

The Exploration and Creative Research of Transparent Leather in Interior Decorative Products Design

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Abstract

This research aims to explore the innovative application of transparent leather in modern decorative arts, focusing on its historical significance and unique material properties. The study employs a mixed-methods approach, utilizing literature review, comparative material analysis, bionic design, and experimental art practice. The research sample includes transparent leather and traditional vegetable-tanned leather, with various decorative art pieces created as part of the study. Research instruments involved comparative analysis tools for assessing material properties, design sketches for bionic inspiration, and traditional leatherworking tools. Data collection was conducted through observation, material testing, and documentation of the creative process. The research analysis focused on comparing the physical properties of transparent leather with traditional leather and evaluating the artistic outcomes of the design experiments.

The research results found that transparent leather offers superior light transmission, hardness, and plasticity compared to traditional vegetable-tanned leather. These properties make it an ideal material for innovative applications in modern decorative arts, allowing for the creation of aesthetically appealing and culturally significant artworks. The study concludes that transparent leather has significant potential in contemporary design, offering new avenues for artistic expression and contributing to the revitalization of traditional crafts.

Keywords: Exploration; Creative Research; Transparent Leather; Interior Decorative; Products Design

Introduction

In the field of decorative arts, the selection and application of materials play an important role in the visual effects and cultural connotations of the works. As stated in China's "Kao gong Ji", "天有时,地有气,材有美,工有巧,合此四者,然后可以为良(tian you shi, di you qi, cai you mei, gong you qiao, he ci si zhe, ran hou ke yi wei liang)" Among them, "材有美(cai you mei)" emphasizes the aesthetic value of the material itself, which is often continuously sublimated in the process of cultural development ("Kao Gong Ji," ca. 500 BCE).

The current state of research on transparent leather is marked by several gaps that need addressing. Primarily, while the material's historical and cultural significance is well-documented in the context of shadow puppetry, there is a lack of comprehensive studies that explore its properties and potential in contemporary design. This gap highlights a critical need for research that not only examines the physical properties of transparent leather but also explores its applicability in modern decorative arts, particularly in interior design. Additionally, as the global design community increasingly values sustainability and cultural heritage,

transparent leather offers a unique opportunity to marry traditional craftsmanship with modern aesthetic sensibilities, yet this potential remains underutilized.

Moreover, the ongoing discourse in material innovation emphasizes the importance of re-contextualizing traditional materials within contemporary frameworks. As designers and artists seek to create works that resonate with modern audiences while preserving cultural heritage, the exploration of transparent leather's capabilities becomes increasingly relevant. This research aims to address the existing knowledge gap by investigating the material's properties, comparing it with traditional leathers, and experimenting with its use in modern decorative art pieces. By doing so, this study seeks to establish transparent leather as a viable material for contemporary design, offering new avenues for artistic expression.

Given these considerations, the primary research problem can be summarized as follows: How can transparent leather, traditionally used in shadow puppetry, be effectively recontextualized and applied in modern decorative arts to preserve its cultural significance while meeting contemporary aesthetic and functional demands? This study intends to answer this question through a combination of material analysis, experimental design, and a thorough exploration of the material's historical and cultural context.

Research Objectives

1. To explore the history of transparent leather, analyses its unique physical properties and consider the potential for innovative applications of these properties in modern decorative arts.
2. To experiment and create transparent leather decorative artworks, demonstrating the expressiveness and diversity of transparent leather in the context of contemporary art.

Research Methodology

1. Population and Sample

The population for this study includes materials and techniques related to transparent leather, particularly focusing on its application in contemporary decorative arts. The sample selected for this research consists of both traditional and modern uses of transparent leather, with particular emphasis on its historical significance in shadow puppetry and its potential for innovative applications in modern interior decorative products. The sample size includes transparent leather materials sourced from different regions where traditional shadow puppetry is practiced, as well as contemporary decorative art pieces created using this material.

2. Research Tools

To achieve the research objectives, a mixed-methods approach was employed, incorporating the following tools:

Literature Review: A comprehensive review of books, scholarly articles, and historical documents related to shadow puppetry, transparent leather, and decorative arts was conducted. This provided a foundational understanding of the cultural and historical context of transparent leather.

Comparative Material Analysis: Transparent leather was compared with traditional vegetable-tanned leather to analyze their respective optical, physical, and formative properties. This analysis was essential for identifying the unique advantages and potential applications of transparent leather in modern design.

Bionic Design Approach: Inspired by natural forms, particularly flowers, the bionic design approach was used to explore the creative potential of transparent leather in decorative arts. This method helped in translating organic patterns into innovative leather art forms.

Experimental Design and Art Practice: Various artistic techniques, such as distortion, deconstruction, reorganization, and integration, were employed in creating decorative artworks using transparent leather. This hands-on approach allowed for the practical exploration of the material's artistic possibilities.

3. Data Collection

Primary Data Collection: Fieldwork involved direct interaction with traditional artisans and modern designers who work with leather, particularly those specializing in transparent leather used in shadow puppetry. Observations and interviews were conducted to gain insights into the traditional production processes, the tools used, and the specific techniques employed in crafting transparent leather. Additionally, the experimental process of creating modern decorative items with transparent leather was documented in detail, including step-by-step records of the artistic processes.

Secondary Data Collection: The literature review provided a wealth of information regarding the historical and cultural significance of transparent leather. Scholarly articles, historical texts, and other publications were reviewed to understand the evolution of transparent leather from traditional shadow puppetry to its modern applications. This secondary data supported the comparative analysis and informed the design and creation of contemporary decorative products.

4. Data Analysis

Data analysis involved both qualitative and quantitative methods:

Qualitative Analysis: The primary qualitative data, gathered from interviews, observations, and the creative process, were analyzed to identify themes related to the cultural significance, material properties, and potential applications of transparent leather. The qualitative analysis focused on understanding the narrative around transparent leather, how it has been historically used, and its modern-day interpretations.

Comparative Analysis: The comparative material analysis involved assessing the differences and similarities between transparent leather and traditional vegetable-tanned leather. This analysis was conducted by evaluating key characteristics such as hardness, translucency, plasticity, and coloration properties. The results were used to determine the suitability of transparent leather for various decorative arts applications.

Experimental Results: The outcomes of the experimental design and art practice were evaluated based on the aesthetic appeal, functionality, and cultural relevance of the created decorative products. The effectiveness of bionic design principles in enhancing the visual attractiveness of transparent leather artworks was also assessed.

Research Conceptual Framework

The conceptual framework for this study is based on the intersection of traditional craftsmanship, material innovation, and contemporary design. It positions transparent leather as a bridge between cultural heritage and modern aesthetics, emphasizing its potential to create new forms of artistic expression in decorative arts. The framework incorporates the following key elements:

Historical Context: Understanding the origins of transparent leather in shadow puppetry and its cultural significance.

Material Properties: Analyzing the physical characteristics of transparent leather that make it unique compared to traditional leathers.

Innovative Applications: Exploring how transparent leather can be adapted for modern decorative products, using bionic design principles and experimental art practices.

Cultural Continuity: Ensuring that while transparent leather is innovatively applied in contemporary contexts, its historical and cultural roots are preserved and honored.

Research Results

1. Transparent leather material

1.1 The History of Transparent Leather

Transparent leather is traditionally used in shadow puppetry. The production process includes scraping and starching. "Shadow puppets are flat and transparent leather or paper cut-outs, fastened to one supporting stick and manipulated by at least two other thin sticks or rods. Shadow puppets are popular in South India, Indonesia, Thailand, Malaysia and China. Imported from China, they are also known in Korea and Japan" (Orr, 1974).

Chen (2003) in *Shadow Theaters of the World* proposed that shadow theatre may have originated in Central Asia or India, but doubted its origin in China. Due to the similarity of shadow theaters in China and Turkey, transparent leather are used in this experiment and artwork. Transparent leather is not only limited to cowskin, but also donkey skin, and sheepskin, etc. In one of the volume of Chinese Culture and Arts Series "Chinese folk art. Acrobatics. Puppet show. Shadow play", Prof. Liu (1999) summed up the categories of Chinese shadows puppetry, which are divided into seven categories according to the regions: Qin and Jin Shadows puppetry, Luanzhou Shadows puppetry, Shandong Shadows puppetry, Hangzhou Shadows puppetry, Chuan, E. and Dian Shadows puppetry, Xianggan Shadows puppetry and Chaozhou Shadows puppetry. Among which the Qin and Jin Shadows puppetry, Chuan, E and Dian Shadows puppetry, Hangzhou Shadows puppetry and Chaozhou Shadows puppetry are made from transparent cowskin and sheepskin. Shadow puppetry in Qin, Jin, Sichuan, Hubei, Yunnan and Xianggan Shadows puppetry are made of transparent cowskin, the Hangzhou and Chaozhou Shadows puppetry are made sheepskin, Shadow puppetry in Luanzhou and Shandong are made donkey skin, and the Xianggan Shadows puppetry are made of coloured paper (Figure 1). The Turkish figures were translucent but the Western European ones were black silhouettes (Chen, 2003). Transparent Leather is the material used in Turkish shadow puppetry (Figure 2). Camel leather has a certain importance and status in shadow puppet portraits because of its ability to absorb color and maintain its form. Due to its availability and degree of transparency, in certain areas of China, donkey skin is also considered a high-quality leather (Corsini, 2021).



Figure 1 Sichuan Shadows, China

Source: https://www.thepaper.cn/newsDetail_forward_3929873



Figure 2 Turkish shadow puppetry” Karagöz and Hacivat”

Source:

[https://commons.wikimedia.org/wiki/File:Turchia,_marionette_karagoz,_xx_secolo,_karag%C3%B6z_e_hacivat_\(protagonista_e_antagonista\)_02.jpg](https://commons.wikimedia.org/wiki/File:Turchia,_marionette_karagoz,_xx_secolo,_karag%C3%B6z_e_hacivat_(protagonista_e_antagonista)_02.jpg)

The production process of transparent leather in China starts from the selection of the right choice of leather, followed by the complicated scraping process. There are two traditional scraping techniques: one is done by hand, and the other is done with the help of some chemicals. The former procedure involves hard work and rich experience of the craftsmen. Both techniques require continuous and repeated scraping until the leather becomes thin, clean and transparent, and then pressed flat to dry (Li, 2020).

To sum up, transparent leather has not been applied in other design fields except in shadow puppet theatre. New innovations with transparent leather in decorative design not only retains the general properties of leather, but also increases the internal cultural significance of the material and the visual effect of enhancing the interior atmosphere. In addition to the traditional carving production process, the author uses leather carving tools to create texture on transparent leather, which is based on the inheritance of traditional culture and the integration

of new techniques and crafts to create interior decorations in line with modern aesthetics. It aims to transform traditional materials into new visual symbols in decorative arts.

1.2 Cultural significance of transparent leather

Through the literature studies and creating works, we can learn that the cultural significance of transparent leather is in its ability to integrate traditional crafts and culture with a sense of contemporary design, thereby promoting cultural dialogue and innovation in the decorative arts. It follows the development of shadow puppetry, a traditional production process with strong historical roots, and its existence is equivalent to a cultural heritage link that preserves the traditional production process in the context of contemporary design. It's usage in decorative arts represents a re-creation of traditional materials and techniques that demonstrates the ability of contemporary cultural artefacts, and evolves to reinvent in an ever-changing environment and aesthetics. Karana's (2010) study of material meaning provides an important theoretical foundation for the innovative application of transparent leather from traditional shadow theatre to modern decorative arts. Karana's central question of "How does a material acquire meaning?" inspires us to think about how we can re-interpret and re-contextualize the cultural significance of transparent leather in new artistic contexts.

2. Comparative analysis of materials

2.1 Prepare a piece of vegetable tanned leather and a piece of transparent leather of the same thickness (Figure 3).








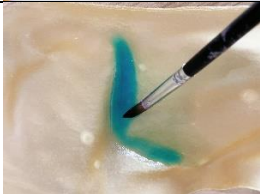




Figure 3 vegetable tanned leather (left) and transparent leather (right)
Source: By researcher, 2023

2.2 Comparative analysis of materials

Table 1 Comparison of vegetable tanned leather and transparent leather materials

category	Vegetable tanned leather		Transparent leather	
Absorbency				
Hardness				

Translucency		
Plasticity		
Shaping tools		
Coloring tools		
Coloring degree		

Source: By researcher, 2023

2.3 Analysis and conclusion

Transparent leather unless soaked in water, its water absorption is particularly slow. Therefore, when used as a decorative material has a strong advantage shape formation especially when its damped or semi-dry.

The use of transparent alcohol dyes not only maintain the transparency of the leather, that is especially suitable for the production of decorative items, which requires the effect of light and shadow, and presents a beam of different colors. Its excellent decorative properties enable more possibilities for innovative design.

3. Creative design, process and output

In the creative process, I combined traditional leather, craftsmanship with modern design concepts. For example, in the production of the transparent leather lamps, traditional leather carving techniques were used to create decorative texture, and at the same time, we used modern LED light sources to highlight the unique light effects of the transparent leather. This combination not only inherits the traditional craftsmanship, but also gives the work a modern feel. Inspired by the organic forms of plants, the authors transformed vegetable tanned leather and transparent leather to an organic abstraction of the flower forms (Figure 4).

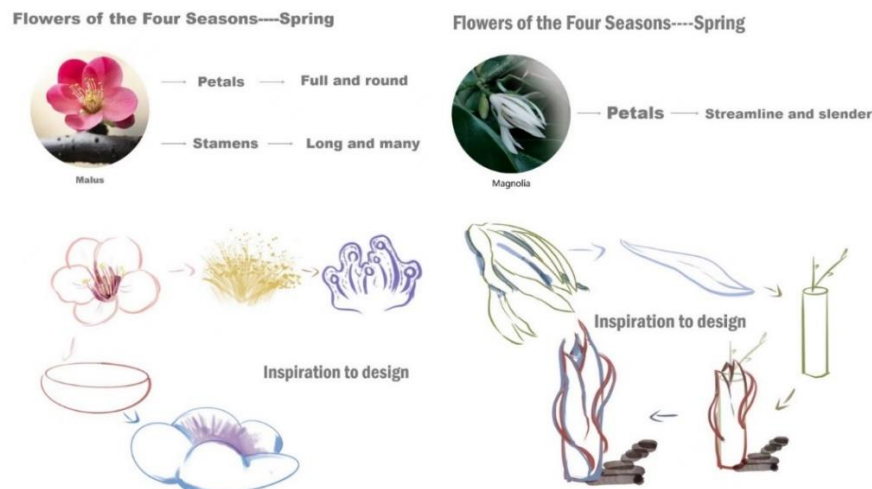


Figure 4 Flower Inspired Design Ideas Sketches
Source: By researcher, 2023

3.1 Vegetable Tanned Leather Creation Process

PROCESS



Take a suitable container as a mold, then soak the vegetable tanned skin in water to soften it and fix it with a fixer.



Plastic rods are used to shape the folds, and then they are fixed, dried and demoulded.



Cutting and trimming, shaping with sculpture mud, and finally wrapping the sewn leather.

Figure 5 Process diagram for creating vegetable tanned leather decorations
Source: By researcher, 2023

In the creation of vegetable tanned leather decorations, many interdisciplinary decorative techniques are added according to the properties of vegetable tanned leather, such as the carving technique of wood carving and the smocking technique of fabric reconstruction.

3.2 Transparent leather production process

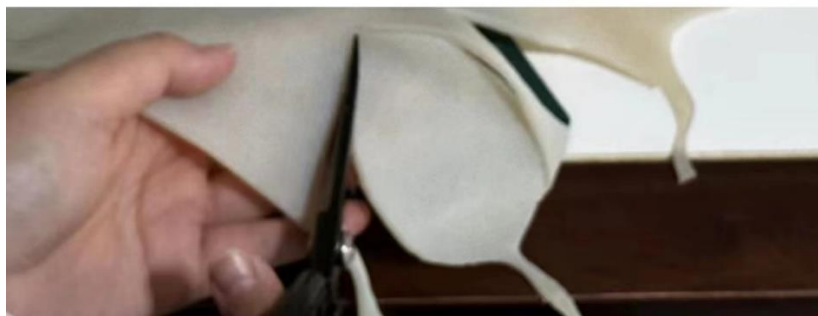


Figure 6 Cut the transparent leather according to the sketch
Source: By researcher, 2023

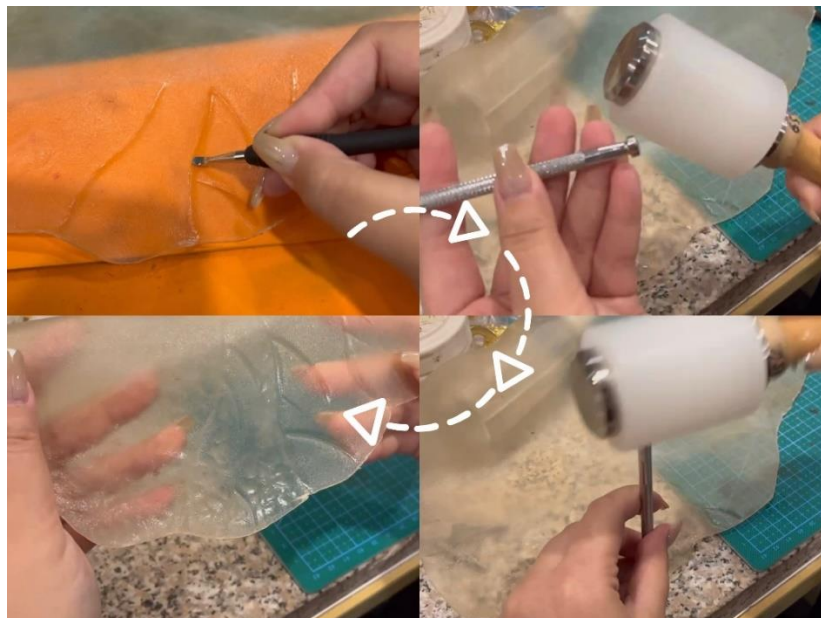


Figure 7 Transparent leather carving process
Source: By researcher, 2023

Transparent leather is soft when soaked in water and can be shaped and carved when semi-dry. The author has made a leather lamp and a leather incense stick respectively.

3.3 Output



Figure 8 Vegetable tanned leather works and details
Source: By researcher, 2023



Figure 9 Transparent leather lamp product display
Source: By researcher, 2023

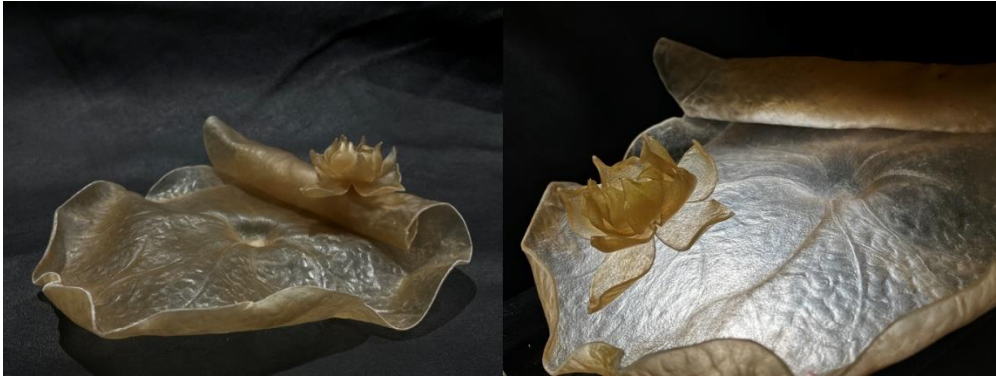


Figure 10 Transparent Leather Incense Holder
Source: By researcher, 2023



Figure 11 Transparent leather exhibition scene
Source: By researcher, 2023

During the exhibition of the transparent leather, this group of artworks attracted a lot of attention. The most frequently asked question was: what is this material? When the author explained that this is the transparent leather used in the traditional shadow theatre, the audience pleasantly surprised and commented on the uniqueness and beauty of the material.

Discussion

1. Research Objectives

This study primarily aimed to explore the history and unique physical properties of transparent leather, focusing on its innovative applications in modern decorative arts. The secondary objective was to experiment with transparent leather in the creation of decorative artworks and demonstrate its versatility in contemporary design. The research sought to bridge the traditional cultural connotations of transparent leather, historically used in shadow puppetry, with modern aesthetics and functionality.

2. Research Results

The study successfully demonstrated that transparent leather, with its semi-translucent properties, can be transformed into decorative products such as lamps and incense holders, showcasing its potential for diverse applications in modern interior design. The comparative analysis with traditional vegetable-tanned leather revealed that transparent leather has superior light transmission, hardness, and plasticity. This makes it an ideal material for decorative items that require unique visual effects, such as the softening of light or the creation of atmospheric shadow effects.

The bionic design approach, inspired by organic forms, further highlighted the material's flexibility and aesthetic appeal. By integrating natural forms into the creation process, the research confirmed that transparent leather could be adapted for various artistic expressions, blending cultural heritage with modern decorative techniques.

3. Reflection

The findings of this study emphasize the innovative potential of transparent leather in modern decorative arts. While traditionally limited to shadow puppetry, transparent leather possesses physical and aesthetic qualities that allow it to transcend its conventional use. Its ability to be shaped and molded when wet, combined with its semi-transparent nature, offers unique possibilities in creating light-modulating decorative items.

Furthermore, the research highlights the importance of combining traditional craftsmanship with contemporary design concepts. By maintaining the traditional carving techniques while introducing modern LED lighting and new aesthetic principles, this study provides a template for the modernization of historical materials without losing their cultural significance.

However, one of the challenges identified was the limited availability of transparent leather in fields beyond shadow puppetry. While the material has great potential, there is a need for further exploration of its production techniques to meet the demands of modern decorative arts, particularly in large-scale applications.

4. Consistent/Inconsistent with Previous Research

The results of this study align with several previously published works while also presenting some contrasts:

Consistent Findings:

The study's findings align with Karana's (2010) theory on the acquisition of material meaning, which emphasizes how materials, through their properties and context, acquire cultural and aesthetic value. Similar to Karana's work, this research shows that transparent leather's historical usage and unique physical characteristics contribute to its cultural and artistic significance.

The results also resonate with Chen's (2003) exploration of shadow puppetry, which emphasized the cultural significance of transparent leather in shadow play. This study confirms the material's cultural richness and demonstrates how its unique properties can be leveraged in contemporary design without losing its historical roots.

Inconsistent Findings:

Contrary to Corsini's (2021) findings, which focused on the aesthetic and cultural significance of transparent leather in traditional crafts, this study extends its potential use in modern decorative arts, suggesting that the material can move beyond its traditional confines. While Corsini emphasized the preservation of traditional techniques, this research advocates for a blend of tradition and innovation.

Liu (1999) stressed the regional limitations of transparent leather, focusing mainly on its use in shadow puppetry in specific Chinese provinces. This study challenges that limitation by exploring the material's applicability across modern decorative arts, from interior lighting to abstract forms, thereby expanding its geographical and cultural relevance in contemporary design.

5. Synthesis of Overall Findings as Knowledge Contribution

The overall findings of this research significantly contribute to the evolving discourse on material innovation and cultural preservation in contemporary decorative arts. By systematically analyzing the physical properties of transparent leather and its historical context, this study not only highlights the material's unique capabilities—such as superior light transmission, hardness, and plasticity—but also establishes its potential as a transformative element in modern design. The successful integration of transparent leather into decorative products, such as lamps and incense holders, demonstrates the material's versatility and opens new avenues for artistic expression that bridge the gap between traditional craftsmanship and contemporary aesthetics. This synthesis of traditional material with modern design practices enriches the understanding of how cultural heritage can be preserved and reimaged in today's creative industries, offering a framework for future explorations in sustainable and culturally resonant design.

Suggestions

1. Theoretical Suggestions

1.1 Expand Theoretical Research on Material Innovation: Further research should focus on the theoretical aspects of material innovation, particularly how traditional materials like transparent leather can be recontextualized in modern design. This involves studying the interaction between material properties and their aesthetic, cultural, and functional implications in contemporary contexts. Such research could provide a more robust theoretical framework for the integration of traditional materials into modern art and design.

1.2 Interdisciplinary Research Integration: To deepen the understanding of transparent leather, it is essential to integrate research from various disciplines such as material science, cultural studies, and design theory. Interdisciplinary approaches can provide insights into how materials acquire cultural significance and how these meanings can be preserved or transformed in new applications. This could also involve exploring the environmental impact of transparent leather production and its sustainability in modern design.

1.3 Application of Advanced Design Theories: Incorporating advanced design theories such as sustainable design, biomimicry, and digital fabrication into the study of

transparent leather could enhance its applicability in modern contexts. By exploring how these theories can be applied to the material, researchers can develop new methodologies for creating innovative products that align with contemporary aesthetic and functional demands while maintaining cultural relevance.

2. Policy Suggestions

2.1 Support for Traditional Craftsmanship Preservation: Governments and cultural institutions should implement policies that protect and promote traditional craftsmanship, including the production of transparent leather. This could involve establishing funding programs or grants for artisans and designers who work with traditional materials, ensuring the continued transmission of these skills to future generations.

2.2 Promotion of Sustainable Material Use: Policies should encourage the use of sustainable materials like transparent leather in modern design. This could include tax incentives for businesses that incorporate environmentally friendly materials into their products or support for research and development in sustainable material innovation. By promoting the use of materials that have low environmental impact, these policies could drive the broader adoption of transparent leather in various industries.

2.3 Educational Programs for Craft and Design Integration: Governments and educational institutions should develop programs that integrate traditional craftsmanship with modern design education. This could involve creating specialized courses or workshops that teach students about the historical and cultural significance of materials like transparent leather, as well as contemporary techniques for working with them. Such programs would help foster a new generation of designers who are skilled in both traditional and modern practices.

3. Further Research Suggestions

3.1 Exploration of Transparent Leather in Broader Design Fields: Future research should investigate the potential applications of transparent leather beyond decorative arts, including fields such as fashion design, product design, and architecture. By exploring its use in a wider range of contexts, researchers can uncover new ways to innovate with this material, potentially leading to breakthroughs in sustainable design and material science.

3.2 Combination of Contemporary Digital Technology with Traditional Craftsmanship: Research should explore how modern digital technologies, such as 3D printing, laser cutting, and digital fabrication, can be combined with traditional leatherworking techniques. This could lead to the creation of more intricate and precise designs, expanding the possibilities for using transparent leather in contemporary products. Additionally, this research could explore how digital tools can enhance the efficiency and scalability of transparent leather production.

3.3 Environmental Performance and Sustainable Production Methods: Further studies should focus on the environmental impact of transparent leather production and explore more sustainable methods of processing and using this material. This could include researching alternative sources of transparent leather, such as using different animal hides or even plant-based materials, to reduce the ecological footprint of its production. Additionally, exploring methods to recycle or upcycle transparent leather could contribute to the development of a circular economy within the design industry.

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