

# Exploring the Digital Creative Product Design of Luoshan Shadow Based on Non-Fungible Tokens

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## Abstract

The popularity of Non-fungible Tokens is reshaping the Internet, digital assets and content. Many cultural sectors worldwide have switched and proposed using NFT technology to enhance the liquidity of financialised art assets. Numerous companies are trying to take advantage of the rapid growth of the NFT markets to increase their competitiveness. Although digital artwork provides numerous technical advantages, few design practices are available for Luoshan Shadow's NFT virtual creative products. This study aimed to investigate the factors influencing the digital design of the Luoshan shadow by NFT technology. We conducted a thematic analysis of the comments and suggestions given by designers and non-geneticists. Data of 185 designers, consumers, and non-geneticists indicated the main concerning themes; i) copyright and security issues; ii) innovation of art form and content; iii) new presentation, and iv) benefits from Non-fungible Tokens technology. These findings may provide experience for Luoshan shadow art to start the layout of digital creative design in the context of the much-needed NFT market and to organically combine its digital derivatives with physical derivatives to achieve joint development.

**Keywords:** non-fungible tokens, digital creative product, Luoshan shadow, innovation

## 1. Introduction

The continued growth of the Non-fungible Tokens segment is driving the fast-reading development of the digital market. According to Coin Gecko data, the overall market capitalization of NFT reached USD 12.7 billion in the first half of 2021, an increase of nearly 310 times compared to 2018. According to Non-Fungible data, NFT transaction size reached USD 754 million in the second quarter of 2021, up 3453 percent year-over-year and 39 percent sequentially, with explosive growth in transaction volume. However, the NFT market has seen some degree of reduced heat since 2022, but the overall trend is still forward. Artists from several countries believed that NFT technology was an unparalleled innovation that could become a new chapter in art history.

Meanwhile, NFT plays a crucial role in protecting rights and economic aspects. Therefore, under the trend of NFT technology, the digital creative design of Luoshan shadow will break the situation that most art creations mainly express the author's emotion, and many art creations will pay more attention to the connection between works' actual public. It is lead most directly characterized by the commerciality and uniqueness of artworks. In addition, designers need to develop innovative digital products to pass on the Luoshan shadow and adapt it to the current environment to better integrate it with modern technology.

## 2. Literature Review

Several studies have reviewed and investigated the creative impact of Non-fungible Tokens infection on digital designers (Logan Kugler, 2021; Lawrence J. Trautman, 2021; Sakib Shahriar & Kadhim Hayawi, 2021; Dan

Weijers & H. Joseph Turton, 2021; Florian Horky, Carolina Rachel & Jarko Fidrmuc, 2022). The factors associated with Non-Fungible Token among digital arts include environment, property, management, copyright, and also prices (Joshua Fairfield, 2021; Andres Guadamuz, 2021; Usman W. Chohan, 2021).

Simultaneously, the application of NFT is expanding to various fields, from artwork and collectibles to avatars and pictures to games and traditional culture. The cultural assets are transformed into unique digital items using the Non-Fungible Token technology (Emre Ertürk; Murat Doğan; Ümit Kadiroğlu; Enis Karaarslan, 2021). The impact of blockchain technologies on cultural heritage preservation is made better with digital evolution support (Denis Trček, 2022).

Moreover, the Non-Fungible Token has also greatly affected intangible cultural heritage (Erica Del Vacchio & Francesco Bifulco, 2022). Although this research has shown the critical signs of blockchain's roles in cultural heritage, its application may have several limitations. These indicators include empirical research, guideline, legal regulation, and consumers (Erica Del Vacchio & Francesco Bifulco, 2022).

Empirical research also facilitates the effective transmission of intangible cultural heritage, such as breaking through the conflict between the economic value of NFT art and the inherent value of traditional art (Yangyang Zhang & Xiaotian Wang, 2021). It is considered a part of the development of the influence of NFT on cultural heritage. Denis Trček (2022) claimed that cultural heritage should be as conserving as possible, and blockchains were perfect for this purpose. The impacts of these technologies in the cultural heritage domain are still comparatively minor. With this empirical research in place amongst cultural heritage, exploiting the advantages and opportunities of new technologies, and thus leading towards cultural heritage better inherited in the face of any social change (Bosone, M.; Nocca, F., Fusco Girard, L., 2021). Regarding relevant design practices, the national intangible cultural heritage of Huaxian shadow puppets released four Beijing Winter Olympic Games-themed shadow digital collections on the digital collection platform in February 2022.

Guidelines of NFT applications such as market access standards, the responsibility of the trading platform, database construction, and digital product regulation are vital indicators of management for the digital art market (Shuangzhou Liu & Zhiwei Guo, 2022). They found that NFT digital artwork value identification was difficult due to opaque transaction information, and payment through virtual currency and other transaction characteristics poses a difficult regulatory challenge. Digital product regulation, on the other hand, affects how to achieve the standardization and legalization of NFT market development. The value realization of various non-homogeneous assets by promoting the compliance flow of assets in the chain under the regulatory framework (Chen Jiang, 2022). Moreover, a legal form of ownership of NFT is both sorely needed and has not yet been established online (Joshua Fairfield, 2021).

Many customers have a different need for NFTs, which significantly impacted the online market (Joshua Fairfield, 2021). The decision environment has different moderating effects on consumers with NFT of cultural heritage. These environments are equally crucial for high NFT consumers and low NFT consumers (Lingli Dong, 2017). The demand of NFT consumers is critical to digital market development. It is not easy to sustain a buyer's market for NFT in the artwork category with low-frequency trading. Consumers and suppliers should be closely involved in connected and intelligent cultural heritage (Johan Oomen & Lora Aroyo, 2011). Hence, a larger consumer group is needed to expand sustainable consumers of entertainment, social, and interest in NFT (Jian Song & Lin Liu, 2022).

Even though we know that NFT has a significant role in the development of cultural heritage through global experiences, current studies on the impact of NFT on the creative design of digital Intangible Culture Heritage (ICH) have yet to describe in-depth. Furthermore, there is sparse information on NFT's digital creative design of ICH in China to inform the appropriate experience of digital creative design for Luoshan shadow. Most of the current study and practice have been from the experience of others elsewhere with different cultural backgrounds compared to Luoshan's shadow. Opinions and experiences of these digital creative designs, which have direct contact with NFT, are invaluable for the current creative design of Luoshan shadow. Hence, this study aimed to explore the influence and matters of NFT on factors contributing to enhancing the level related to the digital creative design of Luoshan shadow.

### 3. Methodology

This section discusses the overall methodology, including the dataset and analysis, the interviews with digital designers, and impacts. Hybrid approaches are employed to ensure the result and finding is dynamic and relevant.

#### 3.1 Data Collection

This study is conducted in China, where many ICHs are protected and utilized to ensure the transmission of traditional culture. A publicly available dataset on Yuxiaoshu (<https://www.yuxshu.cn/Questionnaire>) was utilized for the research. The dataset contains demographic studies such as occupation, age, income, price of

digital products, and attitudes towards NFT products. In this current work, we also analyzed the qualitative data of designers' and folk artists' opinions and suggestions. The questions provided for the digital designers and folk artists were as follows:

- What influences does NFT influence the digital creative design of Luoshan shadow?
- What is the end user's primary concern regarding these products?
- Does Non-Fungible Token have an impact on the creative design?
- How can NFT help them financially?

The questionnaires on the survey are distributed to some designers, the inheritors of Luoshan shadow play and ordinary consumers. The selection criteria include input data in Henan, Hubei, Shandong, Jiangxi, Guizhou, Hebei, and Sichuan. Respondents aged for this study must be 18 years old and above. All data were retrieved within one month, from 28th of April 2022 to 29th of May 2022; We performed the thematic analysis of our dataset across questionnaires and interviews. Data retrieved from Yuxiaoshu, including the respondents' opinions and suggestions, were stored in this data platform. The analyses involved the researchers double-checking the data to confirm topics, ideas, and impact of NFTs on Luoshan shadow digital design. We also perform a fundamental correlation analysis on future Luoshan shadow digital products' development.

### 3.2 Data Analysis

To understand the relationship between the Non-Fungible Token and Luoshan shadow digital design, we present the study's results by interviewing some digital designers and Luoshan shadow puppet inheritors. The gathered data of publicly available information about NFT would provide significant insights into Luoshan shadow digital design development. Apart from the information extracted from Yuxiaoshu, the designers and Luoshan shadow puppet inheritors also provide us with many valuable opinions about the NFTs on Luoshan shadow digital design.

We measure the NFT popularity of Luoshan shadow digital design by aggregating information from all respondents mentioned above. We have 185 questionnaires in the Yuxiaoshu dataset, with the majority 95% of them being conducted in May 2022. Also, over 65% of all respondents were interested in NFT creative products of Luoshan shadow, compared to only 19% who had no feeling about them. We also found that more than 72% of respondents' attitudes toward people around them holding NFT creative products of Luoshan shadow were a novelty. Only 48% of respondents are willing to spend money on the NFT digital creative products of Luoshan shadow in the future. We attribute this to the inflated prices of NFT products in the current market.

### 3.3 Results

Refer to Table 1 for a detailed background of the respondents. A total of 262 inputs by 185 participants were retrieved from the Yuxiaoshu during the study period. The interviews were conducted in person and online with eight professionals. Based on our systematic analysis of the dataset, we have found creative design quality and capability of the Luoshan shadow can be improved by NFT. Almost 57% of respondents in our sample were concerned about the price of NFT virtual products about Luoshan shadow. They expected the price of these products to be under \$200. These data demonstrated how people with different occupations and incomes reflect their attitudes to the NFT creative products of Luoshan shadow.

Table 1. Background of the Participants

Variables		n	Percentage (%)
Gender	Male	66	35.7
	Female	119	64.3
Province	Henan	60	32.4
	Shandong	38	20.5
	Hubei	24	13.0
	Jiangxi	12	6.50
	Sichuan	6	3.20
	Others	45	24.4
Age	<18	0	0
	18-25	64	34.6
	26-35	84	45.4

	36-50	35	18.9
	>51	2	1.10
Major	Art	126	68.1
	Engineering	13	7.00
	Literature	10	5.40
	Management	10	5.40
	Others	26	14.1
Income	<2000	2	1.10
	2500~5500	96	51.9
	5500~10000	67	36.2
	10000~20000	18	9.70
	>20000	5	2.70
Exposure to	<200	105	56.7
NFT	200~1000	73	39.5
	1000~5000	7	3.80
	>5000	0	0

### Function 1: Enhancement of Design Capabilities

Digital product designers and non-genetic inheritors shared their opinion on several functions related to NFT virtual creative products of Luoshan shadow. They emphasized design matters related to NFT, including complementing the NFT product category of Luoshan shadow, combining modern and popular elements in terms of shape and theme, and emphasizing creativity for Luoshan shadow digital creative products. Moreover, they emphasized the creativity of creative digital products in the field of NFT, as said by one of the digital designers who studied the Luoshan shadow:

*“The creative digital design of the Luoshan shadow requires a certain degree of topicality. For example, the scenic digital collection of the Datang City of Night has chosen the shape of the Netflix Miss Invincible, which would increase the sales of the collection with a higher audience. Although NFT is a recent trendy topic, and there are many cases on the Internet where random doodles sell for high prices, as a special status of national NFT, its collection should not be the purpose of the creator but a critical carrier to publicize and promote the national culture, representing the cultural image of China. Therefore, a high degree of originality and attentive design supports the digital creative design of Luoshan shadow”.*

The digital product designers shared their opinions on how to improve the quality of product design, and they included the factors that clarify supply and demand, optimization of development and design process, and attention to detail in sensory response. For the “design methods”, most designers’ suggestions included virtual cultural crossing, flexible use of typical symbols, and enhanced immersion and interaction of the product.

### Function 2: Identification and Copyright

“Identification” was an essential function that emerged from the NFT virtual creative products of Luoshan shadow. Digital product designers and inheritors expect more artists and developers are entering the field of NFT. They claimed that NFT can protect the copyright of authors and that it is impossible to publish photos on the Internet without the copyright owner’s permission unless approved by a blockchain transaction. For example, one of the designers was very excited because many NFTs offer new or more convenient ways to protect and sell their creative works.

*“In terms of intellectual property and related laws, the NFT allows artists to increase their financial income through the sale of digital works. On the other hand, we know that it is very easy to reproduce paintings, photography, music, games, and other digital media in the digital art world. However, NFT is no substitute for crypto art. It aims to guarantee the provenance of digital artworks through blockchain technology”.*

At the same time, most participants wanted the original digital products of Luoshan shadow to be recognized through NFT. Purchase of NFT can be considered as a purchase of a unique art print signed by the creator. The NFT can also better manage the creation and trading of works in a virtual environment through smart contracts.

### Function 3: Relationship Medium

The combination of virtual and realistic Luoshan shadow innovative products will break through the traditional physical space limitation in terms of display. Traditional exhibitions are limited by physical space and can only display part of the exhibits. Nevertheless, virtual worlds have no limits in this regard. The immersive virtual environments will provide us with new ways of looking at art and create new forms of interaction with Luoshan shadow art, including physical, auditory, olfactory, and other forms.

Many participants described that the NFT platform would explore new artists, solve the scarcity of digital art at Luoshan shadow, and explore the possibility of interaction between Luoshan shadow and digital media. For example, one of the inheritors said, "More people will own and participate in the NFT products of Luoshan shadow with blockchain technology." Another inheritor also shared her opinion on this question,

*"Intangible cultural heritage will gain a more durable life through NFT technology because it can break the limits of time and space. The history and culture behind Luoshan shadow can be conveyed by innovative digital products in a more youthful experience, thus becoming an essential breakthrough in promoting its innovative development".*

Most inheritors claimed that NFT is a robust platform to showcase the charm that will enhance the elegance of the digital artwork of Luoshan shadow to the world.

#### **Function 4: Economic System**

Some respondents believed that NFT creative products of Luoshan shadow as a sustainable model that does not create overcapacity and can raise the income of ordinary individuals. To reach a younger consumer group and achieve better sales results, many well-known brand companies have launched their own digital NFTs. Shanniu, one of the inheritors of Luoshan shadow puppets, shared her views on NFT. She believed that the profound combination of NFT and marketing activities could promote the development of the traditional Luoshan shadow industry. The combination of NFT and Luoshan shadow allows everyone on the network to view and buy their favorite shadow products. Most importantly, they reminded the public that NFT products could generate a steady stream of royalty income for creative designers and inheritors of the Luoshan shadow and boost the local regional economy.

#### **4. Discussion**

Through our discussion of the subjective opinions and suggestions, in keeping with some crucial issues related to the NFTS of Luoshan shadow, we also identified that blockchain technology enhances the vitality of digital creative design. Furthermore, the advantages of Luoshan shadow NFT virtual creative products, as found by some researchers, focus on copyright advantages, innovation in form and content, and economic benefits.

##### *4.1 Security and Copyright*

Many designers believe the blockchain provides a traceable ownership guarantee for Luoshan shadow digital artwork. Each NFT reflects a unique serial number on a specific blockchain. The transactions associated with it are recorded on a decentralized blockchain ledger, which is tradable, verifiable, tamper-proof, and traceable. Leqing Wang, the product leader of Tencent Cloud's blockchain "to the chain," pointed out that NFT is unique and has properties such as resistance to tampering, authenticity, and scarcity (Chen Jiang, 2022). NFT is equivalent to a certificate of artwork, proving that digital artwork of Luoshan shadow is original, and others are just copies for preservation. The blockchain will record the work's creator and when it was created, so works freely copied and distributed on the Internet can also be distinguished from forgeries. It will solve the problem of opaque information about the origin and authenticity of Luoshan shadow digital artworks. The blockchain enhances the efficiency of transactions between buyers and sellers of Luoshan shadow digital artworks because it is not necessary to complete the identification of it through professional institutions, saving time and breaking the geographical limitations.

Compared to homogenized tokens such as Bitcoin and Ether, NFT provides a way to note or mark ownership of natively digital assets, making the commodity a unique digital asset on the blockchain. Therefore, through technological innovations such as timestamps and smart contracts, it is possible to register the copyright of each digital creative work of Luoshan shadow, which can protect copyright better. For example, if a digital work of Luoshan shadow is sold on the trading platform, the designer can cast the work as NFT and set rules for authorization or transfer of copyright to work. Meanwhile, the blockchain system will keep a permanent record of copyright flow.

In terms of the security of Luoshan shadow NFT products, some scholars argue that NFT enables the audience to share revenue with art creators and emphasizes the importance of the circulation of copyright transactions and the appreciation of copyright value issues.

##### *4.2 Innovation Issues*

For the consumer subject, the creativity of products is the main factor in attracting their consumption. Therefore,

some designers claimed that the uniqueness of Luoshan shadow digital creative products should be an independent creative process from nothing to something new, requiring that the creative results originate from oneself and cannot be copied by others. Its creativity is closely related to the quality and value of the result, emphasizing that it can be objectively identified. Many experts believe it is more important to set a higher standard for the originality of work and emphasize its spiritual and cultural connotations.

A recent study supported our findings and emphasized that digital derivatives can leverage user-produced content to compensate for creative shortcomings and reinforce each other with physical derivatives. NFT trading platform provides ideas and creativity for digital derivatives of Luoshan shadow by guiding users to deep participation. The whole process combines co-creation and market research to pool ideas in different aspects of creation, such as digital hand-painting of the production process, conceptual design, character styling design, et cetera. A series of digital assets of Luoshan shadow can be designed accordingly and offered to the market using blockchain technology. On the other hand, NFT digital artworks of Luoshan shadow break the absolute boundaries between designers, audiences, and investors and expand the depth and breadth of its artistic expression.

Furthermore, some researchers proposed to strengthen the construction of resource service platforms, drive product innovation, model innovation and industrial innovation with technological innovation, promote the cross-fertilization of traditional culture with literature, games, film, music, and other content forms, and continuously enrich product forms and service models (Hong Yin & Man Zhao, 2021). For example, the design of Luoshan shadow cartoon image will not be limited by language and national boundaries and will prepare design solutions with the help of different cultural elements. Designers also need to break through the limitations of traditional thinking, develop design ideas in the established scenes, and conduct a comprehensive analysis and research to complete the design work successfully.

In conclusion, NFT technology provides space for creating virtual artworks of Luoshan shadow. Technology and traditional culture collide with sparks, stimulating the vitality of creators and attracting the public's attention to Luoshan's shadow.

#### *4.3 Differences in Presentation*

Blockchain technology will enable a change in the form of the digital creative design of the Luoshan shadow. Some designers believed that NFT technology could make the digital creative design of Luoshan shadow produce a new form of artistic expression and bring a new visual impact to the audience. An inheritor of the shadow mentioned that with data support, people would interpret the Luoshan shadow with a long history from a new dimension and perspective, making it a living content. Based on the research of similar products on sale, we found that digital creations are no longer limited to images, short videos, audio, souvenir cards, skins, avatars, and other forms. In other words, blockchain technology will effectively extend the traditional presentation and give audiences a more intuitive feel for the product.

The problems of empty and indiscriminate issuance that existed in the past of digital artworks are solved by blockchain technology. Meanwhile, NFT technology also extends the dissemination channels of Luoshan shadow digital creative works, transmitting them in real-time at any time and place and giving people quick access to product information. It makes the creative works of Luoshan shadow more perfect and can be modified at a later stage to increase the authenticity of artistic creation, which will enhance the interaction between the audience and its creative work.

In essence, compared with the physical, cultural, and creative products, blockchain technology expands the boundary of the information conveyed by innovative digital products of Luoshan shadow. Designers can explain their work better with the help of digital technology and communicate the background, design process, and experience related to their work. Consumers can also purchase, view, and collect innovative digital products of Luoshan shadow at lower prices through more timely and convenient access.

#### *4.4 Other Issues*

As we mentioned earlier, NFT protects the copyright of the digital creative works of Luoshan shadow. At the same time, it generates a steady stream of royalty income for the artists. After executing the on-chain contract, the artist can get the corresponding royalty after each on-chain transaction and permanently own the right of income of their artworks. The traditional royalty mechanism is challenging to monitor the secondary trading and circulation of artworks, while the NFT art of Luoshan shadow has solved the problems of genuine and fake copyright and orderly inheritance.

In addition, although many designers have carried out the digital creative design of Luoshan shadow, the overall development is slow. Very few professionals and designers are involved in it, making it difficult to effectively support the rapid development of innovative digital products of Luoshan shadow. Compared with Shanxi shadow, Tangshan shadow, Hebei shadow, and Sichuan shadow, which cover the frontier fields of cloud games, animation

comics, e-sports, music, digital visual arts, and immersive script killing, Luoshan shadow lacks multi-scene and multi-ecological digital creative products. Therefore, making full use of NFT technology to promote the digitalization and intelligent upgrading of traditional Luoshan shadow puppets and related arts can accelerate the formation of products that are compatible with the development needs of the digital economy and intelligent society.

## 5. Conclusion

This study emphasizes that the key to designing NFT virtual creative products for Luoshan shadow lies in innovation so that they can be more readily accepted, purchased, and identified by the audience. It not only extends the scope of digital works of Luoshan shadow from images to non-homogeneous contents but also ensures the uniqueness, authenticity, and permanence of Luoshan shadow digital assets and solves its ownership and storage problems. The essential factors of NFT technology affecting the digital creative design of Luoshan shadow include copyright application and registration of works, expansion of financial and social attributes of digital artworks, and the innovation of means and contents of artistic creation.

However, many professionals have also raised a series of problems arising from the NFT digital creative design of the Luoshan shadow because of the artificially created scarcity. For example, without the supervision of traditional supervisory authorities, lowering the threshold for artistic creation may produce a surplus of digital artworks of Luoshan shadow, and many unfiltered artworks flow into the market. In addition, the digital art of Luoshan shadow is prone to high manipulation, and the cost of casting will prevent more people from participating.

In the future, NFT technology can advance the development of artistic language and artistic concept of digital creative design of Luoshan shadow and produce more diverse artistic forms. Such as audio, game, apps et cetera. Blockchain technology will facilitate the integration of the Luoshan shadow with existing cultures. Designers and inheritors creatively recombine the various elements in Luoshan shadow to create modern works with traditional cultural connotations. Not surprisingly, it can provide designers and inheritors with scientific guidance to support the sustainable design of digital creative works of Luoshan shadow and give these products a competitive edge in a rapidly changing market.

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