrative construction of digital collections, achieve cross-time and space dissemination through immersive experiences, and explore the DAO governance model to allow the community to participate in decision-making and income distribution, and build a virtuous ecosystem where tradition and innovation coexist.

2. Research Framework and Methodology

In order to more systematically explore the user acceptance mechanisms and influencing factors of

folk art NFTs, this study introduces the survey questionnaire method to conduct empirical research.

2.1. Reliability analysis

Table 1 Data Confidence Analysis

| scale | number of terms | Clonbach's coefficient |
|--|-----------------|------------------------|
| Basic cognitive dimensions | 3 | 0.707 |
| Value recognition dimension | 3 | 0.726 |
| Institutional and Trust Dimensions | 5 | 0.768 |
| Acceptance and Behavioral Willingness Dimensions | 4 | 0.715 |
| ensemble | 15 | 0.906 |

As shown in Table 1, the Cronbach α coefficient was calculated to evaluate the reliability of the data. The overall Cronbach α coefficient was 0.906, and the Cronbach α coefficients of each dimension were 0.707, 0.726, 0.768, and 0.715, all exceeding the conventional standard of 0.7. This indicates that the 15 items have internal consistency, high data reliability, and are suitable for subsequent analysis.

2.2. Validity analysis

Table 2 KMO and Bartlett's test

| | | |
|-----------------------------|------------------------|----------|
| KMO sample adequacy measure | | 0.944 |
| Bartlett sphericity test | approximate chi-square | 1129.054 |
| | free degree | 105 |
| | conspicuousness | 0.001 |

As shown in Table 2, the KMO value is 0.944, which is above 0.7. The closer the KMO value is to 1, the stronger the correlation between variables, and the more suitable it is for factor analysis. Since 0.944 exceeds the standard of 0.7, it indicates that the sampling is highly appropriate.

The approximate chi-square value obtained by Bartlett's test is 1129.054, with 105 degrees of freedom and a significance level (p-value) of 0.000 (less than 0.05). This indicates that the data are not from independent populations, and there are certain common factors among the correlation matrices of the parent population, meeting the basic requirements of factor analysis. The data demonstrate good validity.

2.3. Descriptive statistical analysis

To preliminarily understand the overall characteristics of the sample, this study conducted descriptive statistical analysis on each dimension item and the main variables, with the results shown in Table 3.

Table 3 Descriptive statistics

| dimension | N | least value | crest value | average value | standard error |
|--|-----|-------------|-------------|---------------|----------------|
| Basic cognitive dimensions | 202 | 1 | 5 | 3.946 | 0.897 |
| Value recognition dimension | 202 | 1 | 5 | 3.898 | 0.880 |
| Institutional and Trust Dimensions | 202 | 1 | 5 | 3.825 | 0.817 |
| Acceptance and Behavioral Willingness Dimensions | 202 | 1 | 5 | 3.840 | 0.837 |

The sample size of this study was 202, and it involved four dimensions: basic cognition dimension, value identification dimension, system and trust dimension, acceptance and behavior willingness dimension.

The average score of the basic cognition dimension was the highest (M=3.946), followed by the value identification dimension (M=3.898), the acceptance and behavior intention dimension (M=3.840), and the system and trust dimension (M=3.825).

The fluctuation range of the score of basic cognition dimension is the largest (SD=0.897), and the fluctuation range of the score of institution and trust dimension is the smallest (SD=0.817).

Descriptive statistics showed that the scores of the four dimensions were above the average level, and the sample performed well in these dimensions, among which the cognitive level of the basic cognition dimension was the highest, as shown in Table 4.

Table 4 Relativity

| dimension | Basic cognitive dimensions | Value recognition dimension | Institutional and Trust Dimensions | Acceptance and Behavioral Willingness Dimensions |
|--|----------------------------|-----------------------------|------------------------------------|--|
| Basic cognitive dimensions | 1 | | | |
| Value recognition dimension | .709** | 1 | | |
| Institutional and Trust Dimensions | .618** | .677** | 1 | |
| Acceptance and Behavioral Willingness Dimensions | .625** | .685** | .724** | 1 |

** Significant at the 0.01 level (two-tailed).

2.4. Correlation analysis

The Pearson correlation coefficients among the four dimensions were all statistically significant at the 0.01 level (two-tailed), demonstrating moderately strong positive correlations.

The correlation coefficient between basic cognition and value identification was 0.709**, between basic cognition and trust of institution was 0.618**, and between basic cognition and acceptance and willingness to act was 0.625**.

The correlation coefficient between value identification and trust was 0.677**, and that between value identification and acceptance was 0.685**.

The highest correlation coefficient was between the system and the trust, acceptance and willingness to act (0.724**).

The correlation results show that there is a significant positive correlation among the four dimensions, and the level of one dimension usually increases with the level of other dimensions, as shown in Table 5

Table 5 Multiple linear regression

| | nonstandardized coefficient B | Standard Error | standardization coefficient Beta | t | conspicuousness | collinearity statistic tolerance | VIF |
|------------------------------------|----------------------------------|----------------|-------------------------------------|-------|-----------------|-------------------------------------|-------|
| (constant) | 0.512 | 0.195 | | 2.624 | 0.009 | | |
| Basic cognitive dimensions | 0.147 | 0.061 | 0.157 | 2.396 | 0.018 | 0.462 | 2.163 |
| Value recognition dimension | 0.262 | 0.067 | 0.275 | 3.932 | 0 | 0.406 | 2.464 |
| Institutional and Trust Dimensions | 0.452 | 0.064 | 0.441 | 7.016 | 0 | 0.503 | 1.986 |

a Dependent variable: Acceptance and behavioral intention dimensions. $R^2 = 0.606$; $\Delta R^2 = 0.600$; $F = 101.589$; $P < 0.001$.

2.5. Multiple linear regression analysis

The multiple linear regression analysis was performed with the "acceptance and behavioral intention" as the dependent variable and the "basic cognition, value identification, system and trust" as the independent variables.

Model fitting effect: $R^2=0.606$ (the three independent variables can explain 60.6% of the variance of the dependent variable), F value=101.589, $P<0.001$, the model is statistically significant;

The effects of independent variables: All three independent variables showed significant positive effects on the dependent variable ($P < 0.05$).

Basic cognitive dimension: unstandardized coefficient $B=0.147$, standardized coefficient $Beta=0.157$, $P=0.018$;

Value identification dimension: $B=0.262$, $Beta=0.275$, $P=0.000$;

Institutional and trust dimension: $B=0.452$, $Beta=0.441$ (the strongest predictive effect), $P=0.000$;

Collinearity test: the tolerance of independent variables (0.406-0.503) are all > 0.4 , the variance inflation factor $VIF(1.986-2.464)$ are all < 3 , there is no serious multicollinearity problem.

Regression analysis shows that basic cognition, value identification, system and trust can positively predict acceptance and behavioral intention, and improving the level of these three dimensions can help to enhance acceptance and behavioral intention.

3. Relevant Concepts, Theoretical Basis, and Current Research Status

3.1. Current Status of Research on the Value Recognition and Ownership of Folk Art

The essence of cultural capital theory is the market-based evaluation of the value of traditional folk cultural commodities. Market value replaces cultural value, weakening the influence of non-value factors such as community memory, identity, and emotion. It focuses on "scarce" skills and the identity of "celebrities" as key considerations, conducting a fragmented evaluation of the artistic text, national culture, and actual social context, leading to the marginalization of some intangible cultural heritage due to its immeasurability. Contemporary academic thought adopts a qualitative and quantitative unified model combining cultural capital theory, social networks, and multi-objective decision-making to recognize the renewable, vital, and shared value of folk art works. Understanding public participation, attention, and interaction through social networks and big data statistics represents a value evaluation scheme created by digital technology for redefining folk art commodities in the contemporary era.

The collective ownership and transmission characteristics of intangible cultural heritage are inherently incompatible with the intellectual property system, which emphasizes individual rights: the perpetual transmission of intangible cultural heritage cannot be subject to a limited-term copyright system, and collective transmission groups of intangible cultural heritage are often excluded by early authorization registration driven by commercial interests. While China has attempted to establish property rights systems such as geographical indications and collective trademarks, it also faces challenges such as difficulties and high costs for collective rights holders to provide evidence, as well as risks related to unclear ownership. Blockchain-based evidence repositories can help trace ownership, but whether this right is legally recognized remains uncertain. Therefore, it is crucial to advance legislation in conjunction with technological architecture to construct and build new systems more suitable for intangible cultural heritage rights, such as a system of collective cultural rights and collective dividends for intangible cultural heritage. This could utilize smart contracts to automate authorization and dividend sharing. Furthermore, it is essential to establish an interdisciplinary field combining law, human expertise, and computer technology to regulate systems and technologies that integrate design, smart contracts, and code, ensuring the fairness and sustainability of the digital preservation and continued existence rights of folk art.

3.2. Research on the Application of NFT Technology in the Cultural Field

NFT is short for nonfungible token, which is a unique and irreplaceable data block on the blockchain. It can be used to attach NFT to any type of digital data. Through the combination of

digital works and digital preservation, digital works can be turned into tradable items ^[5]. Since the operation of NFT is based on the blockchain, it has the characteristics of uniqueness, indivisibility and traceability. The advantage of smart contracts can also provide creators with subsequent profit sharing, opening up new possibilities for the display of the value of intangible cultural heritage. NFT has been applied in the cultural field in the creation and sale of digital art, digital cultural relics, etc. As a new technology in the digital age, blockchain can enhance the transformation of the economic value of cultural resources through its ownership confirmation function and DAO collaborative governance, but it will inevitably produce the phenomenon of cultural product materialization caused by technological alienation. In practice, NFTs have achieved some success in the development of excellent traditional cultural industries: the Dunhuang Research Institute and Alipay jointly launched the Dunhuang Blockchain NFT, which uses blockchain to provide ownership and AR to provide an immersive experience, thus expanding the boundaries of cultural dissemination; the Palace Museum's "Auspicious Beasts and Clouds" NFT uses 3D modeling to provide a modern aesthetic form of traditional culture, attracting young people. This shows that NFTs are technology, but more importantly, they are a narrative space for traditional culture, enabling the passive transmission of intangible cultural heritage to become proactive.

At the same time, it is also important to recognize that the following problems still exist: the reliance on institutions for off-chain rights confirmation, the imbalance of interests among intangible cultural heritage inheritors caused by the protection of off-chain cultural entity rights, and the risk of speculation arising from the unclear ownership of virtual and real rights on the blockchain. Therefore, in the future, it is necessary to strengthen the construction of collective discourse power in the intangible cultural heritage community, refine on-chain rights standards and norms, and build internationally compatible interoperability protocols, so as to promote the modern inheritance of traditional arts with "culture first and technology as the foundation".

3.3. Research on Cultural Heritage and Income Distribution in the Digital Age

The income of intangible cultural heritage inheritors on digital platforms is unstable, and they lack digital discourse power. Currently, many digital products are produced by platforms, and inheritors, as information providers, do not receive subsequent transaction value dividends. Some digital product NFT issuance platforms do not provide a secondary circulation income distribution ratio, and the digital product model is short-term and fragmented, which leads to an unfavorable outlook for the continuity of skills. In addition, NFTs, using smart contract programs, can automatically distribute the royalties due in each transaction to the original author or authorized person of the work according to established rules. Furthermore, due to the open, transparent, and immutable nature of blockchain, the transparency and fairness of transaction results can be ensured ^[6]. No third-party institutions are required, which facilitates efficient and transparent distribution while avoiding interference from human factors. Using decentralized storage technology and timestamps, the original source and circulation history of the work can also be traced one by one. Here, by guiding the co-construction mechanism within the intangible cultural heritage community, a decentralized identity authentication protection approach is provided for intangible cultural heritage (enabling intangible cultural heritage inheritors to participate in all aspects of the design and distribution of intangible cultural heritage projects), and by guiding the collaborative relationship among stakeholders (including platform providers, capital providers, and technology providers), the digital transformation process of intangible cultural heritage is prevented from becoming a one-dimensional process of profit-seeking, thereby helping intangible cultural heritage achieve a vibrant life in the digital age.

4. Basic Analysis of Folk Art NFT Conversion

4.1. Feasibility of Digital Transformation of Folk Art

Differentiated digital adaptations should be adopted for different types of folk art: handicrafts utilize 3D modeling to record and showcase the creation process, and then display their unique craftsmanship through NFTs; performing arts utilize audio and video recordings, and important

segments of the performance can be used as time-stamped on-chain assets. While both methods can authenticate ownership through blockchain, static artworks should separate patterns and production steps into digital collectibles and be labeled with cultural symbols; dynamic artworks should adopt a "one work + N interpretations" structure to retain the characteristics of collective creation, and a tiered licensing system should be established to prevent the "over-exploitation" of major cultural IPs.

Following the logic of "accuracy, detail, and traceability," a general metadata database is established to store important information. Level certification is used to determine the scope of NFT permissions, and cultural licensing terms are added to the contract. At the same time, the application of digital IP and actual experience is realized. For example, NFT buyers can obtain physical workshop experience opportunities, thereby creating an experience system that combines virtual and reality, so that intangible cultural heritage can be transformed from passive participation to active participation, and digital IP can be given an emotional color and a purpose.

4.2. Pain Points of Traditional Property Rights Systems and NFT Solutions

In traditional folk art transmission, unclear ownership and value dilution are common problems, especially in collective creation and apprenticeship models. The inability to specifically define the creative labor and deserved benefits makes creators vulnerable to having their creative rights eroded. NFTs, due to the permanent anti-counterfeiting features of blockchain, uniquely mark creative acts, ensuring traceable ownership of creative information. Smart contracts guarantee the distribution of benefits among inheritors. For example, multi-layered ownership verification through NFTs ensures subsequent revenue sharing for inheritors. In shadow puppetry, NFTs can be used for multi-stage distribution and profit transfer, with the on-chain transfer track demonstrating the continuity and legitimacy of the transmission.

The irreplaceability of NFTs provides folk art with a unique digital identity, highly compatible with artistic originality, effectively solving the problems of homogenized registration and ownership confusion in traditional copyright. By anchoring the original data with hash values, combining off-chain storage with on-chain verification, and using timestamp technology to record digital fingerprints and time information^[7], it is possible to ensure that the content is not tampered with and is retained for a long time, which not only strengthens the creator's control but also provides collectors with genuine products, thus building a trust-based digital cultural market ecosystem. Based on this, NFTs can also enrich existing traditional inheritance mechanisms: under the master-apprentice system, inherited works can be represented by casting on-chain digital certificates to reflect the degree of contribution between the master and apprentice in the inheritance of skills; under the ownership system, the dynamic inheritance of ownership requires the creator to obtain the consent of the original author when recreating, thus ensuring its continuity. In addition, the public chain characteristics of blockchain can strengthen cooperation between traditional inheritance communities in different places, thereby transferring intangible cultural heritage from individual protection to collective community protection, transcending geographical limitations to reach audiences around the world, and extending the vitality of traditional handicrafts as material objects into the infinite possibilities of the digital age.

5. Core Innovation: Construction and Application of Cultural Value Tokens

5.1. Definition of Cultural Value Symbols

Intangible cultural heritage (ICH) cultural value symbols embody the value of cultural skills and the attributes of digital assets in the form of cultural symbols. Tokens and smart contracts certify the originality and uniqueness of skills, quantifying the results of cultural labor. Their value includes not only commodity economic attributes but also multi-dimensional cultural value such as community recognition and historical memory. Furthermore, they can make explicit the implicit value in skill transmission; every instance of dissemination, learning, application, and innovation can be transformed into recordable cultural capital.

Based on the token incentive mechanism, participants' contributions can be accurately tracked and

rewarded, building a symbiotic ecosystem for ICH. Token circulation is both a path for cultural dissemination and a dynamic process of building cultural identity. On-chain interaction continuously activates cultural vitality, and combined with the blockchain trust mechanism, it breaks down time and space barriers, achieving equal global dialogue on ICH.

This token ensures the traceability of skill dissemination through on-chain recording. Its programmable nature supports preset transmission rules and incentive mechanisms, and its digital scarcity design resists value dilution, constructing a decentralized ICH value network. It transforms various inheritance examples into verifiable data units, combines timestamps and geographic tags to bind cultural context, enabling intangible cultural heritage to break through physical limitations and achieve sustainable development and global interaction in digital space and time ^{[8][9][10]}.

5.2. Value Quantification Mechanism for Cultural Value Symbols

For intangible cultural heritage (ICH) cultural value symbols, a combination of multiple dimensions can be derived by considering the scarcity value of ICH projects, their degree of social dissemination, and the participation of the communities they serve, ultimately tokenizing the cultural value. This involves recording and measuring the value empowerment of cultural symbols through on-chain cultural behaviors. For example, the actions of ICH inheritors in passing on skills to others, creating or improving certain cultural symbols, are all included in the recording scope; these behaviors constitute on-chain contributions. Audiences' viewing of ICH and their learning, collection, etc., constitute community contributions. These can all be used to realize tokens, cultural rights exchanges, or conversion into increased cultural rights. Furthermore, the token value curve is formed by updating the token weight based on the on-chain recorded influence of skills. In addition, on-chain digital identity tokenization enables the traceability of ICH inheritance, with cultural interactions becoming value nodes. In this process, it promotes the transformation of ICH from a static, inherent cultural inheritance model to a dynamic, value-added cultural construction and innovation model. Ultimately, it achieves the construction of a cultural ecosystem jointly created by all citizens.

This incentive model will bring the hidden merits to the surface, forming a tool for token allocation and empowerment based on cultural credit. Moreover, the accumulation of cultural credit is a prerequisite for participation in governance and can support decentralized cultural governance. In addition, it can also change the circulation supply of tokens by sensing the market application and feedback results of cultural assets such as intangible cultural heritage elements in real time. That is, the more frequently a product is used in the market, the more difficult it is to issue tokens, which to some extent incentivizes product innovation. Meanwhile, cold-start projects can attract early intervention through incentive pools. They can all timely feed back data reflecting users' cultural intentions to the value model, promote the entry of intangible cultural heritage into the scenarios of modern life, and thus realize the rational and sustainable development of cultural resources ^[11].

5.3. Design and Implementation of Smart Contracts

The hash function of blockchain technology ensures the original ownership of several intangible cultural heritage assets and prevents modification, guaranteeing that every transfer can be traced back to the original creator. While executing asset transfers between users, the smart contract distributes shares to creators, owners, trustees, and foundations according to a predetermined sharing economy model. This configuration is implemented at the token smart contract layer, making it immutable and highly transparent, meaning it cannot be regulated or manipulated by intermediaries. Furthermore, the integration of the contract with the on-chain credit system can reduce transaction fees and incentivize long-term contributors when credit is good. Transaction data can also be used to assist in the design of the value model, improving token distribution ratios, market responsiveness, and interaction and multi-chain collaboration in decentralized scenarios.

The contract stipulates that the token issuance mechanism is initiated upon achieving the inheritance target. When conditions such as the number of inheritors and skill ratios are met, the tokens are transferred to the wallets of the parties involved. The on-chain monitoring system prevents token abuse, thus increasing the trust value of the tokens and ensuring the active participation of inheritors. Meanwhile, the action trajectory of the contract output is imported into the intangible

cultural heritage knowledge base, accurately depicting the linear relationship of data in generation, circulation, and dissemination. Visual feedback can also help inheritors grasp hot topics and audience groups, providing a data foundation for the living inheritance of intangible cultural heritage^[12]. The profit-sharing model is the most basic property rights clause, stipulating a fixed profit-sharing of 15% for the first transaction, a profit-sharing rate of 10% for the first three years from the third year, a decreasing rate of 1%/year after the eighth year, until a fixed profit-sharing rate of 5% from the eighth year. This on-demand dynamic allocation mechanism can maintain the balance between the short-term and long-term interests of the inheritors. The profit-sharing contract can be automatically fulfilled and settled, so that the profit-sharing enters the inheritor's account accurately. On-chain traceability allows the inheritors to discover the records of the circulation process of the works and the profit-sharing ledger at any time, which can further enhance their confidence and participation in the digital network platform^{[13][14]}.

6. Challenges and Countermeasures

6.1. Challenges of NFT Empowering Folk Art

The first problem with the digital re-creation and distribution of folk art incorporating NFT applications lies in the potential for technological adaptation and loss of rights. Third-layer systems rely too heavily on third-party companies, and most inheritors of traditional crafts are unable to complete blockchain-related tasks. Smart contracts and wallets are easily exploited maliciously. Furthermore, in most cases, multilingual digital platforms cannot facilitate the further international dissemination of folk art, and errors in on-chain data can affect the authenticity of related artworks. To address these issues, it is necessary to develop a technological adaptation plan, create low-barrier development tools and visualization platforms, and provide offline training in both technology and form to improve the internet literacy of inheritors of folk crafts, thereby maintaining their dominant position.

Thirdly, there is a lack of rights and legal regulations. High commission rates charged by some platforms reduce the share of benefits for inheritors; the returns on sub-licensing royalties are opaque; the current Copyright Law's restrictions and definitions on the property rights of digital collectibles are unclear; judicial practice lacks uniformity in infringement determinations; and insufficient mapping between digital and physical assets leads to disputes over the resale of digital collectibles. This requires a fixed-income sharing mechanism through smart contracts, with on-chain disclosure and dynamic adjustment, and legislation to clarify the nature of digital collectibles, and to establish a cross-chain infringement detection and cross-chain mapping correction system^[5]. In addition, market speculation can inflate cultural value, and NFT prices may deviate from the original intention of cultural inheritance based on speculation. A comprehensive value measurement model should be designed, linking value measurement, inheritance skills, and social contribution. Frequent trading should be prohibited during the cooling-off period to combat speculation, expand the practical application space for exhibitions, education and training, and allow inheritors and the community to participate in decision-making through the introduction of DAO, with part of the transaction funds being deposited into inheritance funds and on-chain auditing to ensure that they are used for skills training and protection, forming a positive cycle of "returning profits to inheritance"^{[8][14][15]}.

6.2. Response Strategies

To address the challenges of applying NFTs in traditional folk culture, a two-pronged approach of empowerment and governance is adopted. Firstly, the online education and training system for intangible cultural heritage practitioners will be improved. The online education platform for intangible cultural heritage practitioners will build a non-linear curriculum system. Courses will be jointly designed by intangible cultural heritage practitioners and technical personnel, ensuring both knowledge of intangible cultural heritage and professional expertise, while also providing practical content. The learning process will be recorded in an on-chain identity system, with privacy protected using zero-knowledge proofs. Certificate authentication will activate governance and market access

points, establishing a "learning-certification-reward" cycle mechanism.

At the same time, NFT transaction standards are introduced: make full use of the traceability mechanism of the distributed ledger of the blockchain to increase the ability of social supervision and error correction^[7]; write creative ethics into smart contracts, add ownership proof to prevent the misuse of intangible cultural heritage elements; the transaction amount is allocated back to the inheritance fund and the original community. After the transaction is completed, the reputation score of the inheritor will be refreshed. When the score reaches the target, the DAO proposal will be activated to exchange resources. At the same time, the on-chain protocol locks the cultural scarcity. The contract is based on the Charter of Intangible Cultural Heritage to prevent misappropriation and alteration. Use technology to protect tradition and protect the digital cultural subject rights of the inheritors^{[13][15]}.

7. Conclusions and Outlook

7.1. Research Conclusions

Blockchain establishes clear digital property rights for local arts and culture, transforming what was originally intangible public memory into identifiable digital goods and assets. It protects property rights while developing potential local markets. NFTs reconstruct the relationship between arts and culture and the public through decentralized trust, carrying local cultural memory, constructing a cross-regional cultural identity network, and empowering marginalized inheritors. Smart contracts, through continuous profit feedback, incentivize public creation and inheritance, transforming the passive protection of intangible cultural heritage into conscious action and an outlet, opening a new chapter in culture and the digital economy.

Cultural value tokens and smart contracts further transform the transmission of intangible cultural heritage into an active participation model. Verifiable value flow on the blockchain constructs a credible incentive mechanism, enabling inheritors to gain global recognition and economic returns through digital identities, forming a sustainable cultural production loop and achieving decentralized co-construction and sharing of cultural dissemination.

Finally, the future of digital intangible cultural heritage should embrace the concept of "technology for good," balancing cultural essence and technological tools, forming a collaborative mechanism between blockchain and intangible cultural heritage databases, and creating a cross-border, interconnected, and inclusive platform. Digitalization of intangible cultural heritage is by no means a replacement of intangible cultural heritage, but rather a way to recreate the memory of intangible cultural heritage with modern expression, making it a dynamic and living thing that is constantly growing, so that culture and technological civilization can be carried forward in a mutually beneficial way^{[10][11][12]}.

7.2. Future Outlook

The future development of folk art NFTs will take cross-chain technology as an important breakthrough point, which can eliminate platform barriers and promote cross-chain transfer between blockchains and the integrated development of digital collections. With the help of cross-chain protocols, digital collections under different cultural ecosystems can achieve common ownership and co-governance collaboration, thereby reducing circulation costs and increasing the possibility of global participation experience. For example, the digital collection of "Dong Folk Songs" will automatically distribute the copyright fees obtained during cross-chain transactions^[8].

On a macro level, folk art under NFTs is reconstructing the recognition of cultural boundaries. In the blockchain, the traditional and modern have achieved a dynamic balance at cultural nodes. Cultural boundaries are not defined by geography but participate in the global node reconstruction in the consensus mechanism. Moreover, they are no longer preset at the time of creation but require participatory verification. Culture has moved out of the original context in the global decentralized resonance and achieved multi-meaning interpretation and collaborative co-creation^[9].

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