Employing Technologies to Apply Ethnic Motifs into Contemporary Product Design

by

Feiyu Shi

A thesis submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Master of Industrial Design

Auburn, Alabama
August 3, 2024

Keywords: industrial Design, cultural design, design integration, Miao motif

Approved by

Tin-Man Lau, Chair, Professor of Industrial Design
Rich Britnell, Professor of Industrial Design
Rusty Lay, Associate Professor of Industrial Design

Abstract

In the field of contemporary design, designers are faced with the challenge of how to effectively integrate traditional ethnic motifs into contemporary design. This involves cross-cultural communication, maintaining cultural authenticity, and design innovation. Despite the existence of a large number of studies on traditional motifs, designers still lack a systematic approach to their practical application. At the same time, the development of scientific and technological means (such as CNC and 3D printing) has provided new possibilities for design, but how to combine these technologies with traditional motifs still needs to be explored.

This research aims to provide a systematic design process to help designers from the preliminary research, selection and transformation of ethnic motifs, prototyping to optimization. By analyzing successful cases, different application strategies and design techniques are extracted, and a specific set of guidelines is proposed by combining with contemporary technology. The research results show that using this process, designers can not only improve the efficiency and accuracy of design, but also achieve cultural inheritance and innovation in design, avoiding cultural appropriation and cultural taboos.

Through this research, it is hoped that designers will be provided with practical tools and methods to promote cultural exchange and diversity in contemporary design and to advance the practice of design.

Acknowledgments

First and foremost, I would like to express my sincere gratitude to my advisor, Tin-man Lau, for his invaluable guidance, continuous support, and patience throughout my master's study and research. His immense knowledge and plentiful experience have encouraged me in all the time of my academic research and daily life.

I would also like to thank the other members of my thesis committee, Rich Britnell and Rusty Lay, for their insightful comments and constructive feedback, which were instrumental in refining this work.

I am deeply grateful to my friends and colleagues in the School of Industrial and Graphic Design, whose support and encouragement were invaluable throughout this journey.

Finally, I extend my heartfelt thanks to my family for their unwavering support, understanding, and encouragement, which have been a source of strength throughout my studies.

Thank you all for your unwavering support and belief in me.

Table of Contents

ABSTRACT 2

ACKNOWLEDGMENTS 3

TABLE OF CONTENTS 4

LIST OF FIGURES 8

CHAPTER 1 INTRODUCTION 11

1.1 Problem Statement 11

1.2 Need for Study 12

1.3 Objectives of Study 13

1.4 Assumptions 15

1.5 Scope and Limits 17

1.6 Anticipated Outcomes 19

1.7 Definition of Terms 21

CHAPTER 2 LITERATURE REVIEW 23

2.1 Overview of contemporary design and ethnic motifs 23

2.1.1 The concept of contemporary design *23*

2.1.2 Characteristics of contemporary design *23*

2.2 Overview of Ethnic Motifs 36

2.2.1 The concept of ethnic motifs *36*

2.2.2 Value of Ethnic Motifs in Contemporary Design *39*

2.3 THE IMPACT OF TECHNOLOGY ON ETHNIC MOTIFS IN CONTEMPORARY DESIGN 47

2.3.1 The Impact of Technology on Contemporary Design *47*

2.3.2 The Influence of Technology on the Application of Ethnic Motifs in Contemporary Designs *53*

2.4 SUMMARY 60

CHAPTER 3 CASE STUDY 61

3.1 DIRECT USE 61

Rosetta Stone USB Memory Stick from The British Museum *61*

Gayer-Anderson Cat Statue Replica *62*

The Great Wave Tote Bag *63*

3.2 FORMAL INTEGRATION 64

3.2.1 De-complex *65*

3.2.2 Abstraction *70*

3.3 IMAGERY INTEGRATION 75

China Pavilion at Shanghai World Expo *77*

UAE Pavilion at Dubai World Expo *79*

Japan Pavilion at Dubai World Expo *81*

3.4 SUMMARY 82

CHAPTER 4 DESIGN APPROACH 84

4.1 OVERVIEW 84

4.2 DESIGN TOOL 89

4.2.1 Step 1 Product Research *89*

4.2.2 Step 2 Motif Research *96*

4.2.3 Step 3 Digitalize *99*

4.2.4 Step 4 Ideation *99*

4.2.5 Step 5 Modeling *109*

4.2.6 Step 6 Adjust material and color. *109*

4.2.7 Step 7 Prototyping *111*

4.2.8 Step 8 Testing *111*

4.2.9 Step 9 Optimization *114*

CHAPTER 5 APPLICATION **115**

5.1 STEP 1 PRODUCT RESEARCH 115

5.2 STEP 2 MOTIF RESEARCH 118

5.3 STEP 3 DIGITALIZE 121

5.4 STEP 4 IDEATION 122

Concept Direction 1: Direct use of the buffalo motif. *122*

Concept Direction 2: De-complex use of the buffalo motif *123*

Concept Direction 3: Abstraction use of the buffalo motif. *125*

Concept Direction 4: Imagery integration use of the buffalo motif. *127*

5.5 STEP 5 MODELING 129

3D model of the sketch in the second concept *130*

3D model of the sketch in the third concept *131*

3D model of the sketch in the fourth concept *133*

5.6 STEP 6 ADJUST MATERIAL AND COLOR. 135

5.7 STEP 7 PROTOTYPING 139

5.8 STEP 8 TESTING 142

5.9 STEP 9 OPTIMIZATION 143

5.10 SUMMARY 144

CHAPTER 6 CONCLUSION 146

6.1 FURTHER RESEARCH 147

REFERENCES 149

APPENDIX A: PRODUCT INFORMATION FORM 160

APPENDIX B: MOTIF INFORMATION FORM 162

APPENDIX C: SUGGESTION FORM ONE 164

APPENDIX D: SUGGESTION FORM TWO 165

APPENDIX E: ASSESSMENT SUGGESTION FORM 166

List of Figures

Figure 2.1: Apple MacBook Series 25

Figure 2.2: Natural industrial dining set 27

Figure 2.3: YEZO Cabin 29

Figure 2.4: Apple Watch 31

Figure 2.5: The Round chair 34

Figure 2.6 Traditional Chinese Armchair 34

Figure 2.7: Beijing Olympic Torch 37

Figure 2.8: Fuji Wave Folding Umbrella 38

Figure 2.9: Viking Mug 39

Figure 3.1: Rosetta Stone USB Memory Stick (Left) and Rosetta Stone (Right). 61

Figure 3.2: Gayer-Anderson Cat statue replica (Left) and Gayer-Anderson Cat (Right). 63

Figure 3.3: The Great Wave Tote Bag 64

Figure 3.4.1: Louvre Pyramid 66

Figure 3.4.2: The Pyramids of Giza 66

Figure 3.5.1: ceramic sculpture "Bastion 3" 67

Figure 3.5.2: Snowy Owl 67

Figure 3.6.1: Scandinavian Mug 69

Figure 3.6.2: Scandinavian motifs 69

Figure 3.7: Butterfly Chair 71

Figure 3.8: Anderson Cat Weather Forecast Bottle 72

Figure 3.9.1: Flamingo Sculpture 74

Figure 3.9.2: Greater Flamingo 74

Figure 3.10.1: China Pavilion at the World Expo in Shanghai 77

Figure 3.10.2: Chinese arched structure 77

Figure 3.11.1: UAE Pavilion at Dubai Expo 2020 79

Figure 3.11.2: Saudi Arabia Observes World Migratory Bird Day 79

Figure 3.12.1: Japan Pavilion at Expo 2020 Dubai. From Hhlloo 81

Figure 3.12.2: Middle Eastern Traditional Vine Motif 81

Figure 3.12.3: Japanese hemp-leaf motif 81

Figure 4.1: Overview of design methods 85

Figure 4.2: Overall flowchart 86

Figure 4.3: Design Tool 88

Figure 4.4: Four ways to approach ethnic motifs 901

Figure 4.5: Direct use of motif 102

Figure 4.6: De-complex use of motif 104

Figure 4.7: Abstraction use of motif 106

Figure 4.8: Imagery integration use of motif 108

Figure 5.1: Step one of the design tools 115

Figure 5.2: Step two of the design tools 118

Figure 5.3: Step three of the design tools 121

Figure 5.4: Miao buffalo motif 121

Figure 5.5: Step four of the design tools 122

Figure 5.6: Sketch for de-complexifying the buffalo motif in case2 124

Figure 5.7: Sketch for abstraction use of the buffalo motif in case 3 126

Figure 5.8: Sketch for imagery integration use of the buffalo motif in case 4 128

Figure 5.9: Step five of the design tools 129

Figure 5.10: Photoshop rendering for concept one 130

Figure 5.11: 3D model of concept two 131

Figure 5.12: 3D model of concept three 132

Figure 5.13: 3D model of concept three 132

Figure 5.14: 3D model of concept three 133

Figure 5.15: 3D model of concept four 134

Figure 5.16: motifs on the batik fabric 135

Figure 5.17: Step six of the design tools 135

Figure 5.18: Contrast between different materials and colors for concept two 136

Figure 5.19: Contrast between different materials and colors for concept three 137

Figure 5.20: Contrast between different materials and colors for concept three 137

Figure 5.21: Contrast between different materials and colors for concept four 138

Figure 5.22: Step seven of the design tools 139

Figure 5.23: 3D-print 1/6 scale models 139

Figure 5.24: Carving process of the seat surface 140

Figure 5.25: Splicing of the various components 141

Figure 5.26: Completed prototype 141

Figure 5.27: Step eight of the design tools 142

Figure 5.28: Step nine of the design tools 143

Chapter 1 Introduction

1.1 Problem Statement

In the context of globalization and modernization, designers face the major challenge of integrating traditional ethnic motifs into contemporary design. This involves not only cross-cultural communication, but also how to maintain cultural authenticity and innovation in design. Despite the abundance of research and resources on traditional motifs, designers still lack a systematic approach to selecting and applying these elements in practice. In addition, with the development of technological means (such as CNC and 3D printing), designers need to find effective ways to combine these technologies with traditional motifs. However, there is currently a lack of guidelines that can help designers systematically select, transform and apply ethnic motifs, and use technology to improve the efficiency and effectiveness of design. Therefore, how to help designers properly select and use traditional motifs in the design process and accelerate design iteration through technology has become an important issue.

1.2 Need for Study

In the context of globalization, designers increasingly face the challenge of integrating traditional motifs into contemporary design. This involves not only cross-cultural communication but also maintaining cultural authenticity while fostering innovation. Despite the wealth of research and resources on traditional motifs, designers still encounter numerous challenges in the implementation process:

- The integration of traditional motifs into contemporary design: How to appropriately use traditional motifs in contemporary design, while maintaining the design's innovation and functionality, while respecting cultural traditions, is a complex design challenge.
- Limited cultural knowledge: Designers may lack a deep understanding of certain traditional motifs, which can lead to difficulties in selecting and applying them. This can not only lead to a decline in the quality of the design, but also to cultural appropriation and disrespect.

This research aims to fill these gaps by providing a systematic set of design guidelines to help designers select and apply traditional motifs, and to use contemporary technology to improve design efficiency and accuracy. This will not only help designers improve their ability to design across cultures, but also promote cultural inheritance and innovation, avoid cultural appropriation and cultural taboos, and ultimately promote design diversity and cultural exchange.

The results of this research will provide practical guidance for designers in their practice, while also providing new perspectives for design education and research and promoting the integration of theory and practice.

1.3 Objectives of Study

The main objective of this research is:

- Establish a systematic set of design guidelines to help designers choose and apply traditional motifs appropriately in contemporary design. This includes an analysis of traditional motifs, a classification of them, and guidelines on how to redesign them to ensure that designers can innovate while respecting culture.
- Explore how the use of digital tools and manufacturing technologies, such as CNC and 3D printing, can assist designers in improving the efficiency and accuracy of their designs, especially in the process of redesigning and applying traditional motifs.
- Provide practical case studies to demonstrate how traditional motifs can be effectively used in different design projects and evaluate their effectiveness in contemporary design. Through these case studies, designers can gain practical reference and inspiration.
- How to promote cultural heritage and innovation. By studying traditional motifs from different cultures, designers can better understand and respect these cultures and incorporate their essence into contemporary design. This not only helps to protect and pass on cultural heritage, but also enriches the diversity and depth of contemporary design.
- Avoid cultural appropriation and cultural taboos. By providing specific guidance and recommendations, this research helps designers avoid disrespectful and

inappropriate use of traditional motifs, thereby promoting the healthy development of cultural exchange.

By achieving these goals, this research aims to provide designers with practical tools and methods to help them effectively use traditional motifs in contemporary design, while promoting design diversity and cultural exchange.

1.4 Assumptions

In this study, the following assumptions were made:

- Designers have basic cultural sensitivity: It is assumed that designers participating in the study have basic respect and sensitivity for different cultures and are willing to learn and understand the cultural background and significance of traditional motifs.
- Digital tools and manufacturing technologies are widely available: It is assumed that most designers have access to and use digital tools and manufacturing technologies such as CNC and 3D printing, which can significantly improve design efficiency and accuracy with the design process.
- Traditional motifs have the potential to be redesigned: It is assumed that traditional motifs from different cultures can be effectively integrated into contemporary design after appropriate adjustments and redesign, retaining their cultural connotations while meeting contemporary aesthetic and functional needs.
- Demand for cultural elements in the design market: It is assumed that there is a demand for design products that incorporate cultural elements in the contemporary design market, and that consumers are willing to accept and appreciate these culturally inspired designs.
- Designers are willing to accept and apply new methods: It is assumed that designers are willing to accept and apply the systematic design guidelines proposed in this study and use these methods to select and redesign traditional motifs in the design process.

- Feasibility of technology and design methods: It is assumed that the digital tools and manufacturing technologies used can support and realize the methods and steps in the design guidelines and can be effectively applied in the actual design process.

These assumptions allow the study to be conducted under reasonable conditions, ensuring that the results are practical and applicable.

1.5 Scope and Limits

Scope:

- Selection of cultural motifs: This study focuses on several representative traditional cultural motifs from different cultural backgrounds, including but not limited to traditional motifs from China, India, Africa and Latin America. These motifs were selected for their rich cultural connotations and wide application potential.
- Design application areas: The research focuses on how traditional motifs can be applied in the fields of furniture design and home decoration. These fields were chosen because they have a high demand for cultural elements in contemporary design and because designers have a lot of creative freedom in these fields.
- Methodology: The research will adopt a case study approach, providing specific design guidelines and methods through the analysis of examples of traditional motif applications in actual design projects. Through these examples, the research aims to provide practical reference and inspiration for designers.

Limits:

- Limitations of cultural scope: Although the study covers several representative cultural motifs, it is not possible to cover traditional motifs from all cultures due to resource and time constraints. Therefore, the results may not be fully applicable to cultural backgrounds that were not covered.
- Limitations in the application of technology: The manufacturing technologies used in this study are mainly CNC, 3D printing and laser engraving, while other digital tools (such as AR, VR, etc.) and manufacturing technologies (such as injection molding,

hydroforming etc.) are not explored in detail in this study, which may limit the universality of the research results.

- Differences in designer skills: The study assumes that designers have basic cultural sensitivity and digital tool usage skills, but in reality, the skill levels of designers may vary greatly, which may affect the application of the research methods and guidelines.
- Limitations of case studies: Although case studies can provide specific references and inspiration, the selection and analysis of cases are somewhat subjective, and the results may be somewhat limited. They need to be adjusted in actual application in combination with specific circumstances.

1.6 Anticipated Outcomes

- Systematic design guidelines: The research will provide a set of systematic design guidelines to help designers effectively select and apply traditional motifs in contemporary design. Through these guidelines, designers will be able to better understand and utilize traditional motifs, enhancing the cultural connotation and innovation of their designs.
- Improve design efficiency and accuracy: The research is expected to provide designers with specific methods and tools to improve the efficiency and accuracy of the design process, thereby achieving high-quality design results.
- Case studies and practical references: The research will demonstrate how traditional motifs can be effectively applied in different design projects through case studies. These case studies will provide practical references and inspiration for designers to apply the research results in practice.
- Promote cultural heritage and innovation: By helping designers to use traditional motifs appropriately in their designs, the research is expected to promote cultural heritage and innovation, giving traditional motifs from different cultures new life and expression in contemporary design.
- Avoid cultural appropriation and cultural taboos: The research will provide specific guidance and recommendations to help designers avoid cultural appropriation and respect cultural taboos when using traditional motifs, thereby promoting the healthy development of cross-cultural design and cultural exchange.

- Enriching design education resources: The results of this research will provide new perspectives and resources for design education, helping students and educators better understand and apply traditional motifs, and cultivating design talent with cultural sensitivity and innovation.

1.7 Definition of Terms

- **Case Study Method:** A research method that explores and understands complex phenomena or processes through in-depth analysis of one or more actual cases to provide specific reference and inspiration.
- **Contemporary design:** refers to the current popular design style and methods, which usually emphasize neutral colors, material Combination, organic shapes, minimalism and mixing of Cultures to meet the needs of modern life.
- **Cultural appropriation:** refers to the borrowing or plagiarism of elements of another culture without respect for the original culture. It usually involves power imbalances and disrespect for the original culture.
- **Cultural Heritage:** Refers to the cultural characteristics, traditions and values inherited and passed down by a society or group, including material culture (such as architecture and art) and intangible culture (such as customs, language and knowledge).
- **Cultural Taboo:** Refers to behaviors, customs or symbols that are considered taboo or inappropriate in a culture. Violating these taboos may be considered disrespectful or offensive to the culture.
- **Design Efficiency:** Refers to the effectiveness and productivity of using resources (such as time, tools, materials, etc.) in the design process, usually through reducing time and cost, improving quality and innovation.
- **Digital Manufacturing Technologies:** refers to the technology of manufacturing products through digital means, including 3D printing, CNC

machining, laser engraving, etc. These technologies can improve the accuracy and efficiency of manufacturing.

- **Digital Manufacturing Technologies:** refers to the technology of manufacturing products through digital means, including 3D printing, CNC machining, laser engraving, etc. These technologies can improve the accuracy and efficiency of manufacturing.
- **Traditional motifs:** decorative motifs that have been passed down for a long time in a particular culture or ethnic group. These motifs often have a deep cultural significance and symbolism.

Chapter 2 Literature Review

2.1 Overview of contemporary design and ethnic motifs

2.1.1 The concept of contemporary design

'Contemporary design' refers to the current, recent style. It is more of a concept of design styles that respond to the aesthetics, techniques, materials, and social needs of the current era. It is not limited to one specific style but is an evolving concept, often incorporating elements of multiple design styles to accommodate changing modern lifestyles and technological advances.

In the 1960s, artists such as John Cage and Joseph Beuys championed the Contemporary Art Movement and argued for freedom and diversity in art creation. Their endorsement of using everyday objects and new media blurred the boundaries of what was traditionally considered art. Under the influence of these principles, contemporary design began to emerge by the 1990s. Designers began to focus more on the spirituality and cultural values of art, attempting to integrate art and design into everyday life. They were thinking about how to improve the quality of life and promote social harmony (Ruan, 2023). To this day, contemporary design remains an evolving field, responding to the changing needs and visions of society.

2.1.2 Characteristics of contemporary design

Benna (2009) described contemporary design as follows:

> The Museum of Modern Art defines contemporary design — contemporary being an adjective, not a style — as well-made, beautiful, efficient, innovative and reflective of its time. This time is preoccupied with environmental concerns, global awareness, economy, durability, experimentation, technology and simplicity. Because

contemporary is ‘of the moment,’ its designs are fluid, ever-changing, eclectic, low-key and open.

Contemporary design is not a fixed style but an adjective word that implies it will change over time, always reflecting the current design philosophy. The characteristics of this era include environmental concern, global awareness, affordability, durability, experimentation, use of technology, and minimalism. Contemporary design is strongly related to these characteristics.

The same is mentioned in the article written by Lucia and Sara (2019): “[Contemporary design] borrow qualities from modernism, minimalism, Art Deco, and other global styles, without hyper-focusing on anyone in particular”. This means that contemporary design incorporates a wide range of design elements and styles without overemphasizing the characteristics of one style. It combines the strengths of different styles to create a design language that is both contemporary and globally oriented. Such an approach to design allows contemporary design to remain stylish and modern, while also being diverse and inclusive across cultures and regions.

Based on existing research, five fundamental elements of contemporary design are listed below:

2.1.2.1 Neutral Colors

As discussed in this section, neutral colors play a key role in contemporary design. They promote the natural integration between design and environment, subtly highlighting design details and reflecting the design philosophy of simplicity and functionality. The choice of this color palette also reflects consideration of environmental protection, as they have a relatively low

impact on the environment. Therefore, the application of neutral colors is not just a visual choice but demonstrates a deep understanding of social values and environmental awareness.

As studies have shown, neutral colors are one of the key elements in contemporary design for multiple reasons. They play a key role in influencing consumer behavior, and studies have shown that color influences purchasing decisions, so effective color integration is crucial for product success (Goguen, 2012, p. 5). Zhou's (2007, np) study further emphasizes the importance of neutral colors and outlines that the strategic use of digital colors, including neutral colors, is essential for aligning with consumer psychology, material selection, environmental functionality, and reinforcing brand image. Additionally, research by Tawfiq and Muhammad (2021, p.1) shows how neutral colors can contribute to the avant-garde nature of interior design, promoting an innovative aesthetic approach that aligns with future design trends and technologies. Overall, these studies emphasize that the use of neutral colors in product design is not only a matter of trends but is critical to market success, brand differentiation, and forward-thinking design.

Figure 2.0.1 2016 MacBook series. From Apple (2016).

The Apple MacBook series (Figure 2.1) is a good example of contemporary design utilizing neutral colors, especially in its silver and space gray models. These neutral colors not only

endow the MacBook with a sleek, professional appearance but also ensure its seamless integration into various environments and design styles, from offices to home spaces.

The use of neutral colors in the MacBook design highlights several aspects of their importance in contemporary design: Firstly, neutral colors offer visual comfort and reduce eye strain, which is particularly valuable for users who frequently work on their computers. Secondly, the versatility and adaptability of these colors allow the product to transcend fashion trends, maintaining its appeal over time. Moreover, neutral colors enhance the product's premium feel, making the MacBook appear more refined and of higher quality.

Through the MacBook, we can see that the significance of neutral colors in contemporary design extends beyond aesthetics and fashion to include long-term value and broad adaptability. This design strategy not only improves user experience but also strengthens brand image, demonstrating the effectiveness of neutral colors in achieving design goals and meeting user needs.

2.1.2.2 Material Combination

In the design field, designers creatively blend various materials, such as integrating metal frames with wooden panels in furniture, to show the delicate durability of industrial materials and the warmth and comfort of natural materials. This strategy not only enhances the practicality and durability of the product but also imparts a unique visual and tactile experience that reflects the importance of diversity, sustainability, and humanity. In addition, designers explore the combination of naturally textured stone or bamboo with high-tech plastics or metals. Their aim is to create products that are both aesthetically contemporary and emotionally resonant, showcasing the fusion of traditional and modern technological thinking.

Based on the research explained here, the combination of natural materials such as wood and industrial materials is a trend in contemporary design. It combines the warmth and organic appeal of nature with the strength and precision of industry. A study demonstrated this through an exploration of Scandinavian furniture design, in which the use of natural wood is complemented by a combination of industrial materials to meet the demands of the international marketplace, embodying innovation while retaining a sense of humanity (Zeng & Wang, 2018). The work of Wiśnicka (2020) exemplifies this through the sustainable design of Simo Heikkilä, in which wood and metal coexist in harmony, embodying the balance of natural beauty and industrial resilience in contemporary design. These creative combinations are not only applicable to furniture but also to high-tech products. As mentioned in the study by Segmehl (2017), the porous nature and structural advantages of wood can be used as scaffolding to create multifunctional materials with variable properties for innovative applications. Overall, the combination of various materials in contemporary design is not only a continuation of traditional craftsmanship but also reflects the drive for innovation and sustainability, which is in line with current trends.

Figure 2.0.2 Natural industrial dining set. From Grain and Frame (n.d.).

Combining North American pine with steel trapezoidal legs, this Natural Industrial Dining Set (Figure 2.2) highlights an exemplary blend of materials. Pine provides a natural feel and warmth, while steel adds modernity and solidity. This fusion emphasizes functionality and clean aesthetics in line with the core principles of contemporary design. By combining these materials, the package highlights the balance between utility and aesthetics, representing an innovative use of materials and form in contemporary design.

2.1.2.3 Organic Shapes

Organic Shapes are also one of the core elements of contemporary design. This element draws on the forms of the natural world, emphasizing smooth, natural lines and curved surfaces to design products that are more humane and more nature friendly. This concept not only pursues visual aesthetics, but also enhances the user experience, resonating with the user's emotions by simulating the forms of nature. Organic shapes have been used in a variety of fields such as home accessories, kitchen appliances, and electronic products. For example, lamps and containers with rounded edges and soft curves are easy to grip and operate while creating a cozy atmosphere; high-tech products such as cell phones and wearable devices use rounded, ergonomic designs to greatly improve wearing comfort. These practices reflect the importance of organic shapes in design and the importance of natural beauty and humanized design principles.

Organic shapes in contemporary design are becoming increasingly popular for their aesthetic appeal and ability to evoke positive emotions in users, as evidenced by research in smartphone design. For example, Li and Pan's (2018) study highlights organic shapes in the evolution of CMF design and charging patterns in iPhones, highlighting their contribution to design innovation and enhanced user experience.

In the field of contemporary architecture, the use of organic shapes takes inspiration from a variety of sources, including environmentally friendly materials and biophilic design principles. Cekić (2017) emphasizes the use of organic metabolism concepts to create flexible vertical socio-cultural communities in urban environments. This approach combines geometric shapes with eco-architectural thinking, ensuring that the building harmonizes with its natural surroundings through prominent vegetated façade membranes with detoxifying properties. Similarly, the Casa Nautilus Solar project by Jebens-Zirkel and Zirkel (2022) demonstrates the integration of vernacular heritage with contemporary ecological principles. Constructed using natural materials such as sun-dried earth and hemp insulation, the family home is an example of regenerative design that combines local climate adaptation with sustainable living practices.

These studies demonstrate a clear trend that contemporary design is increasingly emphasizing the role of organic shapes, not only because of their visual appeal, but also because they meet the goals of sustainability, increase user engagement, and integrate with local cultural contexts.

Figure 2.0.3 YEZO Cabin. From Trend Hunter (n.d.).

The YEZO Cabin (Figure 2.3) is an architectural project located in the mountains of northern Hokkaido, Japan. The building uses smooth lines and curved surfaces to mimic the natural topography and landscape to ensure fit into the surroundings. It was inspired by the magnificent natural landscape of Hokkaido, utilizing organic shapes to create an architectural language that is both modern and at one with nature. In the choice of materials, the YEZO Cabin skillfully combines industrial and natural materials, such as steel and glass made using modern engineering techniques, as well as locally harvested wood and stone. This fusion of materials not only demonstrates the innovative and technical nature of the building, but also emphasizes the respect for natural resources and the concept of sustainable use. Overall, the YEZO Cabin is not only an example of the use of organic shapes in architectural design, but also shows how industrial and natural materials can be combined.

2.1.2.4 Minimalism

In the field of contemporary design, minimalism has become a significant trend. The core is the pursuit of visual simplicity and functionality, by cutting down on superfluous elements and decorations, emphasizing the design philosophy of "less is more". This tendency is not only the pursuit of aesthetic appearance, but also focuses on the effective use of space and the enhancement of user experience. In product design, minimalism manifests itself in the creation of simple and intuitive user interfaces, as well as the use of minimal design elements to meet functional requirements. Straight lines and simple geometric shapes, commonly found in modern furniture, household items, and even electronic products, and the preference for neutral or monochromatic color schemes, aim to reduce visual distractions and enhance the functionality and user friendly.

Minimalism's focus on the essence of design elements, the principles of sustainable design, the influence on technological advances highlight the importance of minimalism in contemporary design (particularly industrial design). Fan (2019) discusses how minimalism captures the essence in logo design, which is directly reflective of the broader minimalist approach that emphasizes simplicity and clarity in product design. Motruk (2019) discusses the eco-benefits of minimalism, emphasizing that minimalist design often uses environmentally friendly practices, an approach that can be used to create sustainable products, reduce waste, and emphasize functionality over redundancy. Similarly, Dong et al. (2022) illustrates how minimalism utilizes the newest technologies, such as 5G and big data, to craft products that provide complex but simple solutions through the design and dissemination of contemporary urban imagery systems, reflecting the evolving digital trends in industrial design. Together, these studies show that minimalism is a cornerstone of contemporary product design, driving the creation of aesthetically pleasing, environmentally friendly and technologically relevant products.

Figure 2.0.4 Apple Watch. From Apple (n.d.).

Apple Watch (Figure 2.4) is a good example of minimalism in contemporary design, demonstrating the core principles of minimalist design through clean lines, elegant user interface, and impeccable craftsmanship. The appearance design of Apple Watch adopts a rounded rectangular shape. This simple and modern shape is not only conducive to the realization of functions, but also meets aesthetic requirements. Coupled with limited color choices and high-quality materials such as aluminum metal, stainless steel, and ceramics, the high-end texture and durability of the product are emphasized. In terms of user interface (UI) design, Apple Watch uses intuitive icons, clear fonts, and an easy-to-operate touch screen to ensure a smooth and efficient user experience. Additionally, by offering interchangeable bands, Apple Watch allows users to customize their look to suit personal preferences and occasions. Although this design strategy is simple, it can effectively meet the needs and aesthetics of different users, reflecting the emphasis on functionality in minimalist design. Overall, Apple Watch not only represents the combination of technology and fashion, but also is an example of the application of minimalist design concepts in contemporary product design.

Overall, minimalism in contemporary design is the pursuit of minimalist aesthetics and functionality. It creates products and spaces that are both aesthetic and functional by streamlining design elements and emphasizing utility and user experience, reflecting contemporary society's preference for efficient, simple, and sustainable lifestyles.

2.1.2.5 Mixing of Cultures

In today's globalization, cultural integration in contemporary design has become more and more common. This element covers both cross-cultural exchange and cultural integration. This is not only in the combination of space, but also in the dimension of time, such as the fusion of

ancient and contemporary cultures. This cultural integration and exchange greatly facilitate the understanding of and respect for different cultures in a global perspective and play a key role in building a more pluralistic and robust society. Understanding and respecting different cultures can promote international cooperation and reduce cultural conflicts. By incorporating design elements and concepts from different cultures, products can be designed that not only show diversity and innovation, but also cross cultural boundaries and gain access to a wider market. This helps to increase the global awareness of brands and products to attract a more diverse group of consumers. In addition, cultural integration can also stimulate innovation. By combining elements and concepts from different cultures, unique design works can be created to bring a sense of freshness and differentiation to the market, thus standing out in the highly competitive global market.

Cultural integration is essential to promote innovation, sustainability, and revitalization of traditional arts in the modern context. Sivasankar's (2020) study highlights the critical role of cultural integration in creating successful multicultural environments and advancing cultural mixing, thereby enriching contemporary design through diverse cultural narratives. Similarly, Shu and Sun (2020) explored the integration and innovation of Huizhou wood carvings in contemporary cultural and creative products, demonstrating how the traditional art can be revitalized and sustained in the contemporary era through creative use and fusion strategies. In addition, Xiong’s (2021) study of the application of Qiang cultural pattern design in cultural and creative products illustrates how cultural fusion not only enhances design sensibility and internationalizes products, but also creates merchandise that resonates with the aesthetics and habits of use of modern consumers, demonstrating deep interconnectivity, enhancing the relationship between cultural heritage and contemporary design needs. Together, these studies

shed light on the importance of cultural integration in contemporary design, emphasizing its role in connecting traditional and modern elements, promoting cultural diversity, and fostering innovation and inclusiveness in design practice.

Figure 2.5 Hans Wegner PP503 The Round Chair. From Twentytwentyone (n.d.).

Figure 2.6 Traditional Chinese Armchair. From Guangdong Rosewood Association (n.d.).

Cross-cultural design emphasizes cultural differences and interactions between geographies and nations. It explores how to integrate different cultural elements in design to create works that have global appeal while respecting local characteristics. The Round Chair (figure 2.5) is a good example of cross-cultural design in contemporary design. By combining the traditional design elements of the Chinese armchair (Figure 2.6) with the aesthetics of Scandinavian modern design, a masterpiece of design is created that transcends the boundaries of time and culture. This integration not only promotes design innovation, but also deepens cross-cultural understanding. In an era of economic globalization, this design strategy allows designers to create works that are both global and culturally profound. By integrating elements from different cultures, the design of the Round Chair demonstrates how to create furniture designs that are

both modern and timeless. This design conversation and integration emphasizes the value of drawing inspiration from multiple cultures and promotes understanding and respect for the diversity of cultures among a global audience.

Therefore, cultural integration in contemporary design is both an exploration across geographical and national boundaries and a dialog across generations. This kind of cultural integration not only enriches the form of expression of design, enhances the cultural depth and emotional resonance of the works, but also promotes the mutual understanding and respect of global cultures. Through such design practice, designers not only convey aesthetic values but also cultural values, while promoting communication and integration between different cultures, and innovation and inclusiveness in design practice.

Five key elements of contemporary design - neutral colors, material combination, organic shapes, minimalism, and cultural integration - come together to shape its unique aesthetic and functionality. Neutral colors provide a calm and flexible visual foundation for design, allowing spaces and objects to be easily integrated into different environments and contexts. The use of material combinations reflects the designer's thoughtful approach to texture, functionality, and sustainability, ensuring that the design is both aesthetically pleasing and functional. Organic shapes bring the design closer to nature, providing a more comfortable and intimate experience for the user. Minimalism emphasizes the removal of superfluous elements and a return to the essence of design, making each design purposeful and functional. Finally, cultural integration injects rich multicultural elements into contemporary design, which not only enhances the global appeal of design, but also promotes understanding and respect among different cultures. These five elements interact with each other to shape the unique style and value of contemporary

design, reflecting modern society's pursuit of aesthetics, functionality, comfort and multicultural inclusiveness.

2.2 Overview of Ethnic Motifs

2.2.1 The concept of ethnic motifs

In essence, ethnicity refers to the common characteristics that distinguish one group from another, such as culture, language, religion or tradition. These common features not only promote a sense of identity and belonging among group members, but also are reflected and passed on through ethnic motifs. Ethnic motifs, as the designs or graphics that carry the characteristics of a particular ethnic group, are a blend of traditional culture and historical allusions, and are widely used in furniture, pottery, clothing, and other art forms and handicrafts.

Ethnic motifs can be expressed through archetypal themes, plots and imagery. These motifs, plots and imagery not only reflect the mentality and traditions that are intertwined with the art forms of a particular nation, but they are also vehicles for conveying deeper cultural narratives. They are an integral part of national identity and have the potential to influence various forms of artistic expression, as emphasized by Nekhvyadovich (2013).

In today's society, the discussion around ethnic motifs is prevalent because of its significance in cultural expression and identity. In the process of globalization, various cultures integrate and affect each other. Ethnic motifs are symbols of ethnic uniqueness and continuity, which are more than just decorative elements and contain profound truths and meanings. These ethnic motifs play an important role in preserving and passing on cultural heritage.

In the field of art and design, ethnic motifs have become a constant source of inspiration for designers and artists, motivating them to create works that reflect the spirit of the times while being deeply rooted in traditional culture. This not only enriches the cultural ecology, but also promotes cross-cultural understanding and respect, highlighting the importance of preserving cultural diversity in contemporary society.

For example:

- 2008 Beijing Olympic Torch (Figure 2.7): The design of the Beijing Olympic Torch is inspired by the traditional Chinese scrolling cloud motif, which symbolizes harmony and good visions. The torch not only shows the combination of modern design and traditional Chinese culture, but also conveys China's cultural confidence to the world through its unique appearance. This reflects the importance of national motifs as cultural icons in the context of globalization.

Figure 2.7 Olympic Games torch - 2008 Beijing. From Olympic Museum (2008).

- Mount Fuji Wave Folding Umbrella (Figure 2.8): The design of this umbrella is inspired by the famous Japanese ukiyo-e artwork "Kanagawa Surfing Sato", which demonstrates the skillful fusion of traditional Japanese art and modern life by applying this classic artwork to modern daily necessities. This design is not only aesthetically pleasing and practical, but also allows the user to feel the unique charm of Japanese culture, further illustrating the application of national motifs in daily life and their cultural heritage value.

Figure 2.8 Fuji Wave Compact Umbrella. From British Museum (n.d.).

- Scandinavian Viking Style Coffee Mug (Figure 2.9): The design of this coffee mug combines the graphic elements of the Nordic Viking culture, such as dragons and intricate geometric motifs, to convey the mystery and power of the Viking culture. Through this design, traditional Nordic cultural elements are reinterpreted and integrated into modern life, enhancing people's recognition and understanding of Viking culture. This proves once again that the diverse application of ethnic motifs in

modern design not only preserves the essence of traditional culture, but also gives it new vitality.

Figure 2.9 Viking Mug. From Etsy (n.d.).

These examples clearly demonstrate the diverse applications of ethnic motifs in modern design, which not only preserve the essence of traditional culture, but also give it new vitality so that it continues to shine in today's society.

2.2.2 Value of Ethnic Motifs in Contemporary Design

2.2.2.1 cultural value

The application of ethnic motifs in contemporary design not only shows the unique artistic value and rich symbolic meaning, but also highlights the important role of ethnic motifs in cultural inheritance and innovation. By integrating the traditional motifs into contemporary design, designers have given the design deep cultural connotations and historical narratives and promoted cultural exchanges and understood in the context of globalization, demonstrating the irreplaceable cultural value of ethnic motifs in contemporary design.

Zhao and Ghazali's study (2023) reveal the adaptability and innovativeness of traditional ethnic minority arts in modern architectural decoration, demonstrating that ethnic motifs can still convey profound cultural and aesthetic significance in new forms and contexts, even in the face of rapid technological advances. Similarly, Huang and Tong's study (2022) of Dunhuang mural motifs in modern design not only highlights the unique perspective and source of inspiration that these ancient motifs provide for contemporary art creation, but also demonstrates the potential of ethnic motifs to promote innovative art forms and to enhance the use of traditional visual elements in modern design.

In addition, the study by Xu et al. (2022) of the cross-domain migration of Yi lacquer leather bag motifs in contemporary product design shows how traditional motifs can be injected with new life through contemporary design means and materials, so that they not only retain their original cultural characteristics, but also acquire new artistic connotations and market values. This cross-generation design practice not only deepens the public's awareness of and respect for national culture, but also opens new paths for the inheritance and development of traditional art.

Through these studies and practical examples, we see that the cultural value of ethnic motifs in contemporary design goes far beyond their function as decorative elements. They become a bridge connecting past and present, tradition and contemporary, providing designers with unlimited creative space and promoting cultural diversity and inclusiveness. By utilizing the deep cultural symbolism of ethnic motifs, designers have not only enriched the expressive power of the design, but also strengthened the dialogue and understood between viewers from different cultural backgrounds, demonstrating the importance and value of ethnic motifs in the era of globalization.

Therefore, the contemporary design application of ethnic motifs is not only a tribute to traditional culture, but also a process of innovation and exploration. It prompts designers to rethink the meaning and value of culture and spreads the important message of cultural diversity through the power of design, making ethnic motifs become an important area of continuous development and exploration in the field of contemporary design.

2.2.2.2 Commercial Value

According to the Reshaping Policies for Creativity Report (2022) published by UNESCO, the cultural and creative industries occupy a pivotal position in the global economy, contributing 3.1% to the global Gross Domestic Product (GDP) and accounting for a 6.2% of the global job market. This figure significantly reflects the strong dynamism and vast potential of the cultural and creative industries. Notably, the value of exports of cultural goods and services doubled from 2005 to 2019, reaching an impressive $389.1 billion. This growth not only demonstrates the popularity of cultural products in the global market, but also reflects the deepening of international cultural exchanges.

Especially in China and the United States, the total import and export of cultural products reached $99.2 billion and $75.8 billion, respectively, according to official data (2019) from the UNESCO Institute for Statistics (UIS). This not only illustrates the important position of the cultural industry in the global economy, but also highlights the important role and value of cultural products in international trade. Such cross-border cultural exchanges and trade promote mutual understanding and appreciation of different cultures, deepening global cultural diversity and inclusiveness. It is clear from these data and trends that the market prospects for the cultural industry are extremely broad.

As people's standard of living improves and their awareness of cultural consumption increases, consumer demand for cultural products and services continues to grow, especially for those products that reflect personal identity and cultural recognition. More importantly, consumers are willing to pay a premium for the additional attributes of cultural products - such as uniqueness, creativity, and the cultural and historical values associated with them. This reflects the fact that cultural products are not only objects of material consumption, but also satisfy emotional and spiritual needs, and are important symbols of consumers' individuality and identity. As Hindsley et al. (2020) pointed out in their study, consumers are willing to pay a premium for the ethical attributes of cultural products such as pure coffee. At the same time, there are differences in consumers' willingness to consume different attributes of cultural products because of different worldviews.

The study by Lee et al. (2014) further emphasizes a key phenomenon in the market for cultural products - the country-of-origin effect, whereby consumers have a significant positive preference for products from a particular country of origin, while they may hold negative attitudes towards products from other countries of origin. This phenomenon is evident in Japanese studies of import demand for foreign cultural products, which show that when consumers perceive products as originating from a particular culture that they know and love, their demand for those products increases significantly. Conversely, if the products originate from a country with a cultural background different from the consumers, their demand may decrease accordingly.

This halo effect reveals the important role of cultural affinity and familiarity in globalized markets. Consumers' cultural preferences and perceptions of country of origin not only affect their purchasing decisions, but also further influence the cross-border flow of cultural products

and the motif of demand in the international market. This implies that firms and policymakers in the cultural and creative industries need to deeply understand and study consumer preferences and acceptance of different cultural products in order to promote their products and services more effectively in the global market.

Moreover, this highlights a key strategy in the marketing and branding of cultural products - reinforcing and capitalizing on consumers' cultural familiarity and affinity. By enhancing the communication of specific cultural identities and values, companies are not only increasing the attractiveness of their products, but also establishing a unique brand position in a highly competitive market. The successful implementation of such strategies can effectively enhance the competitiveness of cultural products in the international market, while promoting cultural diversity and cultural exchange.

Under the above background, the commercial value of ethnic motifs in contemporary design is particularly important. With the deep development of globalization, ethnic motifs, as a strong cultural symbol, can not only stimulate the cultural resonance of consumers in the international market, but also enhance the market attractiveness and differentiated competitiveness of products. The application of ethnic motifs spans across a variety of design fields such as clothing, home decoration, product packaging, etc., becoming a bridge connecting traditional culture and modern consumption.

First, the uniqueness and cultural connotation of ethnic motifs give them unparalleled appeal. Consumers have shown unprecedented interest in products that reflect their personal cultural identity and aesthetic preferences, especially in contemporary society that pursues personalization and differentiation. By integrating ethnic motifs into designs, designers and

brands not only give products deep cultural meaning, but also provide consumers with a way to express their personality and cultural belonging.

Secondly, the use of ethnic motifs helps brands establish unique market positioning and brand image. In a globalized market, consumers are paying more and more attention to brand stories and cultural values. With their rich cultural heritage and storytelling, ethnic motifs can effectively enhance the cultural depth and emotional connection of the brand, attract target consumer groups, and thereby improve brand loyalty and market competitiveness.

Finally, the commercial value of ethnic motifs is also reflected in its potential to promote international cultural exchanges and the export of cultural products. Lee et al. (2014) emphasized the origin effect, whereby consumers have higher demand for products originating from a specific cultural background. Therefore, integrating ethnic motifs into product design can not only open up the domestic market, but also attract overseas consumers, promote international trade of cultural products, and contribute to economic growth.

2.2.2.3 Aesthetic Value

The aesthetic value of ethnic motifs in contemporary design is reflected in their ability to integrate deep cultural heritage and unique visual language to create designs with strong cultural resonance and visual appeal. As discussed by Maslak (2023), ethnic motifs in contemporary packaging design not only make products more visually appealing, but also increase cultural resonance, demonstrating the importance of cultural elements in creating market-competitive designs. This is further confirmed in Zhao and Ghazali's (2023) study of traditional architectural decorations of ethnic minorities in China, which emphasizes the influence of cultural heritage in

stimulating innovative design practices by combining traditional motifs with contemporary architectural elements.

Guo's (2023) study further emphasizes the innovative use of traditional Chinese motifs in the design of cultural and creative products, demonstrating how these motifs can provide aesthetic and cultural continuity to contemporary design. Meanwhile, Majid and Dina's (2023) study of the Tapis fabric motifs of the Lampung people not only demonstrated their artistic appeal, but more importantly revealed the deep cultural teachings and spiritual values embedded in these motifs and their impact on the culture and daily life of the Lampung community.

Furthermore, the work of Yu et al. (2023) demonstrates the contribution of ethnic motifs as aesthetic elements to product design innovation. Transforming Yao festival portraits into contemporary souvenirs promotes cultural heritage, and also brings new designs that are both innovative and authentic to the cultural narrative.

Overall, the aesthetic value of ethnic motifs in contemporary design far exceeds their visual beauty; they serve as a bridge between past and present, tradition and modernity. By innovatively incorporating these motifs, designers are not only able to create works of unique aesthetic value, but also promote cultural heritage, providing rich cultural perspectives and insightful cultural discussions in a globalized world. This design practice not only celebrates cultural diversity, but also pushes the boundaries of creative exploration, injecting new vigor and meaning into the field of contemporary design.

2.2.2.4 Social Value

Cultural products, specially design works incorporating ethnic motifs, not only embody deep aesthetic values but also carry significant social values in modern society. Auger's (2016)

study of the Kazakh community in Istanbul found how design works incorporating ethnic motifs contributed to economic achievement, fostered social cohesion and supportive networks, and influenced social stability and economic development. This suggests that cultural artifacts are effective in reducing social isolation by facilitating integration and bonding among immigrant populations, which in turn promotes mental health and social adaptation.

Meanwhile, Zhyvko and Zastavnyy's (2023) study of cultural products and ethnic motifs in the Middle East revealed their complex roles in promoting regional division, governance and prosperity. This emphasizes the bidirectional impact of cultural products in social cohesion and stability, suggesting that ethnic motifs not only promote unity, but also reflect and contribute to broader socio-political dynamics.

Further, Zheng's (2017) discussion emphasizes government support for public cultural products, particularly those containing ethnic motifs, and their role in fostering social cohesion, strengthening ethnic identity, and creating a healthy and harmonious social climate. This reflects the key role of cultural policy in utilizing cultural products to promote national unity and social stability.

In general, the modern design application of ethnic motifs is not only a reflection of aesthetic pursuit, but also a manifestation of social value. The application of ethnic motifs in design helps new immigrants maintain spiritual ties with their homeland, alleviates cultural barriers, promotes exchanges and understanding among people of different backgrounds, and enhances social inclusiveness and diversity. In addition, the popularization of ethnic motifs and the development of cultural products drive economic growth, promote international cultural exchanges, enhance national soft power, and help to reduce social division and extremist tendencies and build a harmonious society.

2.3 The Impact of Technology on Ethnic Motifs in Contemporary Design

2.3.1 The Impact of Technology on Contemporary Design

2.3.1.1 Innovations in Design Tools

Advances in science and technology, especially the introduction and development of digital tools, have revolutionized the nature and process of design. Marion and Fixson (2020) and Zhou et al. (2006) explored in their studies the application of digital design tools and collaborative information technology (CIT) in the new product development (NPD) process and its profound change in design impact. With the rapid advancement of digital technologies, design and collaboration tools have become more advanced and easier to use, being integrated earlier into the design process. These tools have not only impacted output and process efficiencies, expanding the depth and breadth of the work of individual innovators, but have also led to the rearrangement of the entire innovation process (Marion & Fixson, 2020). People, tea`ms and organizations are thus able to adopt new configurations and redefine the rules of knowledge management as a core competency.

This change has had a profound impact on individuals, teams and organizations (Marion & Fixson, 2020). For individuals, enabling designers and engineers to enter digital concept development earlier transformed their design and analysis workflows. For teams, easy-to-adopt design iterations increase knowledge generation, but also challenge teams not to over-iterate. For organizations, increased knowledge generation and flow means that process discipline is more important than ever, allowing for the formation of new organizational groups and changing access to expertise within the organization.

The widespread use of digital tools has lowered the barriers to entry, making high-quality engineering tools available to virtually everyone and fostering the development of active communities, such as Grab CAD. New collaboration and workflow tools, such as project management software and product data and knowledge management tools, offer new ways to manage knowledge and workflows.

Meanwhile, the transformative impact of technologies such as Reverse Engineering (RE), Rapid Prototyping (RP), Virtual Reality (VR), Tactile Design (TD), and Digital Product Modeling on the product design process has been highlighted (Zhou et al., 2006). These technologies facilitate the virtualization of the design process by allowing designers to create, test, and refine products in digital environments prior to physical manufacturing, dramatically reducing development time and costs while improving product performance and market competitiveness. Reverse engineering quickly captures and enhances existing product features, rapid prototyping technology quickly creates physical prototypes based on digital models, virtual reality technology introduces an immersive dimension to product design, and haptic design technology transforms the interface between designers and digital tools, making digital modeling an intuitive hands-on approach.

Fully integrating these digital tools into product design not only gives designers greater flexibility and control over the creative process, but also brings product development closer to changing market demands and consumer expectations, enhancing the product's competitive advantage in the marketplace.

2.3.1.2 Changes in Production Methods

In the field of contemporary design, the change in production methods due to digital technologies has become an irreversible trend. This change is reflected not only in increased productivity, but also in the increased capacity for product innovation and customized production. Milosevic et al. in their 2020 study delve into the digital transformation of the manufacturing industry towards the concept of Industry 4.0, a transformation which is typical of the changes in modern design and production methods.

Digital manufacturing or digital transformation of the manufacturing industry refers to the interaction between physical and digital models in the production process. This interaction is a key step in the implementation of the industry 4.0 concept, which focuses exclusively on the integration of manufacturing with information technology and digital services (Milošević et al., 2020). In this process, digital engineering accelerates the product development cycle from design to use, increasing the efficiency of the engineering process by integrating CAx and PLM systems. This efficient exchange of digital information makes it possible for project teams to collaborate based on the exchange of digital information, which ensures greater innovation and better quality, while reducing the cost and time to market of new products (Milošević et al., 2020).

Digital manufacturing is a comprehensive concept that includes a whole network of digital models, methods and tools such as simulation and 3D visualization, integrated with continuous data management systems. It represents the integration of virtual and actual manufacturing (Milošević et al., 2020). This integration is seen as a comprehensive concept aimed at improving product and engineering activities with production processes and simulations. By applying

different forms of simulation at different planning levels, improvements can be made to the virtual model to enhance products and manufacturing processes (Milošević et al., 2020).

Thus, digital manufacturing and Industry 4.0 play a crucial role in driving business growth by supporting innovation and improvement in product development. This technology provides shorter time-to-market and reduces development and manufacturing costs. Digital manufacturing opens up the possibility of effective monitoring and improvement of the production process through the use and control of data related to the development, planning and validation of production resources (Milošević et al., 2020).

In summary, the changes that digital technologies have made to the way products are produced in contemporary design are obvious. By implementing the concepts of digital manufacturing and Industry 4.0, the manufacturing industry has been able to not only increase productivity and flexibility, but also to drive product innovation and meet the market demand for customized production. This shift facilitates the transition from traditional production methods to a smarter, connected manufacturing model.

2.3.1.3 Expansion of Design Thinking

In their paper, Silva et al. (2019) explore the profound impact that technology, particularly digital manufacturing techniques, has had on contemporary design thinking. In the field of contemporary design, this impact is manifested in the close integration of design and manufacturing processes, which has reshaped the way designers work and approach innovation.

Advances in technology have led to a shift in the approach to design thinking, which is clearly demonstrated in Silva et al.'s (2019) paper. The introduction of digital fabrication technology has not only increased the efficiency and accuracy of the design process but has also

enabled designers to experiment with and realize complex design concepts in a way that has never been possible before. The application of this technology breaks down the boundaries between traditional design and physical manufacturing, allowing designers to move directly from computational modeling to physical realization without the need for intermediate conversions. This not only accelerates the design-to-production process, but also increases the flexibility and innovation of design experiments.

Silva et al. (2019) show how digital technologies are driving the evolution of design thinking by analyzing the practices of two architectural studios that employ digital technologies. These studios have explored new ways of designing and manufacturing using digital tools and methods. For example, they use 3D printing for rapid prototyping, allowing designers to test and improve designs in real time. This approach not only improves the quality of designs, but also promotes innovative thinking and makes design concepts easier to realize. Thus, this study demonstrates the importance and potential of digital technologies in contemporary design.

Overall, the paper highlights the impact that digital fabrication technologies have had on contemporary design thinking, showing how designers have used these technologies to challenge traditional boundaries and create new design methods and forms of expression. This technology-driven shift in design thinking not only influences how designers conceptualize and realize architectural projects, but also places new demands on design education and practice, driving continued development and innovation in the field.

2.3.1.4 Changes in Communication Channels

With the rapid development of science and technology, changes in information dissemination channels have not only reshaped people's daily lives, but also profoundly

influenced the concepts and practices in the field of contemporary design. The convergence of emerging technologies, especially the widespread use of social media, has changed the way people interact with public space and product design, and facilitated a shift in design thinking. As Friedman (2017) argues, the popularity of social media has not only enhanced the social function of public spaces, but also transformed them into platforms for constructing and displaying online identities. In this context, public architecture, space, and product design are increasingly focusing on the power of visual impact and image communication, aiming to create works that inspire users' desire to share in the digital age.

The diversity of information channels and the ease of distribution of images have led designers to pay more attention to how physical works can be presented as attractive in the virtual world. This trend has prompted designers to make products and spaces into photographable backdrops that fulfill contemporary society's quest for aesthetics and self-expression (Friedman, 2017). For example, the application of traditional ethnic motifs in Contemporary product design requires not only consideration of their cultural significance and aesthetic value, but also attention to their display effect and communication potential on digital media.

This shift in design strategy is not only reflected in physical attributes, but also permeates cultural and social attributes (Friedman, 2017). In contemporary design, designers need to consider not only the utility of a product, but also how it can be digitally expressed and shared. The use of technology becomes particularly important in this process. For example, through Contemporary manufacturing technologies such as CNC technology and 3D printing, traditional ethnic motifs can be accurately applied to product design, which not only preserves the essence of their traditional culture, but also enhances their appeal in the modern market.

Therefore, technological development and changes in information channels have become important driving forces for contemporary design innovation. Within this framework, designers have continued to explore how contemporary design can create environments that promote both physical interaction and stimulate virtual socialization, thereby establishing new connections and dialogues between the physical and virtual worlds. This change not only demonstrates the design field's response to the changing times, but also reflects the constant pursuit and innovation in the way people interact socially and share information.

2.3.2 The Influence of Technology on the Application of Ethnic Motifs in Contemporary Designs

2.3.2.1 Technical Applications

With the rapid development of technology, the emergence and advancement of Artificial Intelligence (AI) technology has become one of the key drivers of change in contemporary society. In all aspects of life, the application of AI not only greatly improves work efficiency, but also opens up new avenues of innovation. Especially in the field of design, AI technology has had a profound impact on the application of ethnic motifs in contemporary design. In a study by Liu et al. (2023), it was found that by using AI, designers are able to take advantage of the huge database and computing speed to improve the innovation and efficiency of design and reduce repetitive and meaningless labor. Especially in the creation and application of ethnic motifs, AI can not only help designers to disperse inspiration and provide sources of inspiration, but also make the design process more flexible and convenient by quickly analyzing a large amount of material. Although AI design is currently unable to completely replace human design work in the professional field, it has become an important tool to help designers broaden their thinking and

improve their creative efficiency. Through further technical optimization and model training, the auxiliary role of AI will be more significant, making the design of ethnic motifs more colorful and better integrated into the modern design context.

The application of AI technology in ethnic motif design is not only an embodiment of technological progress, but also an innovation in design thinking and cultural inheritance methods. First of all, the integration of AI technology enables designers to cross the traditional creative limitations, and through the assistance of machine learning models, designers are able to explore new combinations and deformations of ethnic motifs in different cultural contexts, so as to create design works with both ethnic characteristics and modern aesthetics. This cross-cultural design practice not only enhances the expressive power of ethnic motifs, but also opens new ways for cultural dissemination and communication.

Secondly, AI's ability in processing big data provides designers with an unprecedented library of materials and inspiration. Through AI algorithms, designers can quickly retrieve and analyze historical ethnic motifs, discover commonalities and differences, and then trigger new possibility. This data-based approach to creation allows designers to gain a deeper understanding of a broader view of different ethnic cultures, and to incorporate these cultural elements into contemporary designs in a more innovative way.

In addition, AI technology can help designers optimize the design process and reduce the cost of trial and error. In the early stages of design, AI can provide rapid prototypes of multiple design options to help designers assess the feasibility and effectiveness of various options, so as to make more accurate design decisions. This rapid iterative design process not only improves the efficiency of design, but also increases the creative possibilities, giving designers more time and energy to explore and experiment with new design concepts.

As AI technology continues to develop and improve, it is reasonable to expect that future design work will focus more on human creative thinking and cultural understanding. In this process, technology will serve as a powerful tool to assist designers in transforming creativity and understanding into concrete design outcomes. This new mode of human-machine cooperation is expected to promote the innovation and development of ethnic motif design, while providing support for leaving behind cultural heritage of contemporary significance.

2.3.2.2 New Market

The use of ethnic motifs in contemporary design has undergone a qualitative leap with the rapid development of technology, especially with breakthroughs in the fields of digitization and information technology. The study by Jefferson et al. (2022) highlights the key role of technological tools such as immersive technologies and gamification in promoting cultural and heritage tourism destinations, which not only greatly enhance the user experience, but also disseminate knowledge and develop new forms of interaction in tourism environments. This point demonstrates how technological advances have been effective in expanding the reach of cultural industries, in particular with regard to the innovative development of ethnic motifs. Designers and artists are now able to utilize advanced design software and digital tools to easily realize the design and modification of complex motifs, increasing the efficiency of creation as well as the quality and innovation of their work.

Meanwhile, Skarlatos et al.'s (2016) study brings underwater cultural heritage into the public's digital view through AR and VR technologies, providing an immersive cultural experience. This technological application not only allows global audiences to reach and understand the cultural heritage of different peoples across time and space, but also enhances the

user's engagement and interest in learning through interactive experiences. Kantaros et al.'s (2023) study further reveals the application of 3D scanning and 3D printing technologies in the field of cultural heritage preservation, which are capable of creating research-ready digital models for research and physical replicas for education and exhibitions, increasing the efficiency and accuracy of documenting and preserving cultural heritage.

These technological advances have led to new business models and consumption motifs in the cultural industry, such as Virtual Reality (VR) and Augmented Reality (AR) technologies that provide consumers with immersive cultural experiences and new perspectives on the presentation of culture and heritage. The value of the application of 3D scanning and printing technologies is gradually becoming apparent in a variety of fields, with museums around the globe adopting the use of 3D models through partnerships with 3D model-sharing platforms like Sketchfab and Thingiverse, to share 3D models of their collections and improve accessibility and interactivity of their collections (Kantaros et al. 2023).

2.3.2.3 Digital Media Communication

As discussed by Jin and Liu (2022), digital media communication, especially virtual reality (VR) technology, has had a significant impact on the importance of presenting and experiencing ethnic motifs in contemporary design. Through virtual reality technology, cultural heritage is able to be transferred from physical space to cyberspace and experienced in a lighter, more fluid form, unlocking the infinite possibilities of landscape simulation. This transformation not only changes the way images are viewed and produced, but also expands the types of images in visual culture, introducing potential dimensions of dynamism and three-dimensionality. Virtual Reality

provides viewers with new immersive media experiences and aesthetic paradigms centered on spatial perception, allowing viewers to actively intervene and re-experience cultural heritage.

Firstly, digitization makes it easier and faster to reproduce, disseminate and modify ethnic motifs, thus facilitating the global dissemination and exchange of ethnic cultures (Jin & Liu, 2022). Designers and artists can easily draw inspiration from all over the world, merge different cultural elements, and create new ethnic motifs with a global perspective. J. Hidayat et al. (2020) explored how cross-cultural artists can collaborate to drive the innovation of ethnic motifs in contemporary design by examining a modern bamboo ceramic wax and silver craft project co-created by Indonesian and Japanese artists. This cross-cultural innovation further enriches the meaning of ethnic motifs so that they not only represent primitive cultures, but also become a medium of cultural exchange in the context of globalization.

Second, the interactive and participatory nature of digital media communication, such as the use of social media and online communities, provides a new platform for the dissemination of ethnic motifs (Jin & Liu, 2022). This allows the public to be not only consumers of ethnic motifs, but also participants in their dissemination and innovation. Through online voting, design competitions and social media sharing, the public can directly influence the popularity trend of ethnic moitfs, making their development more democratized and diversified.

In conclusion, digital media communication has greatly expanded the creation, display and communication of ethnic motifs in contemporary design by providing new technical means and communication channels. This not only enables ethnic motifs to be presented in a more diversified and dynamic form, but also promotes the exchange and integration of global cultures, bringing unprecedented innovative opportunities for contemporary design.

2.3.2.4 Challenge and opportunity

With the development of technology, especially the popularity of the internet and social media, designers can more easily access cultural elements from all over the world. This convenience has brought a wealth of creative resources, but it has also raised the issue of cultural appropriation.

In exploring the use of ethnic motifs in contemporary design, the study by Minnakhmetova et al. (2019) provides valuable insights, especially in terms of the balance between cultural appropriation and creative respect. The study provides an in-depth analysis of cross-cultural communication between non-local designers and local communities, revealing the cultural appropriation problem that is common in contemporary design and architectural practice. By analyzing the ornaments that appear in contemporary design practices, the study points out that designers often borrow and mix elements from different cultures at will, which ignores the cultural context and sacred meaning behind the ornaments, and thus leads to an implicit violation of cultural norms and values.

A typical example is the 2014 Roberto Cavalli perfume advertisement. Cavalli used a motif similar to the Sufi "sun" in the advertisement. This motif has religious and cultural significance in Sufism, representing spirituality and faith. However, Roberto Cavalli's casual use of this motif in the advertisement, detached from its original religious context, led to strong opposition from the Sufi community, who considered it a desecration and misinterpretation of their beliefs. In the end, Roberto Cavalli withdrew the advertisement and issued a public apology.

In response to this issue, Minnakhmetova proposed a new design philosophy, which is that the ethical and moral principles underlying design activities must be adjusted to better harmonize with traditional heritage and local visual communication methods and rules. This means that

designers should not simply superficially adapt established decorative motifs to new multicultural and multi-ethnic realities, but should instead start with a critical analysis, deconstruct the colonial history of local decorative practices, and respect the culture and values of indigenous peoples. At the same time, the research emphasizes that designers and architects should explore and utilize the hidden qualities of indigenous technical knowledge and traditional objects and practices to achieve a deep understanding and respect for local culture. This approach not only avoids cultural appropriation, but also promotes the adaptation and survival of ethnic communities, demonstrating a cultural ecological perspective that aims to record and study disappearing cultural elements, while focusing on the natural evolution of tradition rather than simple protection.

Minnakhmetova's research provides an insight into the complexity of cultural appropriation in contemporary design practice and its profound impact on communities. It not only reveals the problem, but also outlines a way forward, through cultural sensitivity, critical thinking and innovation to find solutions. It emphasizes the importance of respecting and integrating local culture in the context of globalization and multiculturalism and provides designers and architects with guiding principles for balancing cultural respect and creative expression. In this way, design becomes not only a bridge between the past and the present, but also a powerful tool for cultural understanding and inclusivity. Ultimately, this research prompts us to consider how we can use cultural heritage in a responsible and respectful way, ensuring that design practice reflects the diversity of contemporary society and promotes the continued development and mutual respect of cultures.

2.4 Summary

In order to further elaborate on how to transform ethnic motifs and to show readers the practical application of ethnic motifs in contemporary design, we will then delve into case studies. These examples have been carefully selected to show how designers can skillfully apply these motifs, which are full of historical and cultural values, to modern design works. Through these practical design examples, we will not only be able to see how ethnic motifs have been revitalized in contemporary design, but also understand how designers have transformed traditional motifs into products that can be accessed and experienced by modern consumers. This section will provide readers with concrete methods and inspiration to help them understand how to incorporate and innovate these culturally rich motifs in their own design practice.

Chapter 3 Case study

3.1 Direct use

When we begin to explore the use of ethnic motifs in contemporary design, there is no more direct and common way to do so than through direct references to the motifs. In the following case studies, we will present a few selected examples that represent the diverse applications of direct references to ethnic motifs in contemporary design.

Rosetta Stone USB Memory Stick from The British Museum

Figure 3.1 Rosetta Stone USB Memory Stick (Left) and Rosetta Stone (Right). From British Museum (n.d.).

The Rosetta Stone USB Memory Stick (Figure 3.1) from the British Museum is a prime example of how ethnic motifs can be incorporated into contemporary design products through direct reference. The design takes as its inspiration the Rosetta Stone - a stone monument inscribed with ancient Egyptian hieroglyphics, Denmii and Ancient

Greek, which is a landmark in the interpretation of ancient Egyptian writing. By applying the motifs of this historical artifact with strong cultural symbolism directly to an everyday electronic product, the USB memory stick, the designer not only creates a functional modern technological product, but also makes this product a medium of cultural communication.

The method of this design approach is that it directly bridges the gap between ancient culture and contemporary life, enabling consumers to feel a cultural experience that transcends time and space when using this seemingly ordinary technological product. By accurately reproducing the details on the Rosetta Stone, the designer maintains the authenticity and educational value of the cultural symbols, combining cultural heritage with modern technological products to create a design that is both practical and educational.

Gayer-Anderson Cat Statue Replica

The example shown is the Gayer-Anderson Cat Statue Replica (Figure 3.2) from the British Museum, a replica of an ancient Egyptian original that not only reproduces the original form and ornamentation, but also passes on its deep cultural meaning and symbolism. In ancient Egyptian culture, the cat was considered a sacred animal, symbolizing protection, good luck, and female strength and independence. The creation of this statue replica is a direct reference to ancient Egyptian national motifs and symbolism, and it demonstrates how deeply historic motifs can be preserved in a modern design piece, while also connecting this history to a wider modern audience.

Figure 3.2 Gayer-Anderson Cat statue replica (Left) and Gayer-Anderson Cat (Right). From British Museum (n.d.).

The Great Wave Tote Bag

Figure 3.3 is The Great Wave Tote Bag for sale at the British Museum, which is inspired by the famous Japanese ukiyo-e artist Katsushika Hokusai's "Kanagawa Surfing Sato", transforming a work of deep cultural and historical significance into a practical object for everyday use. This design not only preserves the artistic appeal and

cultural value of the original work, but also integrates the work into the public's life in a new form through contemporary design concepts and techniques.

Figure 3.3 The Great Wave Tote Bag from British Museum (n.d.).

The design of the Great Wave Tote Bag demonstrates how ethnic motifs can be skillfully applied into modern lifestyles through direct references. The design of the bag recreates the image of waves from "Under the wave off Kanagawa"(The Great Wave). This design approach indicates a respect for the original cultural heritage and is an innovative attempt for traditional art through contemporary product design, so that consumers around the world can experience and appreciate the charm of this historical heritage in their daily use.

3.2 Formal integration

When applying ethnic motifs to contemporary design, the use of formal integration is also very widespread. The two main methods of formal integration are De-complex and abstraction,

both of which aim to make the motifs more suitable for the context of contemporary design while preserving their cultural essence. Formal integration focuses on the appearance of the motifs, and through visual adjustments, the motifs are made to be contemporary without losing their original cultural significance.

3.2.1 De-complex

De-complexification focuses on refining the core elements and visual characteristics of a motif, removing details that seem overly complex or non-essential in contemporary design. The process begins with an in-depth understanding of the cultural context and symbolism of the motif to ensure that the simplified motif still conveys its core meaning. The key to simplification is to identify and retain those elements that are symbolic to the motif, such as specific shapes, lines or colors, while removing or simplifying minor decorative details. In this way, designers are able to transform complex ethnic motifs into clean, contemporary design elements that are easy to apply across a variety of products and mediums.

When simplifying motifs, it is crucial to balance the recognizability and simplicity of the motifs to ensure that the simplified motifs are still recognizable to the viewer and associated with their original cultural context.

Pyramids of the Louvre

Pyramids have historically and culturally symbolized power and eternity. In designing the pyramid of the Louvre (Figure 3.4.1), I.M. Pei retained this central meaning. The geometry of the tetrahedron, the basic form of the pyramid (Figure 3.4.2), was retained and this ancient symbolism was expressed through modern materials and techniques. Traditional Egyptian pyramids are usually made of stone

blocks with a rough surface. The Louvre pyramid, on the other hand, employs a large glass and metal frame, greatly simplifying the materials and surface treatments. This use of modern materials not only simplifies the visual effect, but also increases transparency and lightness, making it more in line with modern aesthetics. In contrast to traditional pyramids, the Louvre's pyramid is devoid of complex ornamentation or symbolic painting, opting instead for a minimalist design language. This design removes all non-essential decorative details and places the focus entirely on the shapes and materials themselves.

Figure 3.4.1 Louvre Pyramid. From Light ZOOM Lumière (n.d.).

Figure 3.4.2 The Pyramids of Giza. From Live Science (n.d.).

I.M. Pei's design takes into account not only the pyramid itself, but also its skillful integration into the historical context of the Louvre. The pyramid is placed in front of the ancient palace as a modern element creating a dialog between the historical and the contemporary. This design treatment not only demonstrates a modern interpretation of the pyramid, but also emphasizes the design concept of blending the old with the new.

'Bastion 3' Ceramic edition of 24

Anthony Theakston's contemporary ceramic sculpture "Bastion 3" (Figure 3.5.1) is a simplification of the owl (Figure 3.5.2) through a de-complexification process, whereby Theakston understands the owl's imagery and symbolism, and retains its core elements such as the rounded body, silhouette and prominent eyes. These core elements ensure that the sculpture remains recognizable in its simplified form, allowing the viewer to instantly recognize it as an owl. The owl's silhouette is simple and straightforward, conveying its calm, intelligent qualities.

Figure 3.5.1 Ceramic Sculpture by Anthony Theakston. From Theakston (n.d.).

Figure 3.5.2 Snowy Owl. From All About Birds (n.d.).

Theakston has removed the intricate feather detailing and other decorative elements of the owl's image, utilizing a smooth surface finish. This simplification not only enhances the modernity of the sculpture, but also gives it a more abstract artistic character. By reducing unnecessary details, the focus of the work shifts to the posture and form of the owl, emphasizing its geometric beauty and sculptural sense.

Finally, the author chose ceramic as the main material, utilizing its smoothness and purity to further enhance the simplicity of the design concept. The use of ceramic material avoids the complex textures that may be associated with traditional sculptural materials, making the sculpture more in line with the aesthetic standards of contemporary design. The monochromatic treatment also gives the sculpture a more unified and minimalist look, adding to the visual impact of the work.

In these ways, Anthony Theakston has transformed the complex natural image of the owl into a clean, contemporary design element, demonstrating the application of de-complexity in contemporary art design. This sculpture is not only visually strong and contemporary, but also retains the owl's central significance as a symbol of wisdom and mystery.

Scandinavian Mug

Through a de-complexification approach, this Scandinavian-inspired mug (Figure 3.6.1) exquisitely integrates elements of Nordic folk art (Figure 3.6.2) into contemporary design, making it a work of art with both cultural significance and aesthetic value. The designer first extracted core elements and visual features from Nordic folk art, such as minimalist floral and animal motifs and clean geometric

shapes. These elements are known for their minimalist lines, vibrant colors and refined depictions of nature. During the design process, complex or non-essential details were removed, and only symbolic shapes, lines and colors were retained, ensuring that even after simplification, the motifs still conveyed their cultural essence.

Figure 3.6.1 Scandinavian Mug with Folk Art. From Etsy (n.d.).

Figure 3.6.2 Scandinavian Folk Art. From Adobe Stock (n.d.).

The designer reorganizes and arranges these motif elements to form a completely new design. This approach not only highlights the modernity, but also preserves the unique characteristics of Nordic culture, making the mug not only a practical everyday

object, but also a work of art. Through this de-complexification design approach, the mug highlights the core qualities of Scandinavian design - simplicity, practicality and harmony with nature. The streamlining and reorganization of each motif reflects the designer's deep understanding of Scandinavian folk art and the clever fusion of contemporary design aesthetics. The result is a mug that is not only visually pleasing to the eye, but also functionally balanced in terms of practicality and artistry.

3.2.2 Abstraction

The Abstract Method goes a step further in de-complexity. It emphasizes the reorganization and rearrangement of motif elements to create new shapes or motifs that echo contemporary design trends with a stronger sense of modernity. In the process of abstraction, designers not only simplify the shapes and lines of motifs, but also deconstruct and recombine the elements of motifs in innovative ways to produce entirely new visual effects. This may involve splitting motifs into basic geometric shapes or combining different elements in novel ways to create a design language that is both national in character and contemporary in aesthetic. The abstract method allows designers to explore more freely the possibilities of combining motifs with contemporary design, inspiring more innovative design ideas.

Whether it is the de-complexification method or the abstraction method, designers need to consider the performance of motifs in new application scenarios, including their adaptability and visual effects under different materials, sizes or colors. This requires designers to possess not only a deep understanding of national culture, but also flexible design skills and creativity to ensure that the final design work reflects the flavor of national culture while meeting the aesthetic and practical needs of contemporary design.

Butterfly Chair by Santo & Jean Ya

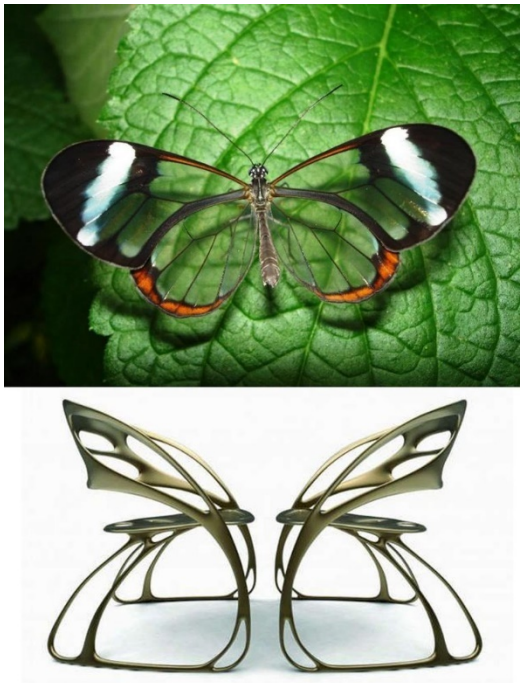

Figure 3.7 Butterfly Chair by Santo Jean Ya. From Sohomod (n.d.).

In designing the Butterfly Chair (Figure 3.7), Santo and Jean Ya used abstraction to simplify and recombine the image of the butterfly to create a contemporary piece of furniture. The designers began by distilling the butterfly's core elements, retaining its elegant curves and the basic shape of its wings to ensure the chair's recognizability. The beauty of the chair's shape is emphasized by removing complex decorations and textures and using smooth surfaces and clean lines, giving it a simple yet elegant visual effect. At the same time, the color of the chair is simplified to a single or limited palette, adding visual unity and modernity.

The designer creates new shapes and motifs by splitting and reorganizing the butterfly's shapes and lines in an innovative way, so that the chair maintains the

symbolic elements of the butterfly while presenting a strong sense of modernity and uniqueness. This innovative reorganization not only enhances the visual impact of the design, but also allows it to perform well in different materials, sizes and colors. The abstraction method allows designers to explore more freely the possibilities of combining moitfs with contemporary design, inspiring more innovative design ideas.

Anderson Cat Weather Forecast Bottle

Figure 3.8 Anderson Cat Weather Forecast Bottle. From Catmega (n.d.).

This design (Figure 3.8) is a reference to the Gayer-Anderson Cat (Figure 3.2), combining it with a contemporary design of a weather forecast glass bottle. This design shows respect for history and cultural heritage, but also incorporates contemporary

design with technology and artistic creativity, making it a creative gift that is both functional and decorative.

In this design process, the designer first employed simplification techniques to carefully distill the core symbolic features of the Gayer-Anderson Cat - the cat's silhouette, the earrings, and the colors of the decorative motif. This step removes complex or unnecessary details and retains only those symbolic shapes, lines and colors, making them more representative and recognizable. Subsequently, through abstraction, the designer skillfully reorganized and rearranged these elements, creatively integrating the image of the cat with the weather forecast glass bottle. Although the image of the cat has been changed, it can still be easily associated with the Gayer-Anderson Cat with the help of the gold color accents and the details of the earrings.

Pink flamingoes

Figure 3.9.1 Metal Coil Animal Sculpture by Lee Sangsoo. From 121clicks (n.d.).

Figure 3.9.2 Greater Flamingo. From Wikipedia (n.d.).

In "Artist Lee Sangsoo Creates Metal Coil into Minimal Animal Sculptures", artist Lee Sangsoo simplifies and reorganizes animal figures through abstraction to create minimalist metal sculptures. He retains the basic contours and postures of the animals, adopts a single metallic color, removes unnecessary details and decorations, and uses smooth metal lines to outline the animal's form.

Taking the flamingo sculpture (Figure 3.9.1) as an example, Lee Sangsoo pays special attention to its elegant curves and gestures, expressing the dynamics and characteristics of the flamingo (Figure 3.9.2) through simple geometric lines and smooth metal curves. The graceful curves of the flamingo's long neck and standing posture are refined into geometricized lines, making the entire sculpture both recognizable and contemporary. This treatment not only preserves the symbolic

elements of the flamingo, but also gives the work a unique artistic appeal and the simplicity of contemporary design.

Lee Sangsoo skillfully transforms the complex animal image into a simple, abstract sculpture that embodies cultural flavor while meeting modern aesthetic and practical needs.

3.3 Imagery integration

The process of Imagery integration of ethnic motifs into contemporary design is a combination of deep cultural exploration and innovative expression. Unlike the direct adoption or formal transformation of ethnic motifs, imagery integration emphasizes a deep understanding and abstract expression of ethnic cultural connotations. This approach requires designers to be not only users of motifs, but also interpreters and disseminators of culture. Designers need to study the cultural background, history and symbolic meanings of ethnic motifs in order to grasp the stories and spirits behind them.

In the process of imagery integration, designers first need to make in-depth interpretation of selected ethnic motifs and dig out the cultural stories and symbolism behind them. This includes not only the intuitive meaning of the motifs, but also the historical events, social customs, religious beliefs and other cultural dimensions associated with them. Then, designers need to creatively abstract these deep-seated cultural elements and extract representative imagery or symbols. This process is more about re-interpreting and expressing the cultural story behind the motifs, rather than just simplifying or adjusting the form of the motifs.

When integrating the refined imagery into the design, the designer should consider how to make the product resonate with the user emotionally through the visual language and choice of

materials, and how to guide the user to feel and understand the deeper meaning of the national culture. This may involve a variety of aspects such as the symbolism of colors, the cultural significance of materials, and the symbolic design of product forms. Designers can convey the spirit of traditional craftsmanship of a certain ethnic group by choosing a specific material, or evoke emotional associations related to ethnic stories through specific color combinations.

In short, the key to imagery integration lies in how to reflect the spirit and emotion of national culture in the form of abstraction and symbolization in contemporary design through profound cultural insight and innovative design thinking, so as to create products that have cultural depth but also satisfy contemporary design aesthetics and functional needs.

China Pavilion at Shanghai World Expo

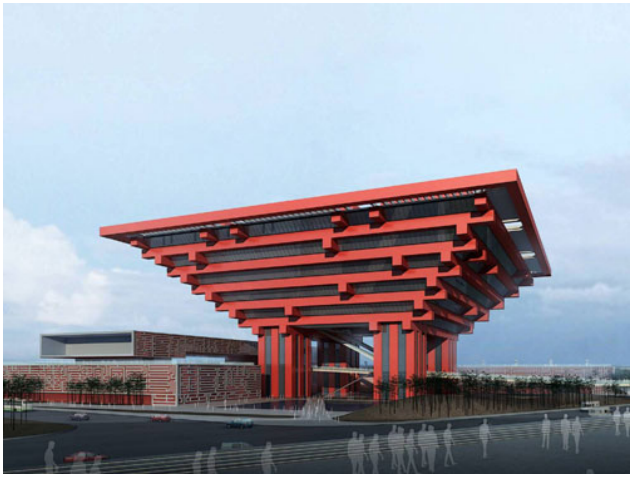

Figure 3.10.1 China Pavilion at the World Expo in Shanghai (2010)

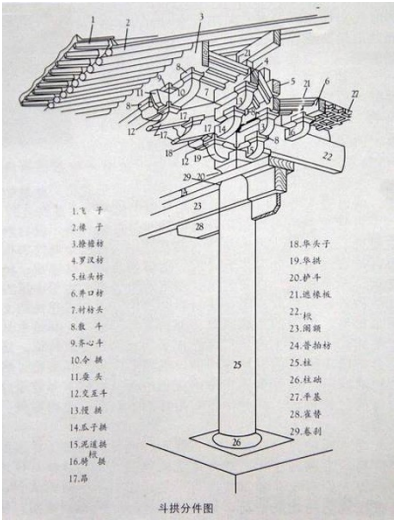

Figure 3.10.2 Chinese arched structure

The China Pavilion at the Shanghai World Expo (Figure 3.10.1) is an example of imagery integration of cultural elements into contemporary design. The designers, through a deep understanding of traditional Chinese culture, abstracted it and integrated it into contemporary architecture. The shape adopts the arch structure of ancient Chinese architecture (Figure 3.10.2), reconstructed with contemporary materials and technology, retaining the symbolic elements, and giving them a new visual effect. In particular, the 56 beams and pillars symbolize the 56 ethnic groups in China, demonstrating the spirit of unity.

The overall design is inspired by the "Crown of the Orient", which symbolizes the profoundness of Chinese culture and the concept of a "flourishing China". The red façade of the pavilion symbolizes auspiciousness and festivity, while the layout of the nine-cell grid reflects traditional Chinese balance and harmony. Chinese characters and ceramic decorations are widely used in the displays and decorations, reflecting the

unique beauty and historical achievements of Chinese characters and ceramic art. The use of bamboo elements not only highlights elegance and toughness, but also integrates contemporary design techniques to enhance the modernity of the building.

In addition, the designers also used environmentally friendly and renewable materials in the selection of materials, reflecting the inheritance of the spirit of traditional craftsmanship and echoing the concept of modern sustainable development. The comprehensive use of these cultural elements makes the China Pavilion a building full of cultural flavor and contemporary design. The displays inside the pavilion vividly present China's long history and rich cultural connotation through modern technology and artistic methods. Through these design techniques, the China Pavilion at the Shanghai World Expo has successfully embodied the spirit and emotion of traditional Chinese culture in the form of abstraction and symbolization in contemporary architecture, creating an architectural work that has cultural depth and meets contemporary aesthetic and functional needs. This kind of design not only lets visitors feel the charm of Chinese culture, but also demonstrates China's innovative ability in the field of contemporary design.

UAE Pavilion at Dubai World Expo

Figure 3.11.1 UAE Pavilion at Dubai Expo 2020. From Dezeen (2021).

Figure 3.11.2 Saudi Arabia Observes World Migratory Bird Day. From Mashable (n.d.).

The design of the UAE National Pavilion at the Dubai World Expo (Figure 3.11.1), a typical imagery integration, was indeed inspired by the Peregrine Falcon (Figure 3.11.2) - a bird of prey that has a profound symbolic significance in Arab culture. By capturing the image of the falcon and its spiritual qualities and translating them into the language of architecture, rather than simply mimicking the falcon's form, the design reflects a deep level of cultural expression and innovative design thinking.

In the process of imagery integration, the designers do not directly copy the falcon's form, but refine the falcon's dynamic beauty, sense of power and elegant lines, abstracting and integrating these qualities into the architectural design. The roof and overall structure of the UAE Pavilion resembles a falcon flying with its wings outstretched, displaying an upward and outward expansion of dynamics. This design not only visually echoes the image of the falcon, but more importantly spiritually conveys the qualities of speed, power and freedom that the falcon represents.

Imagery integration is also reflected in the choice of building materials and techniques, creating a design language that is both in keeping with the image of the falcon and futuristic through the use of contemporary design techniques and materials. Such a design not only demonstrates the UAE National Pavilion's respect for and inheritance of traditional culture, but also its exploration of and anticipation for the future, reflecting the UAE's vision of finding a balance between tradition and modernity.

Japan Pavilion at Dubai World Expo

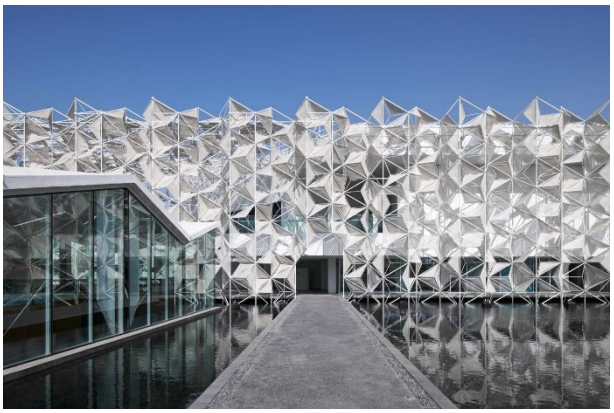

Figure 3.12.1 Japan Pavilion at Expo 2020 Dubai.

From Hhlloo (n.d.).

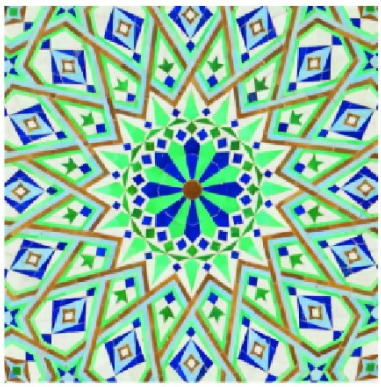

Figure 3.12.2 Middle Eastern

Traditional Vine Motif

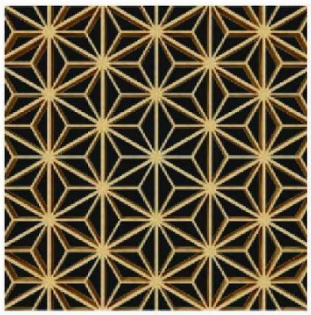

Figure 3.12.3 Japanese hemp-leaf motif

The design of the Japan Pavilion at the Dubai World Expo (Figure 3.12.1) is an excellent example of how traditional Japanese cultural elements - hemp leaf motifs (Figure 3.12.3) and origami shapes - can be imagery integration with the Arabian trailing vines and auspicious floral motifs (Figure 3.12.2) to create a contemporary design that reflects Japanese culture while incorporating the characteristics of the host country.

In this project, the designers first studied and understood the cultural background and symbolism of these motifs. The hemp leaf motif symbolizes health and longevity in

Japanese culture, while origami is a form of traditional Japanese art that expresses creativity and fine craftsmanship. Meanwhile, the trailing vine motif of auspicious flowers is often used for decoration in Arabic culture to symbolize prosperity and wealth. By understanding the deeper meanings of these elements, designers are able to create innovative designs in a way that honors the original cultures.

In the process of imaginative fusion, the designer does not simply juxtapose these motifs, but integrates them through innovative design ideas. Hemp leaf motifs and origami shapes are abstracted and re-deconstructed, combining them with trailing vines and auspicious floral motifs to create a new visual language. This design preserves the uniqueness of each cultural element while achieving a harmonious visual integration. For example, the exterior of a building may present sharp origami-like lines and layers through modern construction materials and techniques, while incorporating flowing trailing-vine motifs to create an appearance that is both modern and traditional.

Overall, the design of the Japan Pavilion at the Dubai World Expo skillfully blends traditional Japanese and Arabic motifs and shapes through imagery, which not only demonstrates the designer's creativity and deep understanding of culture, but also embodies the beautiful vision that different cultures can achieve harmonious coexistence and mutual respect in the context of globalization.

3.4 Summary

Exploring the use of ethnic motifs in contemporary design demonstrates a rich and varied range of approaches, from direct reference, formal integration to imagery integration, each of which emphasizes to varying degrees the preservation of the essence of traditional culture and its

adaptation to contemporary design contexts. Direct use references to ethnic motifs can clearly convey the beauty and depth of cultural heritage, formal integration makes motifs contemporary without losing their original cultural significance through de-complex and abstraction, and imagery integration goes a step further, requiring designers to explore and interpret ethnic culture in depth, and to grasp the story and spirit of culture through innovative expression.

Chapter 4 Design Approach

4.1 Overview

In today's design industry, advances in technological tools and software have greatly improved the efficiency of designers, especially in integrating and innovating traditional elements, such as ethnic motifs, with contemporary designs. The development of modern technology has enabled designers to quickly access inspiration and information through big data screening, replacing the time-consuming manual search and research of the past (Liu et al., 2023). The application of digital tools not only makes the modification of design solutions faster and easier, but also immediately simulates the actual effect of the product, allowing designers to easily experiment with different materials and textures in order to find the most appropriate design solution (Zhou et al., 2016).

The advantages of digital means are especially evident when applying ethnic motifs to contemporary design. It simplifies the process of transforming traditional motifs into digital form, allowing designers to easily preview the effect of the motifs on a variety of backgrounds and materials and to appropriately adjust the size, color, and layout of the motifs to ensure that the design reflects the cultural values of the motifs as well as conforms to contemporary aesthetics (Zhou et al., 2016).

However, while technology offers convenience and efficiency, how to appropriately extract ethnic motifs and combine them with products is still a process that requires thoughtful consideration. This involves not only understanding and respecting the motifs themselves, but also how to maintain their traditional significance while creating designs that are both novel and meaningful.

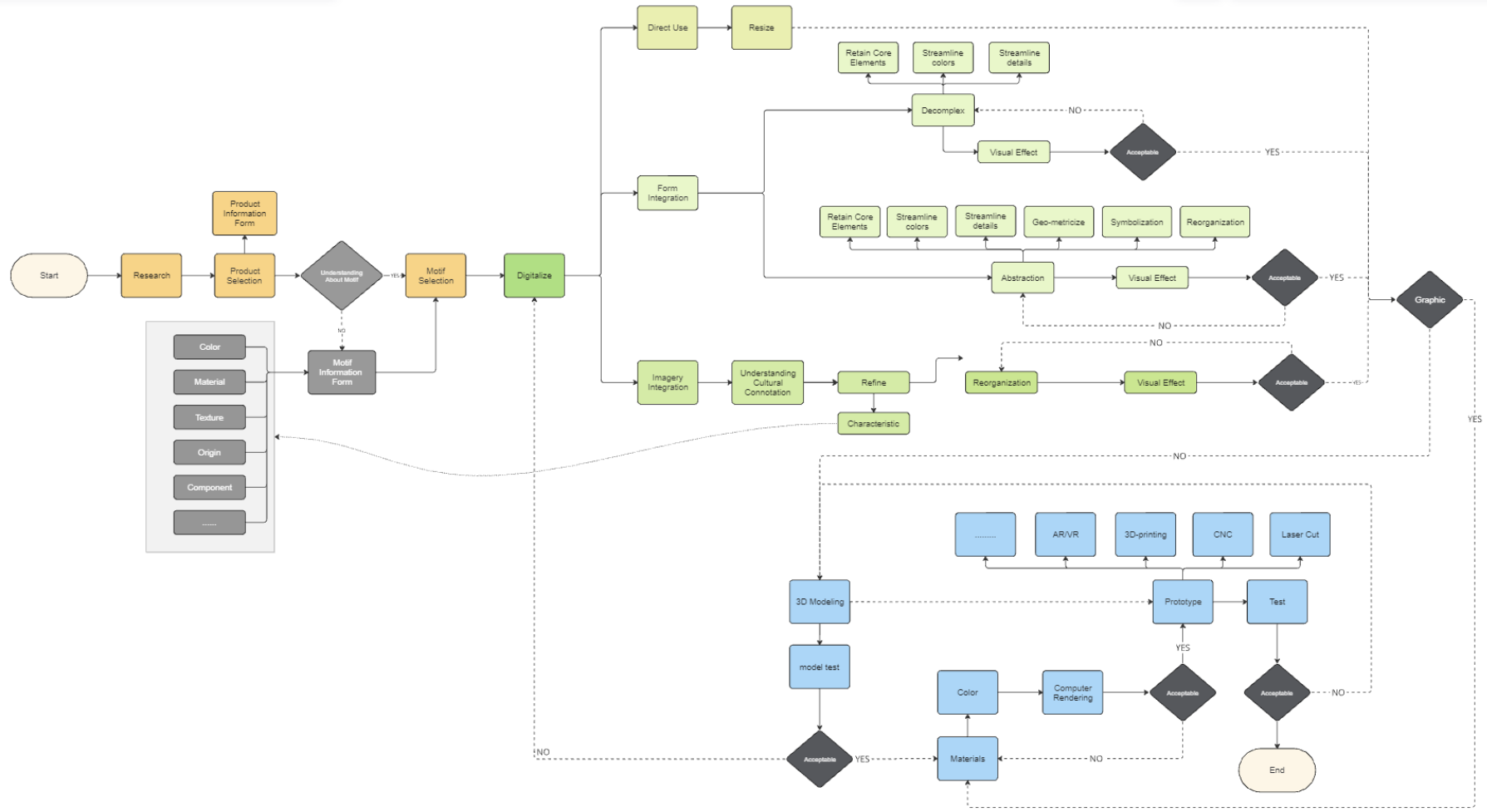

Figure 4.1 Overview of design methods

This is especially true when it comes to finding a balance between cultural appropriation and creative respect when designing across cultures. How to help designers quickly select appropriate traditional motifs to incorporate into product design and minimize cultural appropriation and some of the taboos of cultural elements? The process and tools (Figure 4.1) in this thesis can help designers quickly understand and select appropriate traditional motifs that fit the product, even if the motif comes from a culture that the designer does not understand, thus minimizing the damage caused by cultural appropriation.

By filling out survey forms, this thesis helps designers to learn more about products and ethnic motifs when researching, especially when researching ethnic motifs that they do not know, these forms can help designers to quickly find representative and compatible ethnic motifs for their products, and to gain a comprehensive and in-depth understanding of the chosen ethnic motifs, so as to avoid the occurrence of cultural appropriation. Meanwhile, the methods provided in this thesis can help designers to recreate and combine ethnic motifs with products according to their needs.

In summary, the flowchart (Figure 4.2) contains four parts: research, conceptualization and modeling, prototyping, testing and optimization.

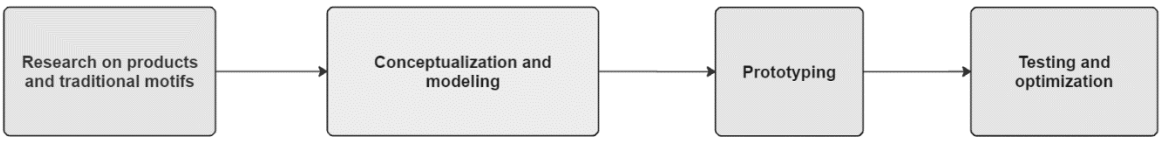

Figure 4.2 Overall flowchart

- The first part is about gaining an in-depth understanding of the background and cultural values of the product and traditional motifs, which lays a solid foundation for the design.
- The second part is conceptualization and modeling, which is the stage of transforming the research results into a preliminary design proposal, and gradually refining the design through several iterations and adjustments.
- The third part is prototyping, in which designers create physical or digital prototypes of the preliminary design solutions in order to evaluate their effects more intuitively.
- The fourth part is testing and optimization. Through testing and feedback on the prototypes, further improvements and refinements are made to ensure that the final design is both culturally valuable and contemporary.

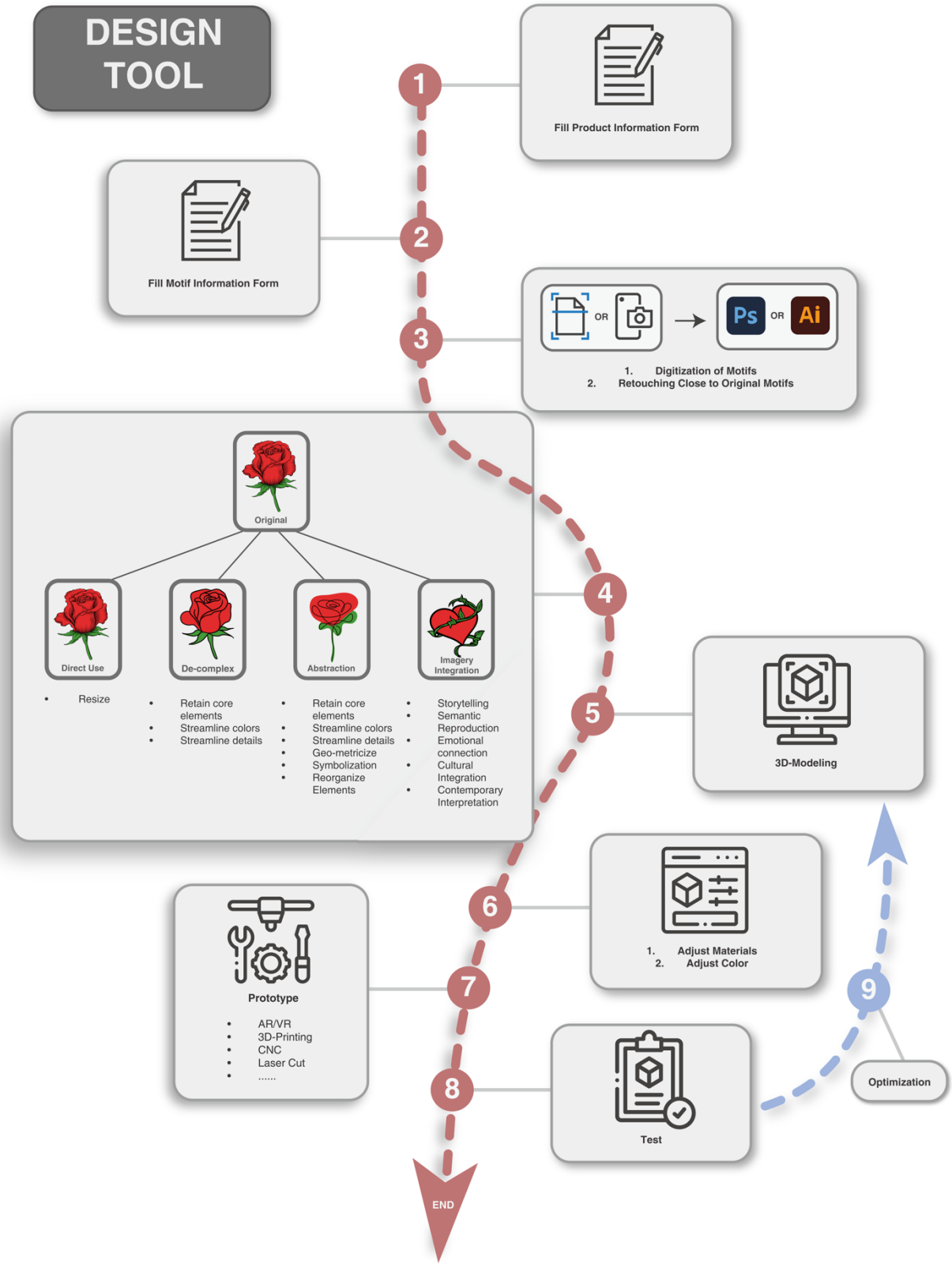

Figure 4.3 Design Tool

4.2 Design Tool

In order for designers to better understand and apply these steps, the specific methods used will be detailed in each step. This design tool (Figure 4.3) will help designers to operate effectively in each step of the process to achieve their design goals.

4.2.1 Step 1 Product Research

Following the design tool, the first step is to fill out the Product Information Form.

Product Information Form

The purpose of this form is to systematically collect and organize the information obtained during product research to help designers in the subsequent design process.

Product:	What is the product that needs to be designed or redesigned? _____ _____
Typology:	What type of product is this? (Choose as many as necessary) Utility Products: ☐ The main emphasis of these products is on functionality and utility. Entertainment Products: ☐ Products that primarily provide entertainment, recreation or gaming functions. Educational Products: ☐ Products designed to provide knowledge, skill learning or educational functions. Luxury Products: ☐ High-end, high-priced products that emphasize brand value, quality and uniqueness. Eco-friendly Products: ☐ Products that emphasize the concept of environmentally friendly, sustainable, or green living.
User Information:	Age: Age range of the target group _____ Gender: If the product is targeted at gender-specific users. _____ Revenue: Economic situation and consumption capacity of the target group _____ Context: The environment in which the product is used and how it is used. _____ _____ _____ _____ _____ _____

Similar Products:	Similar products in the market _____ _____ _____ _____ _____ _____ _____
Price Range:	Price range of existing products _____ _____
Common Materials:	What are the common materials for similar products available? _____ _____ _____
Common Colors:	What are the common colors for similar products available? _____ _____
Production:	What are the available production processes and manufacturing methods? _____ _____
Design Trends:	What are the design trends associated with the product? _____ _____ _____ _____
Product Related Standards	What are the design standards associated with the product? (safety standards, environmental standards, ADA standards, etc.) Depends on the product field. _____ _____ _____ _____ _____

In the first row of this form, the designer needs to identify what product needs to be designed or redesigned. This helps the designer to clarify the design goals and direction.

- In the second row, designers determine which type of product is being used. According to the type of use, the products are divided into five categories: Utility Products, Entertainment Products, Educational Products, Luxury Products, and Eco-friendly Products. Designers can choose according to the type of product they want to design, and multiple choices can be made. Different types of products have different needs, which will affect the selection and application of ethnic motifs.
    - **Utility products:** This type of product emphasizes functionality and practicality and is primarily designed to meet specific needs or perform certain tasks. These products usually prioritize durability and efficiency and are suitable for a variety of uses in daily life. The use of ethnic motifs in these products tends to be simpler, with a focus on enhancing the practicality and durability of the product.
    - **Entertainment products:** This type of product is intended to provide entertainment and diversion and designed to be fun and engaging. These products usually feature a colorful appearance and high interactivity to attract users' interest. The use of ethnic motifs in such products tends to be more colorful and creative to enhance the entertainment value of the product.
    - **Educational products:** These products are used for education and learning and are designed with a focus on practicality and educational value. These products often contain elements and designs that contribute to learning and help users better understand and master knowledge. The application of ethnic motifs in such

products may have cultural and educational significance, helping users increase their cultural understanding and interest in the learning process.

- **Luxury Products:** These products focus on high-end quality and luxury experiences and are designed to emphasize uniqueness and sophistication. These products often use high-quality materials and complex craftsmanship, aiming to provide users with a status symbol and a high-quality lifestyle. Ethnic motifs are often used in luxury products in a very fine and intricate manner, highlighting the level of craftsmanship and cultural uniqueness.
- **Eco-friendly products:** These products focus on environmental protection and sustainability, prioritizing environmental impact and resource efficiency in their design. These products usually use renewable materials and energy-saving technologies to minimize the negative impact on the environment. The use of ethnic motifs in eco-friendly products may convey the concept of environmental protection, using natural and environmentally friendly materials and processes to highlight the environmental characteristics of the products.

- The third row is about user information. Clarifying the age range and gender of the customer group can assist in clarifying the user's needs and thus the design direction. This information is crucial in determining the specific needs of the users and helps to further clarify the direction of the product design. For example, users of different ages and genders may have different preferences for the appearance and functions of the product; the economic status and spending power of the users are directly related to the price they are willing to pay for the product, which will affect the cost budget and material selection of the product. In addition, the environment in which the product will

be used and the way it will be used are also important considerations, as these factors will determine the choice of materials, structural design and color matching of the product to ensure that the product meets the actual use needs and aesthetic preferences of the target user group.

- The fourth row deals with similar existing products in the market. This section should list and analyze in detail the existing products in the market that are similar in function or use to the proposed product. This includes, but is not limited to, the functional characteristics of these products, their market positioning, user reviews, and their performance in the market. This analysis helps identify market gaps, competitive advantages, and potential points of improvement.
- The fifth row is the price range of the existing products. Designers should summarize and analyze the price range of related products in the market. This includes entry-level price, mid-range price, and high-end market price tiers. Understanding the price range will help designers position the product in the market and develop a pricing strategy to ensure that the product is both competitive and achieves a good profit margin.
- The sixth row is the common materials for related products. Designers should view and record the materials commonly used in related products in the market, including primary and secondary materials. This helps to understand industry standards, cost control and product quality assurance, as well as being important for environmental sustainability and product innovation.
- The seventh row shows the common colors of related products. Designers should analyze the common colors and their matching of related products in the market, which reflects the aesthetic trends and color preferences of the target user groups. Correct

color selection can enhance the attractiveness of the product and improve the brand image.

- The eighth row is on the production methods of related products. It explores the production techniques and processes of related products in the market and their efficiency. This includes, but is not limited to, manual production, semi-automated production, and fully automated production methods. Knowing this information can help optimize the production process of the designers' products, improve productivity and quality control, while considering the possibility of cost-effective and sustainable production.
- The ninth row is about checking design style trends on social networking sites, social media and online platforms. Social networking sites such as Instagram, Pinterest, and Behance are a treasure trove for exploring and tracking design trends that not only highlight the latest design styles, but also reflect public preferences and interests. By analyzing popular content on these platforms, inspiration can be gained to ensure that product designs are not only innovative but also in line with market needs. In addition, social media is also an important channel to understand the preferences of the target user group in terms of colors, materials, shapes, and functions.
- The tenth row is to check product-related standards. To complete this section, the designers should research domestic and international standards, regulations and certification requirements related to the product. This includes understanding product safety standards, environmental protection regulations, industry-specific quality standards, and so on. Compliance with relevant standards is not only a prerequisite for a product to be able to enter the market, but also relates to brand reputation and user

trust. In addition, understanding these standards helps in decision-making during the product design and development process, ensuring that the product complies with industry and legal requirements every step of the way, from design to production.

4.2.2 Step 2 Motif Research

The second step is to fill out the Motif Information Form.

Motif Information Form

The purpose of this form is to systematically collect and organize the information obtained during the motif research process to assist the designer in the subsequent design process.

Cultural Context:	What is the basic information about ethnic groups and their common motifs? _____
Motif:	What is the chosen motif? _____
Origin:	What is the origin of the motif? _____ _____
Semantics:	What is the meaning of this motif in the culture that it belongs to and the story behind it? What is the story behind it? _____ _____
Application:	What is this motif for? (multiple choice) Decorative: ☐Acts to beautify and decorate objects, spaces, etc. Signage: ☐Labeling of specific information, social identity, ethnic affiliation, etc. Functional: ☐With specific utility functions. Ceremonial: ☐Related to religious beliefs. Artistic:☐ Artistic and aesthetic value.
Usage Scenarios:	What are common usage scenarios for the motif? _____ _____
Limits:	What are the limitations on the use of these motifs? _____ _____ _____
Material:	Document the materials traditionally used in motifs, including but not limited to textiles, metals, wood, ceramics, and more. _____ _____ _____
Material Semantics:	Is the motif affected by the material? Yes ☐ No ☐ If yes, what are the semantics of this motif's Material? _____ _____

Texture:	Does the motif have texture? Yes ☐ No ☐ If yes, what are the textures? _____ _____
Color:	Does the motif have color? Yes ☐ No ☐ If yes, what is the color? _____ _____ If yes, please complete the next research selection.
Color Semantics:	Is the motif affected by the color? Yes ☐ No ☐ If yes, what are the semantics of this motif's color? _____ _____ _____
Composition of motifs:	What elements make up this motif? _____ _____ _____ Which are the subjects of its semantics? _____ _____ _____ Which are the decorative elements? _____ _____ _____
Market cases:	Examples of relevant motif applications in the existing market, including but not limited to the fashion industry, interior design, product packaging or other areas.

4.2.3 Step 3 Digitalize

After completing the preliminary research and identifying the elements to be utilized, the extraction and re-creation of ethnic motifs becomes the next important task. First, the ethnic motifs must be digitized. This process can be conducted by scanning or photographing the motifs and inputting them into the computer. The process of digitization not only helps to preserve the original form of motifs, but also lays the foundation for subsequent editing and creation. Next, the motifs are further processed with the help of various image processing software, such as Adobe Photoshop or Illustrator. Sharpness adjustment, color correction and shape optimization are important steps. With these tools, it is possible to ensure that the digital version of the motif is visually faithful to the original design, making it more adaptable to contemporary design scenarios. In the case of digitized motifs obtained online, they can be used directly if they meet the designer's needs.

4.2.4 Step 4 Ideation

With the type of product and the purpose of the motif, the designer can choose the appropriate way to contemporize the ethnic motif by comparing information from the "suggestion form". As mentioned in the previous case study, there are four ways (Figure 4.4) of using ethnic motifs in contemporary design.

- **Suggestion form one**

Product Type	Types of Motifs	Purpose of Applying Motifs
Utility Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Used to reinforce brand identity by incorporating motifs with a specific social or ethnic identity to strengthen the brand image of a product.
	Functional ☒	Enhancing product interactions through specific cultural connections.
	Ceremonial ☐	
	Artistic ☐	
Entertainment Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Reinforce users' cultural identification with the product, especially in travel gear, and convey the cultural characteristics of a specific region through ethnic motifs.
	Functional ☒	Enhancing product interactions through specific cultural connections.
	Ceremonial ☐	
	Artistic ☒	Enhance the aesthetic value of the product and the user's visual experience.
Educational Products	Decorative ☐	
	Signage ☒	Convey a specific social message or educational meaning that reinforces the cultural context of the educational content.
	Functional ☒	Enhancing product interactions through specific cultural connections.
	Ceremonial ☒	Teaching specific cultural or religious knowledge.
	Artistic ☒	Increasing the attractiveness of educational products.
Luxury Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Reinforce the brand image and the unique identity of the product.
	Functional ☐	
	Ceremonial ☐	
	Artistic ☒	Enhance the uniqueness and artistic appreciation value of the product.
Eco-friendly Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Labeling products with environmental attributes and sustainability features.
	Functional ☒	Reinforce the environmental message of the product.
	Ceremonial ☐	
	Artistic ☐	

- **Suggestion form two**

Types of Motifs	Characteristic	Application
Decorative	It is used to beautify and decorate objects or spaces with a strong visual appeal.	Direct Use De-complex Abstraction Imagery Integration
Signage	Used to identify specific information, social identity, ethnic affiliation, etc.	Direct Use De-complex Abstraction Imagery Integration
Functional	With specific utility functions that are not just for aesthetics.	Direct Use De-complex Abstraction Imagery Integration
Ceremonial	Associated with religious beliefs, ceremonial activities, or specific cultural practices, it has a certain sense of sacredness or ritual.	Direct Use De-complex Abstraction Imagery Integration
Artistic	Emphasizing artistry and aesthetic value, it has a unique creative style and aesthetic concept.	Direct Use De-complex Abstraction Imagery Integration

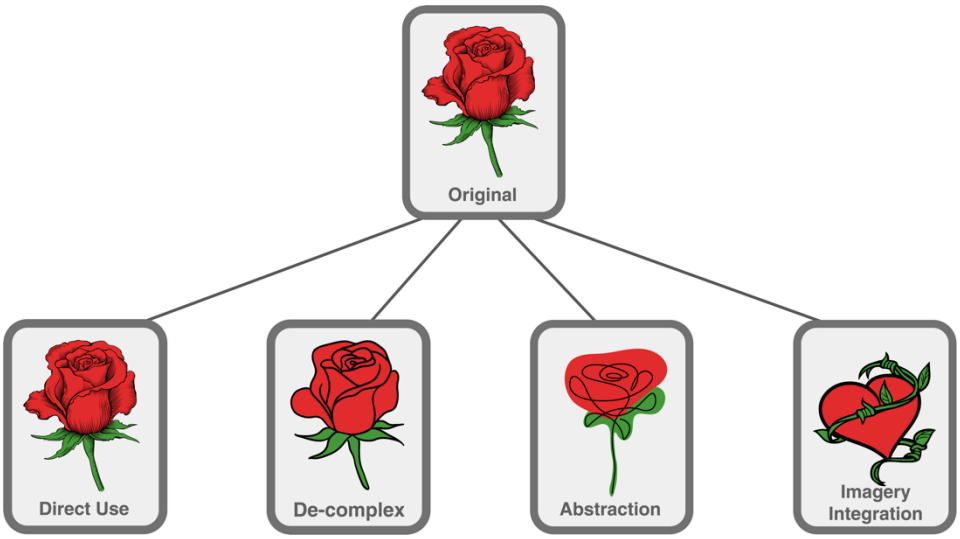

Figure 4.4 Four ways to approach ethnic motifs.

Direct Use

This approach involves applying ethnic motifs in their original form directly to the product design, without modifying the motifs themselves, merely adjusting the size of the motifs to fit the product form. This approach respects and maintains the original meaning and aesthetic characteristics of the motifs and is suitable for design projects that need to emphasize cultural heritage and traditional aesthetics. Through this approach, designers can convey strong cultural heritage and traditional values, making the product visually and culturally profound.

As an example, taking the rose motif in the figure 4.5 apply to contemporary product design through Direct Use, the designer does not need to modify the motif itself, but only needs to adjust the size of the rose motif according to the shape of the product. With this process, the rose motif can be used in several ways.

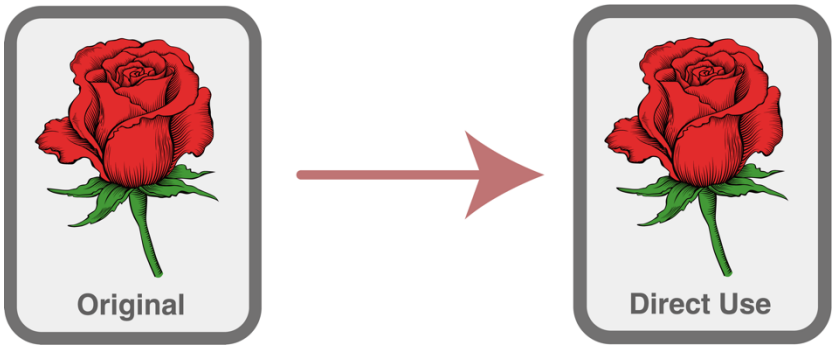

Figure 4.5 Direct use of motif.

De-complex

In this approach, the designer retains the core elements of the motif while simplifying the colors and details to fit contemporary aesthetics and manufacturing techniques. This approach is usually used for motifs that have a complex structure but a clear core meaning. By removing overly complicated parts, the design is made clearer and more contemporary while still retaining the cultural core of the motif, making it suitable for products that are looking for a simple style but do not want to give up their cultural depth.

- **Retain core elements:** When filling out the motif information sheet, designers need to retain the core elements of the motif, which are usually the main shapes, lines, or most representative symbols of the motif that carry the main cultural and visual significance of the motif.
- **Streamline colors:** Designers should reduce the number of colors in the motif by replacing them with similar neutrals, using colors that are more modern or more appropriate for the target market. This step not only helps to make the motifs easier to integrate with contemporary product design, but also enhances the visual impact of the motifs through the careful choice of colors.
- **Streamline details:** By simplifying non-essential decorative details in the motifs, the motifs are made more concise and easier to apply on various products. This includes cutting down overly complex graphic elements, as well as those subtle parts that may not be accurately reproduced in small-scale production. Simplifying the details makes the motifs more modern and clearer, while also making them easier to apply to a wide range of various products and materials.

Taking the rose motif as an example for de-complex use of motifs (Figure 4.6), the first thing that needs to be identified and preserved is the core part of the motif, i.e. the flower, the leaf and the branch. These elements constitute the main visual features and symbolism of the rose motif. For the treatment of colors, since the original motif mainly uses two colors - the red of the flowers and the green of the leaves - the number of colors is already relatively simplified and there is no need to further reduce the variety of colors, but depending on the needs of the product, the designer may consider whether to replace these colors with more neutral tones to suit contemporary aesthetics or specific market preferences.

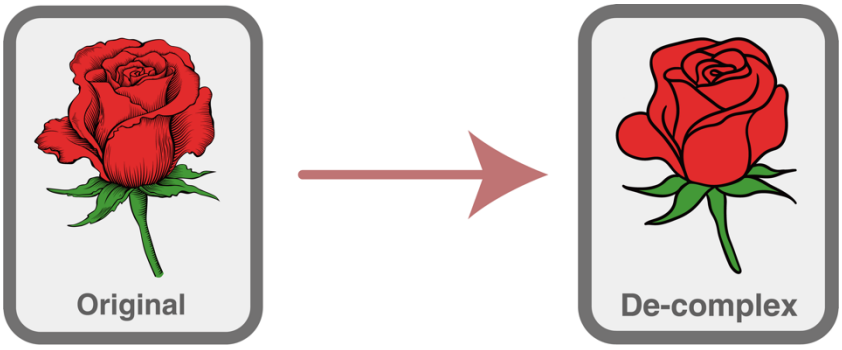

Figure 4.6 De-complex use of motif.

The next step is to simplify the details in the motif. The roses in the original image are enhanced by many fine lines that add volume and detail, and these can be omitted in the de-complexification process. Additionally, the complex contour lines designed to add realism can also be simplified and expressed with smoother and cleaner lines, making the overall shape more organic and contemporary. With these modifications, the designer is able to create a cleaner, more contemporary motif suitable for

contemporary product applications that not only maintains a direct link to the original drawing but is also overall clearer and easier to apply in different design contexts.

Abstraction

Abstraction is a deeper level of design innovation that involves not only retaining the core elements of a motif and simplifying the color details, but also geometrizing, symbolizing, and reorganizing the elements. This approach is suitable for innovation-oriented design, where abstraction and reinterpretation of motifs creates a new visual expression that demonstrates cultural heritage as well as incorporating contemporary design language.

- Retain core elements: Retaining the core elements and themes of the motif ensures that the cultural and visual significance of the motif is passed on.
- Streamline colors: Simplify the number of colors in the motif by using colors that are more modern or better suited to the target market.
- Streamline details: Remove complicated details and decorations to make the motif simpler and easier to apply on various products.
- Geo-metricize: Transforming motif elements into geometric shapes increases the abstraction of the design and makes it more in line with contemporary design language.
- Symbolization: Abstracting motif elements into symbols reinforces their symbolic meaning for easy recognition and communication.
- Reorganize Elements: Reorganize motif elements to create new visual effects and adapt to the design needs of various products.

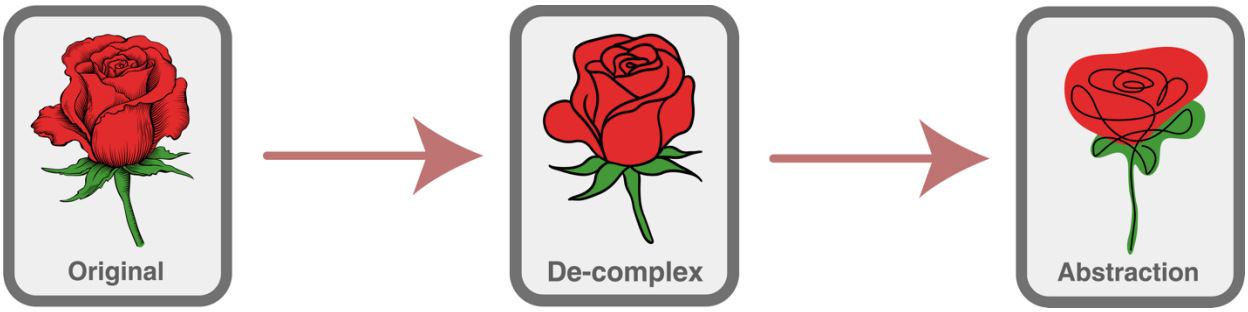

Figure 4.7 Abstraction use of motif.

Again, the rose motif is used as an example of abstraction (Figure 4.7). Abstraction is an advanced version of de-complexification, which is the reprocessing of the motif on top of de-complexification. It starts out the same, keeping the core of the motif, simplifying the number of colors in the motif and then taking out the intricate details and embellishments. Then after that comes the difference, the abstraction of the motif, which still starts around the body of the motif. For this rose motif, the main part of it is the flower, which in turn is made up of multiple petals. One of the differences between a rose and other flowers is the shape as well as the color of the flower. Then the designer needs to show the characteristic shape of the rose flower and the red color of the rose when making the abstraction, which can make people quickly associate it with a rose. Then the same technique is used to show the branches and leaves to keep the overall unity. Finally, designers can use these abstracted elements in new arrangements or combinations according to specific product needs. For example, in textile design, the elements may be repeated and arranged to form motifs; in product design, the flower and leaf shapes may be used for decorative details or functional components.

Imagery Integration

Imagery Integration is a comprehensive design strategy that involves storytelling, semantic reproduction, emotional connection, cultural integration and contemporary interpretation. This approach is not only about visual application, but also about deep excavation and re-creation of motifs on an emotional and cultural level. By combining ethnic motifs with product usage scenarios and user experience, designers give products unique cultural stories and emotional values, thus highlighting cultural uniqueness and contemporary relevance in a globalized market.

Storytelling: Tell a story through the motifs to increase the narrative level of the product.

Semantic Reproduction: The design conveys the cultural and symbolic meaning of the motif.

Emotional Connection: Designs that touch consumers' emotions and create an emotional connection.

Cultural Integration: Integrate motifs with other cultural elements to create a cross-cultural design language.

Contemporary Interpretation: Modern interpretation of traditional motifs to make them compatible with contemporary aesthetics and usage.

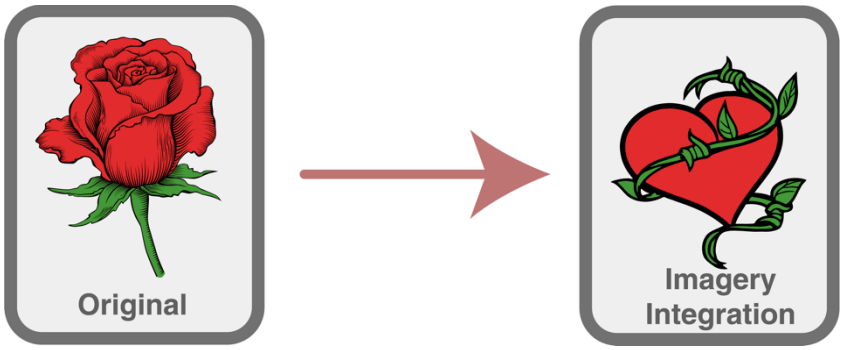

Figure 4.8 Imagery integration use of motif.

In actual use, designers can use these design strategies individually or in combination according to product needs. Taking the rose motif (Figure 4.8) as an example, most people recognize that red roses represent love. When Imagery Integration is performed on the rose motif, it is not necessary to focus only on the rose itself but can focus more on the love it symbolizes.

The steps go as follows: First, identify the core semantic meaning of love represented by the red rose. Next, translate these semantics into more contemporary design elements, such as the red heart. To strengthen the connection between the rose and the heart, the rose's branches and leaves can be added to wrap around the heart so that the design retains its traditional meaning while still having a modern feel.

This design not only conveys the concept of love, but also touches consumers' emotions and makes them empathize with the product. Through this Imagery Integration approach, the designer was able to create a red heart motif entwined with branches and leaves from the initial red rose motif, a design that is both emotionally deep and a blend of cultural and contemporary design.

4.2.5 Step 5 Modeling

the fifth steps vary depending on how the motif will be applied. For those designers who plan to use the motifs in a flat manner, such as printing directly onto the surface of a product, the modeling step can be skipped. In this case, the designer should directly select appropriate materials and colors and use digital editing software such as Photoshop to preview how the motif will look on the actual product. This method is suitable for motif applications such as clothing prints, paper packaging or furniture surface decoration.

On the contrary, if the designer intends to apply the motif in a more three-dimensional form, such as integrating the shape or structural elements of the motif in the product design, then he or she needs to enter the modeling stage. During this process, designers should choose the modeling software they are most familiar with to create a 3D model of their product. Modeling not only helps designers more accurately realize their design intent, but also allows for detailed functional and structural testing before production to ensure the quality and utility of the final product (Zhou et al., 2016).

4.2.6 Step 6 Adjust material and color.

After modeling the product, the designer needs to move on to the material and color selection phase, a step that is key to realizing the design concept and ensuring the product's market appeal. At this point, the designer should make decisions based on previous research information and the need for a balance between contemporary and traditional.

First, referencing common colors of similar products on the market can provide the designer with a visual understanding of current trends and consumer preferences. This helps designers ensure that product colors are market-ready while still standing out from the competition.

Second, designers may choose to use the original hues of traditional motifs, an approach that honors and preserves elements of cultural heritage and gives products a unique cultural value and storytelling. If the cultural semantics of traditional colors can enhance a product's market performance or customer's emotional connection, these colors should be utilized positively.

However, neutrals can also be considered as an alternative to traditional colors, especially if the primary colors may be too strong or not in line with modern aesthetics. Neutral colors are often easier to integrate into a modern home or fashion environment and can also lead to wider market acceptance of a product (Zhou, 2007).

When selecting materials, designers should consider their texture, durability, and integration with traditional elements. The use of traditional materials, such as wood, silk or ceramics, can convey deep cultural heritage and craftsmanship values. These materials can be treated with modern processing techniques to enhance their performance and aesthetics in contemporary applications.

At the same time, designers can also consider combining traditional materials with modern ones to create innovative products. For example, combining natural materials with high-tech synthetic materials can achieve a perfect fusion of tradition and modernity, retaining the tactile and visual effects of traditional materials while enhancing the durability and functionality of the product. This method of material fusion not only leads to a unique textural and aesthetic experience, but also gives new functions and features to the product (Wiśnicka ,2020).

When adjusting colors and choosing materials, designers should consider the product's usage scenario, target market and brand positioning. This process is not only a technical choice, but also a creative and strategic realization that expresses the uniqueness and cultural depth of the product through a clever mix of colors and materials. Such an approach helps to create

designs that respect traditions but are also in line with contemporary trends, meeting the needs and expectations of modern consumers.

4.2.7 Step 7 Prototyping

After adjusting the materials and colors, the designer can move on to the prototyping stage. Using digital manufacturing techniques such as 3D printing or CNC machining, product models can be created quickly and accurately. This approach allows designers to physically evaluate and test the design to ensure that the final product meets the design specifications and functional requirements before going into mass production (Milošević et al., 2020).

Digital manufacturing not only increases the efficiency of prototyping, but also makes the iterative process easier (Milošević et al., 2020). Designers can modify design details in a short period of time and quickly create new prototypes to validate these changes, which greatly accelerates the product development cycle. In addition, the use of advanced manufacturing techniques helps to reduce material waste and increase the sustainability of production. This stage is a critical step in transforming a design from concept to reality and is essential to ensure that the product design is viable and competitive in the marketplace.

4.2.8 Step 8 Testing

After the prototype has been completed, the designer needs to conduct a comprehensive test of the prototype, focusing on evaluating the success and appropriateness of the use of ethnic motifs in the product design. This step is a critical moment in verifying whether the design concept has been implemented correctly and is also an important stage in evaluating whether the product is ready for the market. The test ensures that the application of ethnic motifs in the

product not only meets the requirements of aesthetics and cultural accuracy, but also demonstrates the functionality and durability it should have in actual use. If the test results meet expectations, the product can enter the production stage. If any problems or defects are identified during the testing process, such as cultural misuse, design elements that are not in harmony, or poor user experience, the product will need to enter the optimization phase. To better help designers with testing, the following Test Suggestion Form lists the key points that need to be evaluated.

Assessment Suggestion Form

Visual effect:	Is the overall visual effect of the motif in the product aesthetically pleasing and in harmony with the overall design style of the product? **Yes** ☐ **No** ☐ Is the recognizability of the motif in the design acceptable? **Yes** ☐ **No** ☐
Cultural accuracy:	Does the motif retain its original cultural characteristics and symbolism and correctly represent the culture to which it belongs? **Yes** ☐ **No** ☐ Does the use of the motif avoid cultural misuse and ensure that it does not cause cultural misunderstanding or offense? (Compare the limits in the motif information form.) **Yes** ☐ **No** ☐
Functionality:	Does the use of the motif affect the basic function and user experience of the product? **Yes** ☐ **No** ☐ Is the motif durable in actual use? **Yes** ☐ **No** ☐
User experience:	Is the target user group positive about the ethnic motifs in the product design? **Yes** ☐ **No** ☐ Do users from the cultural background of the ethnic group think that the design respects and appropriately displays their culture? **Yes** ☐ **No** ☐
Technical feasibility and production feasibility:	Is the motif feasible to realize in practice? **Yes** ☐ **No** ☐ Is the use of the motif feasible in terms of cost control? **Yes** ☐ **No** ☐
Contemporary design evaluation:	Does the product fit into the contemporary design trend? ● Neutral Colors ☐ ● Material Combination ☐ ● Organic Shapes ☐ ● Minimalism ☐ ● Mixing of Cultures ☐
Weaknesses:	

4.2.9 Step 9 Optimization

In step 9, the optimization phase, the designer needs to make necessary adjustments and improvements to the design based on test feedback. This may include modifying design details, replacing materials, or adjusting the structure of the product. Optimization is a necessary process to ensure the final quality of the product and user satisfaction, as well as a critical step to avoid bigger problems in future production. After identifying the adjustments and improvements that need to be made, the designer will go back to step 5 and start modeling again.

Chapter 5 Application

For ease of application, this chapter will focus on how to simulate real-world situations using the methods and approaches described in Chapter 4.

5.1 Step 1 Product Research

Following the design tool, the first step (Figure5.1) is to fill out the Product Information Form.

Figure 5.1 Step one of the design tools.

Product Information Form

The purpose of this form is to systematically collect and organize the information obtained during product research to help designers in the subsequent design process.

Product:	What is the product that needs to be designed or redesigned? _Design a seating furniture with ethnic motifs
Typology:	What type of product is this? (Choose as many as necessary) Utility Products: ☒ The main emphasis of these products is on functionality and utility. Entertainment Products: ☒ Products that primarily provide entertainment, recreation or gaming functions. Educational Products: ☐ Products designed to provide knowledge, skill learning or educational functions. Luxury Products: ☐ High-end, high-priced products that emphasize brand value, quality and uniqueness. Eco-friendly Products: ☒ Products that emphasize the concept of environmentally friendly, sustainable or green living.
User Information:	Target group: __People who are interested in traditional culture_ Age: age range of the target group: __18-65___ Gender: if the product is targeted at gender-specific users. _____N/A Revenue: Economic situation and consumption capacity of the target group ___Cost-conscious and value oriented. Context: The environment in which the product is used and how it is used. Family environment: including living room, dining room, study room, etc., as daily use of seating or decorative furniture to enhance the cultural atmosphere of the home. Commercial environment: Chinese restaurants, teahouses, cultural centers, etc., as decorative and functional furniture to create a cultural atmosphere and attract customers.

Similar Products:	Similar products in the market _____ _____ ● Modern Chinese style dining chair: simple solid wood design with simplified plum blossom or auspicious cloud motif on the backrest, suitable for family dining room. ● Chinese style study chair: modern shape, with embroidered or laser engraved landscape painting or calligraphy on the backrest, suitable for study room. ● Chinese style modern dining room chair: modern lines, wood or metal, with celadon motif on the back or seat, suitable for Chinese style dining room. ● Tea House Modern Chair: bamboo or solid wood material, simple design, with bamboo leaf or lotus motif on the chair back, suitable for tea house. ● Modern Hotel Lobby Chair: High-end design, mixed materials, chairs with simple Chinese decorative elements, such as embroidered or carved auspicious cloud motifs, suitable for high-end hotel lobbies.
Price Range:	Price range of existing products _____$50-$500_____ _____ _____
Common Materials:	What are the common materials for similar products available? _____ _____Common materials include solid wood, bamboo, metal and plastic, and some chairs come with leather or cloth cushions._____ _____
Common Colors:	What are the common colors for similar products available? _____ _Common colors include natural wood, dark brown, black, white, red, blue, green, and gold or silver as accents.
Production:	What are the available production processes and manufacturing methods? _____ _Traditional handmade, CNC, laser cutting, mold forming and modern mechanized production, etc._____
Design Trends:	What are the design trends associated with the product? _____ _____Neutral colors, material fusion, organic shapes, minimalism, cultural fusion, etc._____ _____
Product Related Standards	What are the design standards associated with the product? (safety standards, environmental standards, ADA standards, etc.) Depends on the product field. _____ __https://www.belson.com/Resin-Safety_____ ____https://woodbin.com/ref/furnituredesign/chairs/_____ ___https://www.dimensions.com/collection/chairs-seats_____ _____

5.2 Step 2 Motif Research

The second step is to fill out the Motif Information Collection Form.

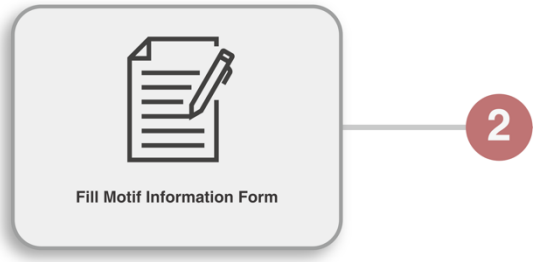

Figure 5.2 Step two of the design tools.

Motif Information Form

The purpose of this form is to systematically collect and organize the information obtained during the motif research process to assist the designer in the subsequent design process.

Cultural Context:	What is the basic information about ethnic groups and their common motifs? The Miao is an ethnic minority in China, mainly located in Guizhou, Hunan and Yunnan. The Miao are famous for their colorful costumes and unique embroidery techniques. Common traditional motifs include dragons and phoenixes, buffaloes, birds and flowers, fish and insects, and geometric shapes, etc. These motifs are not only aesthetically pleasing, but also contain deep cultural and religious significance.
Motif:	What is the chosen motif? Water Buffalo Motif
Origin:	What is the origin of the motif? The buffalo is the guardian deity and totem of the Miao people, and at the same time the buffalo is an indispensable labor force in the farming society.
Semantics:	What is the meaning of this motif in the culture that it belongs to and the story behind it? What is the story behind it? The buffalo totem is an important symbol in Miao culture, representing strength, courage and prosperity. Legend has it that the buffalo once appeared when the Miao faced a disaster, leading people to escape floods and helping them rebuild their lives. This story gave the buffalo a sacred status and made it the guardian god and symbol of the Miao people. The buffalo totem not only reflects the Miao people's reverence for and reliance on nature, but also their communal solidarity and resilience against adversity.
Application:	What's this motif for? (Choose as many as necessary) Decorative: ☒ Acts to beautify and decorate objects, spaces, etc. Signage: ☒ Labeling of specific information, social identity, ethnic affiliation, etc. Functional: ☒ With specific utility functions. Ceremonial: ☒ Related to religious beliefs. Artistic: ☒ Artistic and aesthetic value.
Usage Scenarios:	What are common usage scenarios for the motif? The buffalo totem is used in Miao culture for artistic decoration, festivals, rituals and sacrifices, folklore and farming life.
Limits:	What are the limitations on the use of these motifs? When using the Miao buffalo motif, avoid applying it to vulgar, luxurious or overly commercialized products, such as alcohol and tobacco, as well as items that can be easily stepped on or regarded as lowly, such as the soles of shoes and garbage cans. The motifs should not be applied to items or occasions related to Miao religious rituals, so as not to disrespect the religion and ancestors. At the same time, it is important to respect the buffalo's symbolism of strength, industriousness, and bountiful harvests in the Miao culture, and to avoid using the design in ways that are contrary to these symbolisms, such as violent, lazy, or destructive images and products.
Material:	Document the materials traditionally used in motifs, including but not limited to textiles, metals, wood, ceramics, and more. ● Fabrics ● Silver jewelry ● Wood carving ● Bamboo carving
Material Semantics:	Is the motif affected by the material? Yes ☒ No ☐ If yes, what are the semantics of this motif's Material? Buffalo motifs on fabrics are mainly used for decoration, silver jewelry carries religious beliefs and ritual symbols, and wood carvings or bamboo weaving reflect the buffalo's practicality.

Texture:	Does the motif have texture? Yes ☒ No ☐ If yes, what are the textures? Miao's buffalo motifs usually contain textures or motif designs that may be in the form of lines, embellishments, geometric shapes, or other decorative elements. These textures may be simple geometric motifs or complex motif designs to emphasize the aesthetic and decorative effects of the buffalo motif.
Color:	Does the motif have color? Yes ☒ No ☐ If yes, what is the color? The buffalo totem may be presented in different ways on different vehicles such as Hmong fabrics, silver jewelry, wood carvings, or bamboo weaving, but usually maintains the black or silver color as the primary representation. If yes, please complete the next research selection.
Color Semantics:	Is the motif affected by the color? Yes ☐ No ☒ If yes, what are the semantics of this motif's color? _____ _____ _____
Composition of motifs:	What elements make up this motif? Miao buffalo motifs usually contain the overall image of a buffalo or its horns, supplemented by geometric shapes such as lines, rhombuses and triangles, decorated with floral and botanical motifs to symbolize nature and life force. Sometimes they also include wave and cloud motifs to symbolize water and the sky, enhancing the motif's sense of movement and spirituality. In addition, other animal or human figures may appear in the motifs, displaying stories or legends associated with the buffalo. Which are the subjects of its semantics? The image of the buffalo is the centerpiece of the motif, usually presented abstractly or figuratively, representing strength and sanctity. Which are the decorative elements? The secondary parts of the buffalo motif include geometric shapes such as lines, rhombuses and triangles, which are used to decorate and enrich the details of the motif; floral and botanical motifs, which symbolize nature and vitality; waves and clouds, which symbolize water and the sky and enhance the motif's sense of movement and spirituality; as well as other figures and animal images, which display stories or legends related to the buffalo and add to the motif's cultural connotations.
Market cases:	Examples of relevant motif applications in the existing market, including but not limited to the fashion industry, interior design, product packaging or other areas.

5.3 Step 3 Digitalize

The third step (Figure 5.3) is the electronic processing of the ethnic motifs, but since the Miao buffalo motifs (Figure 5.4) obtained in the data search are already digitized, then they can be moved to the next step without much processing after the basic design needs have been met.

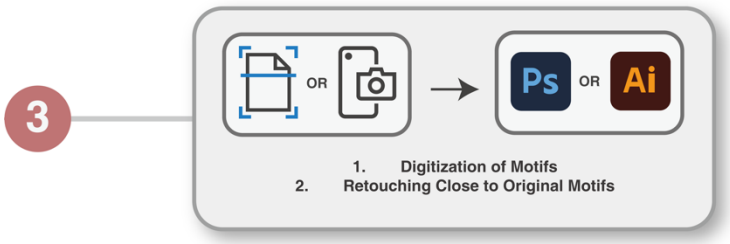

Figure 5.3 Step three of the design tools.

Figure 5.4 Miao buffalo motifs. From Etsy (n.d.)

5.4 Step 4 Ideation

By comparing the suggested tables, it was found that all four applications methods can all be realized on the buffalo motif. So, we can divide it into four directions to develop our design concept.

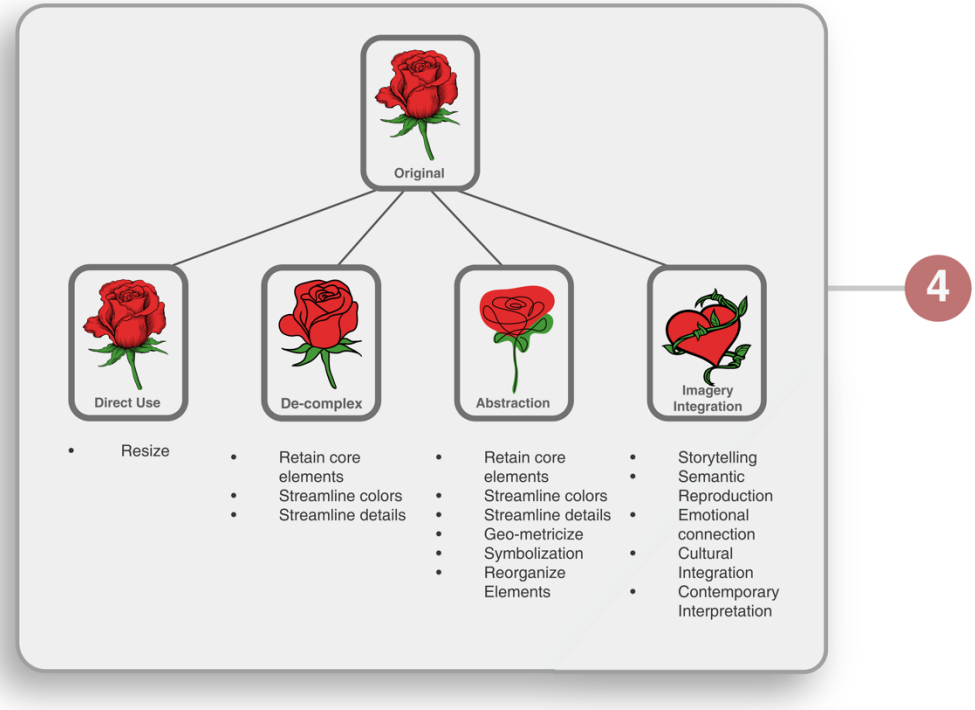

Figure 5.5 Step four of the design tools

Concept Direction 1: Direct use of the buffalo motif.

In the first concept, we need to apply the buffalo motif (Figure 5.4) to the design of the sitting furniture in a direct application way. The direct application approach means that we not only need to disseminate the motif itself, but also to retain the original meaning and aesthetic characteristics that it comes with. Combined with this Miao

buffalo motif itself, it is made of fabric, so we can convey its cultural connotation and artistic value through this material.

As an important symbol of Miao culture, the Miao buffalo motif contains a rich historical and cultural background. The buffalo has an important position in Miao life, symbolizing strength and hard work. The buffalo motif presents this cultural element through exquisite embroidery techniques, which gives it a unique artistic charm. Therefore, in the design process, we should not only retain the visual effect of this motif, but also reflect the cultural significance behind it.

In terms of specific application, we can integrate the Miao buffalo motif with contemporary fabric stools. The contemporary design of fabric stools is characterized by comfort and diversity. By applying the buffalo motif to the surface of the stools, we can create works that have both traditional cultural flavor and contemporary design. This combination can not only give the traditional motifs new life, but also let users feel the charm of national culture in their daily life.

Concept Direction 2: De-complex use of the buffalo motif

In the second concept, we need to apply the buffalo motif (Figure 5.4) to the design of the sitting furniture by using the De-complex method, which requires the designer to simplify the motif while retaining the core elements of the motif, so as to make the motif more in line with the aesthetics and practicability of contemporary design.

First, in this Miao buffalo motif, the core element is the buffalo. We can extract the element of buffalo as the basis of the design. In this way, we retain the most

representative part of the motif so that it can still convey the unique connotation of Miao culture. Second, we need to simplify the colors in the motif. Most of the colors commonly used in traditional Miao embroidery are blue and red, which have distinctive ethnic characteristics and visual impact. In the subsequent design, we can keep these two colors to maintain the ethnic style and artistry of the design.

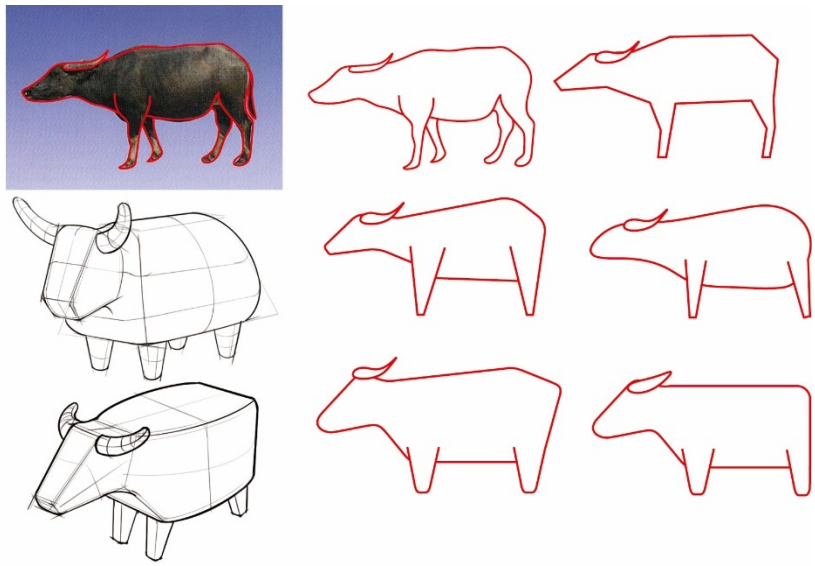

Figure 5.6 Sketch for de-complexifying the buffalo motif in case2

After extracting the core element of the buffalo (Figure 5.6), as the buffalo motif at this time is still more figurative and carries more details, we can conduct some more simplified processing. By reducing the details and lines, we can make the image of the buffalo become smoother and simple and use this shape to design the sitting furniture. As shown in the illustration, the local buffalo is used as a reference to extract a more figurative appearance, and then try to simplify this shape. The first attempt was to replace some of the more complex curves with straight lines, which helped to ignore some of the more figurative depictions, resulting in a more geometric shape. This

initially creates an angular shape, and we can chamfer or soften these sharp corners to make the shape simpler and more organic. Further simplifications are made, using fewer lines while maintaining its buffalo shape, resulting in several simplified forms.

As shown on the left side of the concept sketch (Figure 5.6), the first sketch model, due to the upward-tilting horns, made it look more like a bull rather than a buffalo. This led to the second sketch model, where the horns are curved backward, and the back is flatter, increasing its usability.

Concept Direction 3: Abstraction use of the buffalo motif.

In the third concept, we need to use Abstraction to apply the Miao buffalo motif to the design of the seat. Since Abstraction is an advanced version of de-complexification, the first steps are consistent with the de-complexification in case two. First, the core elements of this buffalo motif are extracted, and then the colors and motifs are simplified. Then comes the removal of those complex details and decorations to make the buffalo motif as simple as possible. The next step is to really abstract the Miao buffalo motif. Abstraction can be achieved in many ways, and the ones summarized in our tool are: Geo-metricize, symbolization, and reorganize elements, all of which are shown in the illustration.

Combining the Miao culture with the common buffalo elements in life, we can know that the buffalo horn is a very common and important part. At the same time, the buffalo horn is also its more significant feature. When geometricizing the buffalo motif, we can keep the recognizability of the buffalo horn, and process its shape to a certain extent, but still maintain its recognizability. In this way, the horns can be abstracted as

symbols to strengthen the symbolism of the whole motif as well as to increase the correlation between the processed motif and the primitive culture.

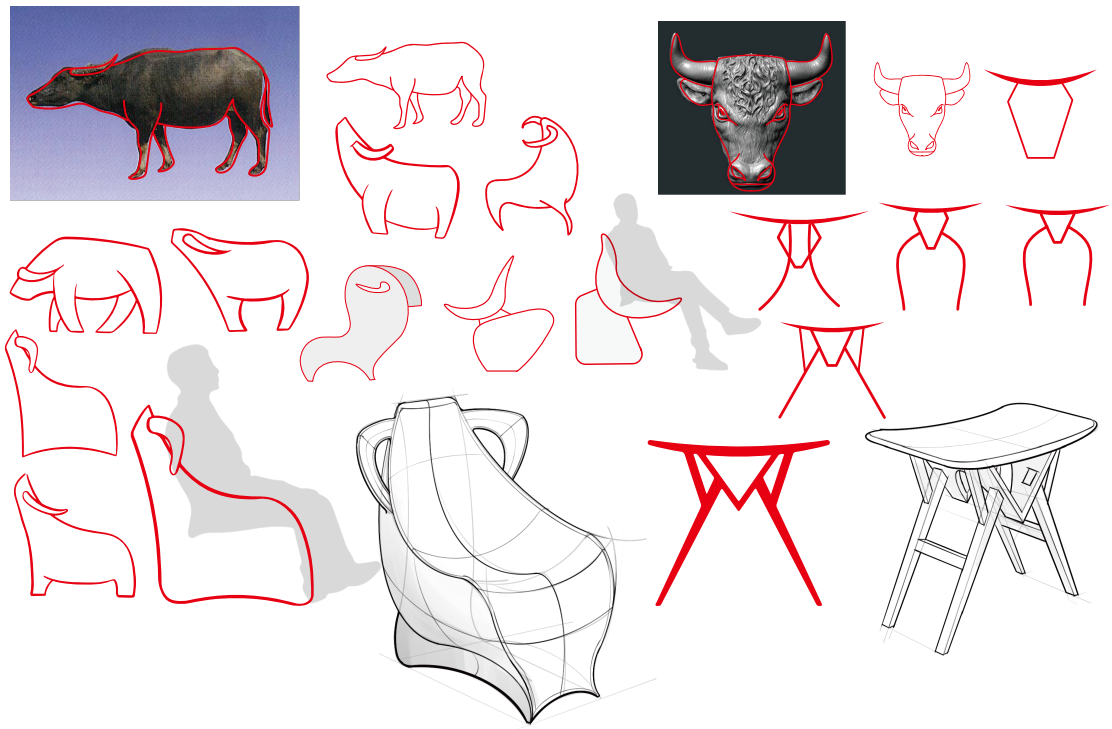

Figure 5.7 Sketch for abstraction use of the buffalo motif in case 3.

The buffalo represents a reliable strength and dependence in Miao culture, symbolizing heaviness and stability. Therefore, when abstracting the processing, we want to reflect the heaviness and stability of the buffalo. We can try to represent the buffalo's body with simple geometric shapes while keeping the buffalo's horn recognizable, along with other design elements to convey this sense of solidity and reliability.

Just like in the sketch (Figure 5.7), a buffalo horn shape can be used as the backrest and sitting surface in the design, combined with a thick geometric motif

forming the body of the buffalo. We can also strengthen or enlarge a certain part to make the overall shape closer to a sitting piece. With the back of the buffalo as the sitting surface, the neck of the buffalo can be deformed and lengthened to form the back part of the seating furniture. This shape is a buffalo looking up to the sky, symbolizing praying to heaven to bless the Miao people with a good harvest, which is in line with the local cultural definition of the water buffalo. The Miao also hold buffalo-related festivals every year to pray for a good harvest. The combination of the two makes for an aesthetically pleasing and culturally meaningful design. Finally, the buffalo's horn is added to reinforce the symbolism of the motif and to increase the connection between the treated motif and the original culture.

The sketch also shows another angle of the design idea. Taking the buffalo's head as the starting point, the outline shape is extracted, simplified and abstracted. The ratio of the buffalo's horns to the head is exaggerated, and it is deformed into the seat of the stool. The curve of the buffalo's head is replaced by a straight line, and the complex details are ignored, finally simplifying it into an inverted triangle to replace the buffalo's face.

Concept Direction 4: Imagery integration use of the buffalo motif.

In the fourth concept, we need to use Imagery Integration to integrate the Miao buffalo motifs (Figure 5.4) into the design of the seat, which is a comprehensive design strategy that recreates the emotion and culture behind the motifs as opposed to the previous three cases. As the object of worship of the Miao, the buffalo has unique cultural connotations. Miao is a typical traditional farming ethnic group, and the buffalo

is an important part of people's productive life as they plow together with people. There are also local festivals related to cattle, which are also associated with farming and celebrating a good harvest.

Figure 5.8 Sketch for imagery integration use of the buffalo motif in case 4.

By associating the buffalo with helping people to plow food, we can design a concept that incorporates the unique architectural style of the Miao (Figure 5.8). While searching for information, I noticed the unique architecture of the hanging footstools of the Miao. Taking this kind of architecture as a source of inspiration, we recreate it. First, we remove the decorative parts and keep the basic structure of the hanging footstool. The footstool is a repeating and superimposed structure, so we can remove the repeating part to get a basic shape. The upper arc symbolizes the protruding eaves of

the hanging footstool. The overall shape retains the framework of the hanging footstool, but it still looks a bit ordinary.

In order to increase the uniqueness and cultural connotation of the design, we can further remodel this base shape. The most distinctive feature of Miao is not only the footstools, but also their exquisite silver jewelry. We can extract elements from the eaves of the hanging footstools and combine them with the buffalo horn headdresses in Miao silver jewelry, combine and simplify the two, and add them to the previously obtained frame of the hanging footstools. In this way, it not only highlights the deep heritage of Miao culture, but also gives a unique national character and emotional value to the design of the seat.

5.5 Step 5 Modeling

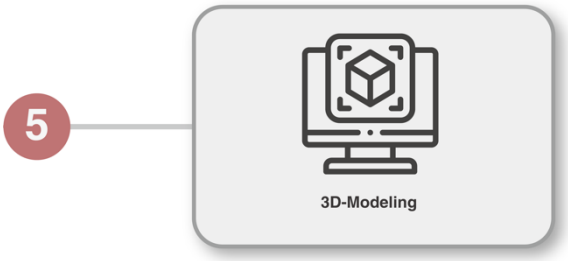

Figure 5.9 Step five of the design tools.

Based on the four concepts above, we can get four different design sketches of the buffalo motif. The first concept is a flat application of the buffalo motif. Compared to complex modeling, we can use Photoshop and other tools to quickly preview the effect of the motif on the

actual product. The example (Figure 5.10) shows the effect of this design concept on the actual product.

Figure 5.10 Photoshop rendering for concept one.

The other three concepts are a development of the three-dimensional use of the buffalo motif (Figure 5.9). The design sketches for these three concepts all need to be realized in modeling software.

3D model of the sketch in the second concept

In this design concept, we simplified the image of the water buffalo and applied it to the design of the seating through a de-complexification method. In the 3D modeling process, we used Fusion 360 to initially model the design, ensuring that the image of the water buffalo was recognizable. The proportions and details of the model (Figure 5.11) were further adjusted to meet the needs of practical use, especially the design of the four legs, which are wider at the top and narrower at the bottom, symbolizing the legs of the water buffalo and ensuring its stability and load-bearing capacity. The body part is designed as a soft leather-covered cushion to enhance comfort, while the horns are designed as leather products with soft padding inside to add liveliness and safety to

the design. Through these steps, we have initially completed the three-dimensional processing of the buffalo image, laying the foundation for subsequent material selection and detail processing.

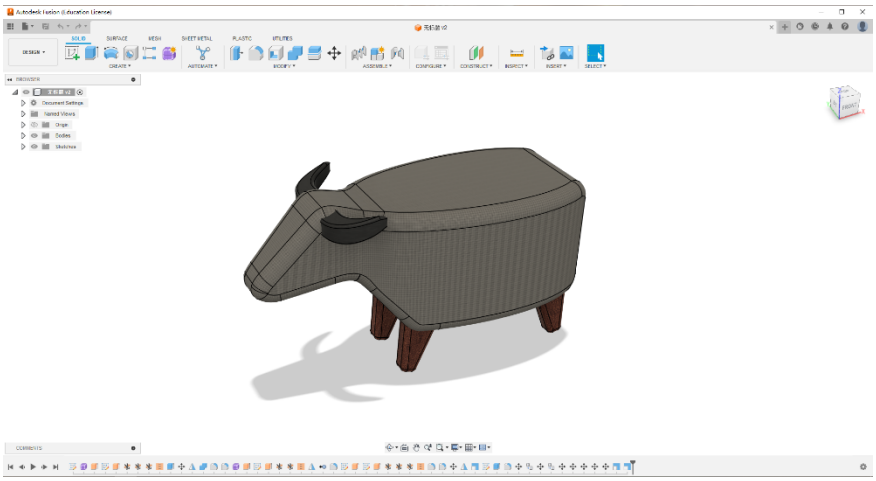

Figure 5.11 3D mode of concept two

3D model of the sketch in the third concept

In this design concept, the image of the water buffalo is simplified and applied to the design of the seat through the method of abstraction. According to the previous design sketch, we use Fusion 360 to perform preliminary modeling. The scale and details of the model (5.12-5.13) are further adjusted to meet the actual needs of use. The seat surface is concave inward to fit the curve of the human buttocks, and the back of the chair is slightly curved backward to further provide the seat with comfort. The horns are enlarged, and the inner curved arc is an extension of the seat and backrest, providing good support when sitting on it and increasing a sense of security. From the side, the image of the buffalo looking up at the sky in the sketch is retained. In order to

strengthen the connection between the product and the Miao culture and the comfort of the seat, some of the cushions and cushions are added. The backrest, buttocks and legs are all covered with cushions made of Miao batik.

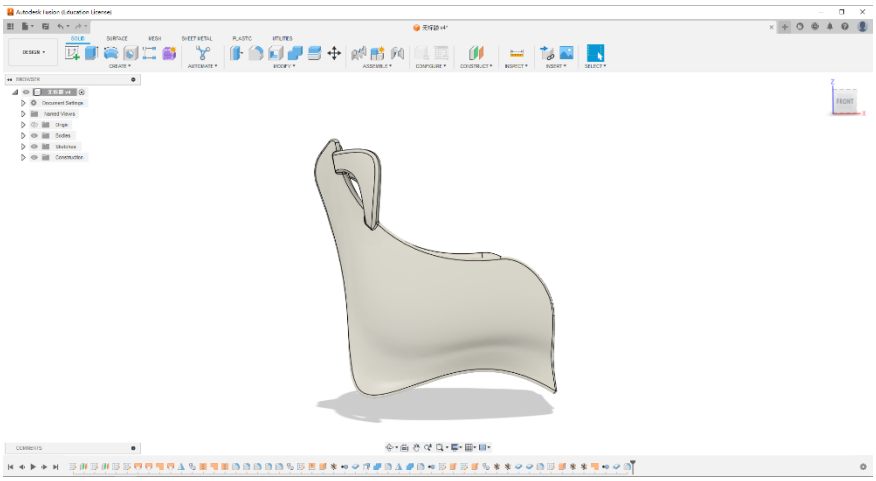

Figure 5.12 3D mode of concept three.

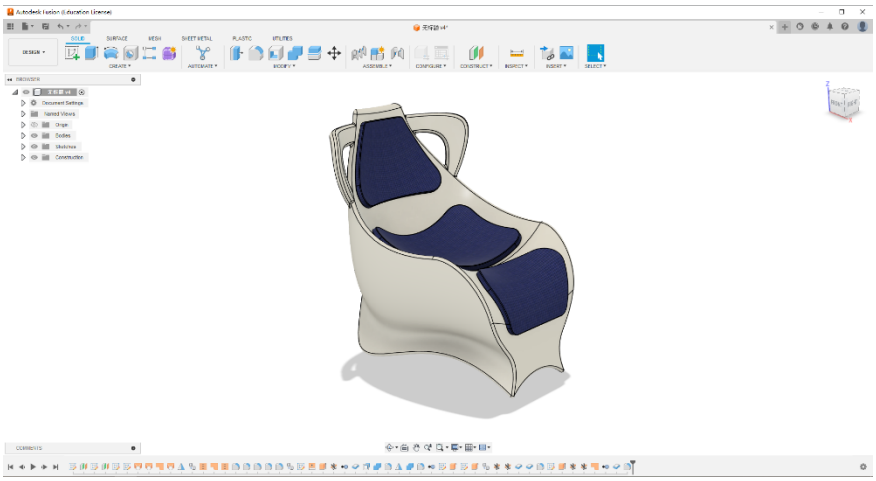

Figure 5.13 3D mode of concept three.

In the third design concept, another development idea is to abstract the buffalo head image. When modeling, the proportions and details of the stool need to be adjusted

according to actual usage needs. We can further enlarge the horns, making them elongated and deformed into the seat surface of the stool. In order to meet the actual needs of use, the overall design of the seat surface should be thick in the middle and thin on both sides. In addition, the material characteristics need to be considered, and the two sides of the stool need to be optimized to avoid reducing the durability of the material with too thin a thickness. At the same time, in order to increase the comfort of the seat and the connection with the image of the buffalo, a cushion option can be added to the design. The buffalo motif can be added to the cushion to enhance the cultural connotation and beauty of the design.

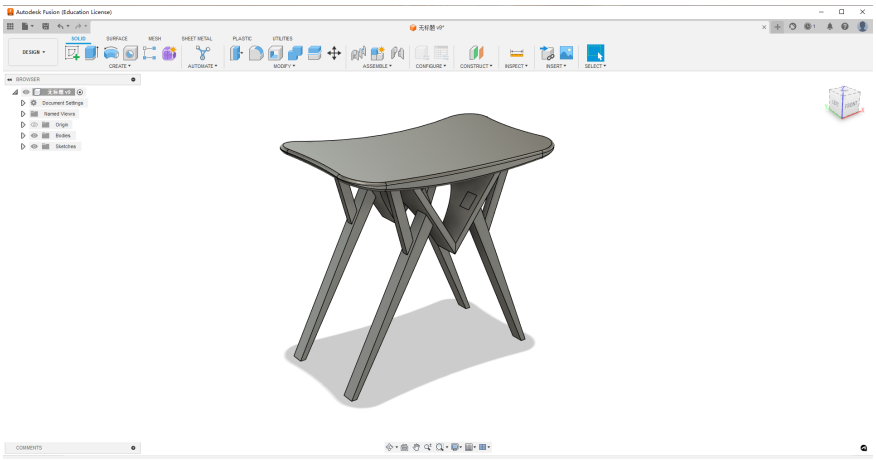

Figure 5.14 3D mode of concept three.

3D model of the sketch in the fourth concept

In this design concept, we simplified the image of the water buffalo and applied it to the design of the seating through the method of imagery integration. Based on the previous design sketches, we used Fusion 360 to perform preliminary modeling and adjusted the scale and details of the model (Figure 5.15) to ensure that it meets the

actual use requirements and aesthetic standards. The overall shape follows the development of the sketch and draws on the essence of the stilted frame structure. The curvature of the seat surface symbolizes the flying eaves of the stilt house. This curved design not only adds visual dynamism, but also enhances the comfort of the seat. The legs of the stool are designed to be wider at the top and narrower at the bottom, symbolizing the strong legs of the water buffalo and also ensuring the stability of the stool. This design not only supports the weight of the stool functionally, but also conveys a sense of strength visually. The simplified eaves and the horn elements combine to form the cross-braces of the stool. This design not only enhances the stability of the stool structurally, but also symbolizes the important role of stilt houses and water buffalo in Miao culture.

At the same time, for better comfort, a layer of Miao batik fabric can be added to the seat surface. The motifs on the batik fabric (Figure 5.16) are made up of repeated stacking of motifs in the development of sketches.

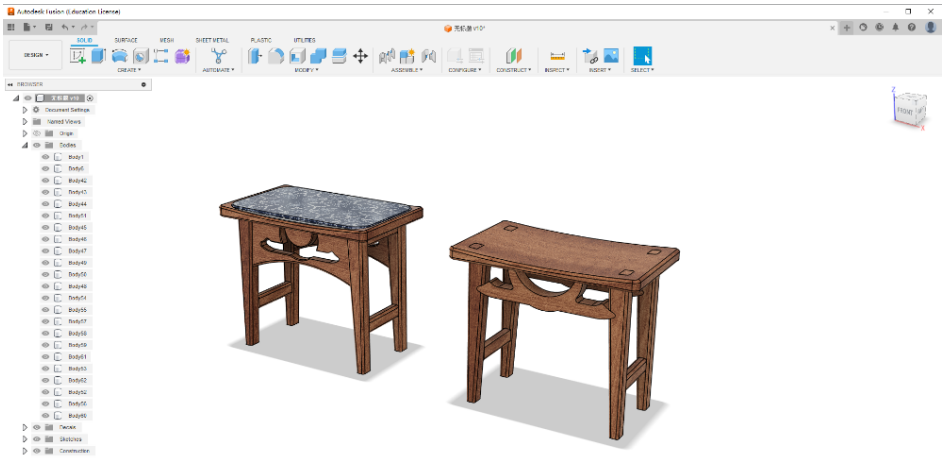

Figure 5.15 3D mode of concept four.

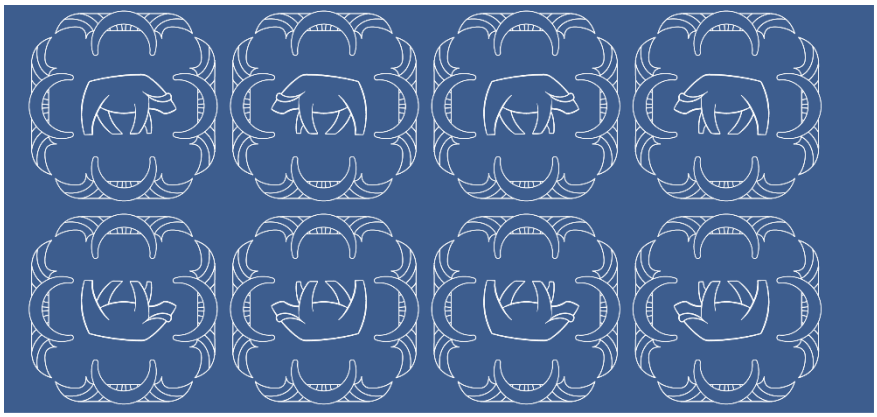

Figure 5.16 motifs on the batik fabric.

5.6 Step 6 Adjust material and color.

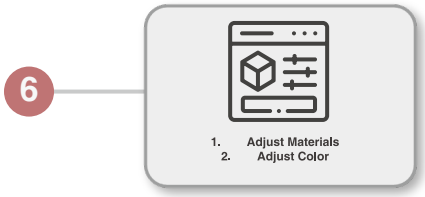

Figure 5.17 Step six of the design tools.

After completing the modeling, in this step (Figure 5.17) the designer needs to select the appropriate materials and colors according to the requirements. We can test the effect by replacing different materials and colors based on the existing model. According to the preliminary research, it can be learned that the common colors in Miao culture are blue, green, black, red and yellow, etc., and the common materials are wood, silver, bamboo, cotton, silk, etc. Nodeling software can be used to apply these colors and materials to the model and test the effect.

The designer continues to use Fusion 360 to open the completed model, select different parts of the model, and apply different materials and colors to replace them. The materials selected include wood, plastic, cement, leather, and fabric. The colors mainly rely on the original colors of the materials themselves.

First, the designer should open the finished model in Fusion 360 and create a color library in the software that represents the traditional colors of the Miao, including blue, green, black, red, and yellow. Then, they create a material library that includes traditional materials (such as wood, silver, bamboo, cotton, and silk) and modern materials (such as plastic, cement and leather). Selecting different parts of the model, the designers replace them with different materials and colors. These images (Figure 5.18-5.21) show the combination of materials and colors.

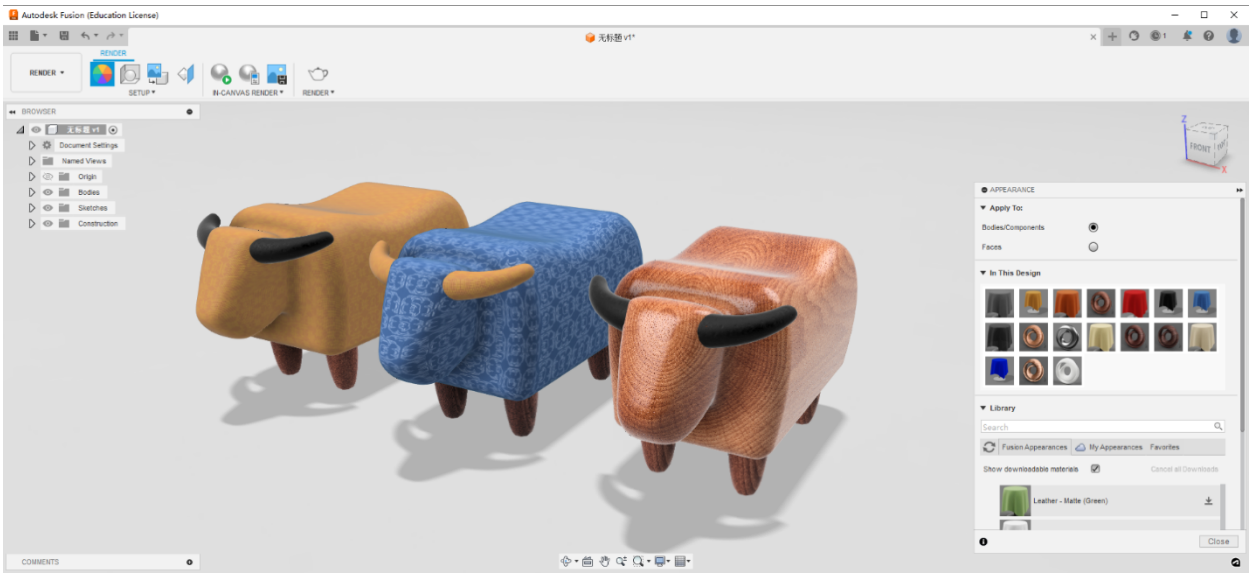

Figure 5.18 Contrast between different materials and colors for concept two.

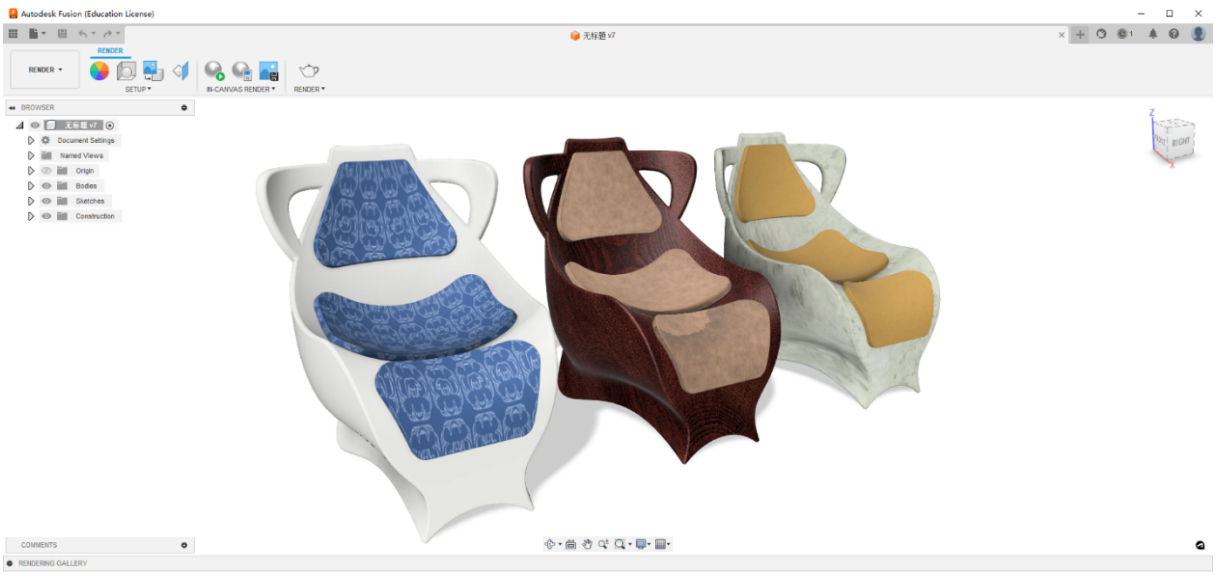

Figure 5.19 Contrast between different materials and colors for concept three.

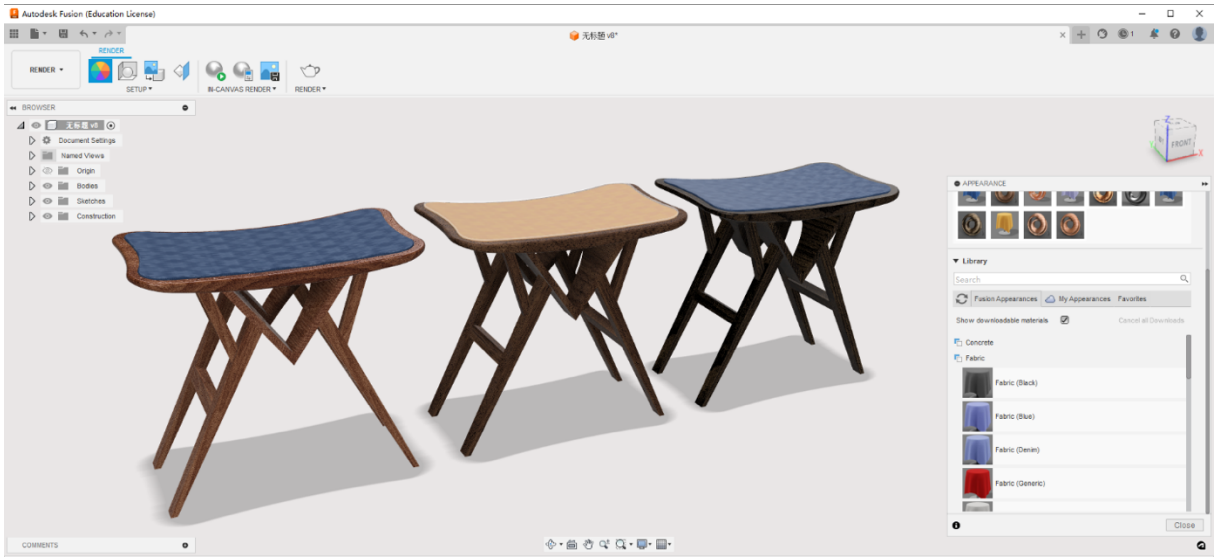

Figure 5.20 Contrast between different materials and colors for concept three.

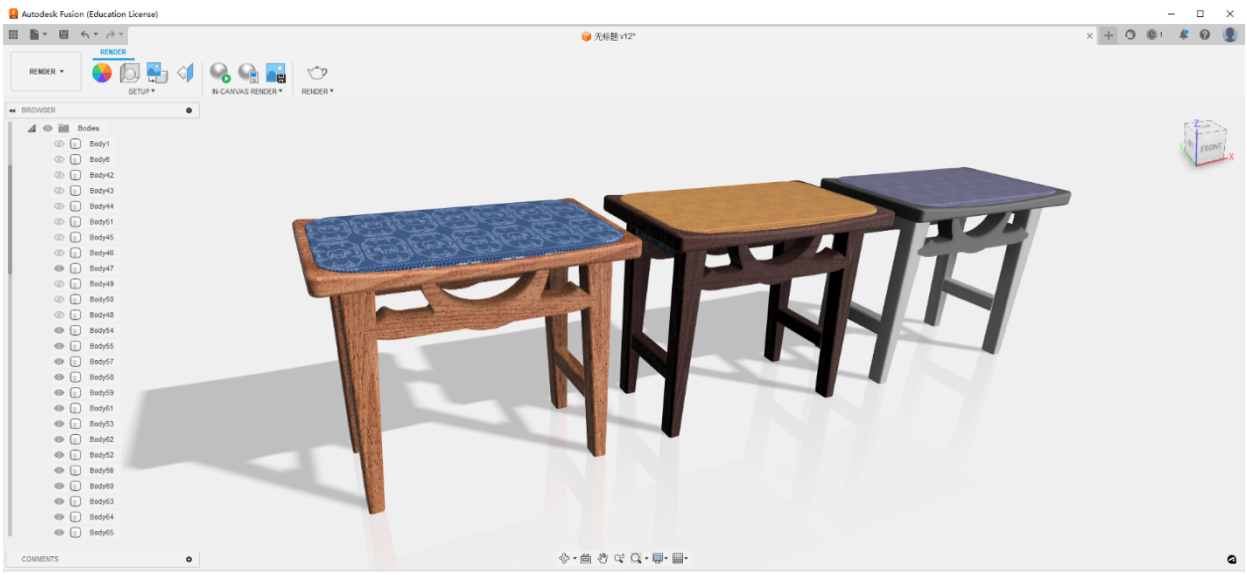

Figure 5.21 Contrast between different materials and colors for concept four

5.7 Step 7 Prototyping

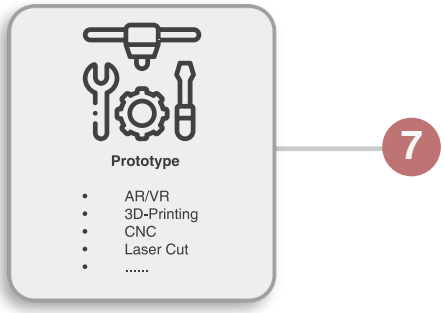

Figure 5.22 Step seven of the design tools.

In this step (Figure 5.22), we use 3D printing and CNC to make a prototype. First, the finished 3D model is exported as an STL file in Fusion 360. Then, the exported model file is opened using Cura slicing software, the printing parameters (such as layer height, infill density, printing speed, etc.) are set, and a slicing file is generated. Then the next part is to select a suitable 3D printer and printing material and adjust the printer settings according to the size and complexity of the model.

Figure 5.23 3D-print 1/6 scale models

The designer uploads the sliced file to the 3D printer and starts printing. After printing, the necessary post-processing steps should be completed, such as removing the support structure and sanding the surface. The figure (Figure 5.23) shows all the 1/6 scale models that were printed using 3D printing.

Next, we select one of the models to create a prototype of the actual size. The selected 3D model is placed in the CNC slicing software and processing begins. The picture (Figure 5.24) shows the carving process of the seat surface. The preliminary assembly diagram (Figure 5.25) shows the splicing of the various components, all parts except the sitting surface (Figure 5.24) are made by hand. Finally, the picture (Figure 5.26) shows the completed prototype.

Figure 5.24 Carving process of the seat surface.

Figure 5.25 Splicing of the various components.

Figure 5.26 Completed prototype.

5.8 Step 8 Testing

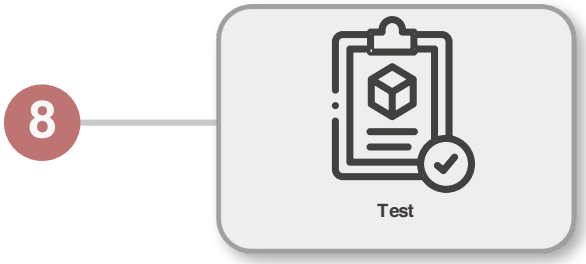

Figure 5.27 Step eight of the design tools.

In this step (Figure 5.27), we evaluate the completed stool prototype based on the Test Suggestion Form and test the stool in practical use.

Assessment Suggestion Form

Visual effect:	Is the overall visual effect of the motif in the product aesthetically pleasing and in harmony with the overall design style of the product? **Yes** ☒ **No** ☐ Is the recognizability of the motif in the design acceptable? **Yes** ☒ **No** ☐
Cultural accuracy:	Does the motif retain its original cultural characteristics and symbolism and correctly represent the culture to which it belongs? **Yes** ☒ **No** ☐ Does the use of the motif avoid cultural misuse and ensure that it does not cause cultural misunderstanding or offense? (Compare the limits in the motif information form.) **Yes** ☒ **No** ☐
Functionality:	Does the use of the motif affect the basic function and user experience of the product? **Yes** ☐ **No** ☒ Is the motif durable in actual use? **Yes** ☒ **No** ☐

User experience:	Is the target user group positive about the ethnic motifs in the product design? **Yes** ☒ **No** ☐ Do users from the cultural background of the ethnic group think that the design respects and appropriately displays their culture? **Yes** ☒ **No** ☐
Technical feasibility and production feasibility:	Is the motif feasible to realize in practice? **Yes** ☒ **No** ☐ Is the use of the motif feasible in terms of cost control? **Yes** ☒ **No** ☐
Contemporary design evaluation:	Does the product fit into the contemporary design trend? ● Neutral Colors ☒ ● Material Combination ☒ ● Organic Shapes ☐ ● Minimalism ☐ ● Mixing of Cultures ☐
Weaknesses:	The legs and supports are thin and deform to a certain extent when they bear a large weight.

5.9 Step 9 Optimization

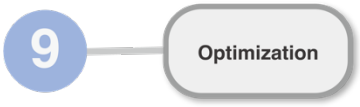

Figure 5.28 Step nine of the design tools.

This step (Figure 5.28) is to optimize the problems found in the previous step. According to the feedback from the prototype test, it was found that the legs and supports of the stool were

relatively thin and would deform under heavy weight. To solve this problem, we can start from multiple aspects.

First, we can consider replacing the material with a stronger one. Using high-strength wood or composite materials can significantly increase the strength of the legs and supports. We can even consider adding a metal structure inside to increase the overall load-bearing capacity, while maintaining the traditional wood appearance on the outside.

Structural design is also an important direction. Increasing the diameter or thickness of the legs can directly enhance the load-bearing capacity. In addition, introducing support bars or reinforcing ribs, especially at the connection between the legs and the seat, can improve the overall stability. The improvement of the connection method is also important. By using stronger connectors or glue, the connection between the legs and the seat can be made more secure, and it is less likely to loosen or deform. Using traditional techniques such as mortise and tenon joints can not only increase the aesthetics, but also enhance the structural strength.

Shape optimization is also an effective method. Adjusting the shape of the legs to make them more evenly stressed, for example by designing them as a cone or in another shape that disperses the pressure, is one way to do this. Optimizing the supporting parts, for example by adding transverse support bars, can ensure that the overall structure is more stable when carrying a load.

5.10 Summary

This method demonstrates how to employ technologies to apply ethnic motifs into contemporary product design. Due to space limitations, only some optimization ideas and

directions are proposed for the problems found in the prototype evaluation, and they are not discussed in depth.

In practical application, this method not only helps designers incorporate traditional motifs into product design, but also ensures the design's modernity and market appeal. The application of this method demonstrates how to create products with contemporary design aesthetics while retaining the essence of traditional culture.

Chapter 6 Conclusion

Based on the research in Chapter 2, designers would benefit from a method to help them utilizing a verity of common technology to apply ethnic motifs to contemporary design. In Chapter 3, through case studies, we find some examples of successful application of ethnic motifs to contemporary design and summarize them. In Chapter 4, combined with the previous case studies, we summarize a set of design processes to help designers from preliminary research to how to transform and apply ethnic motifs, to prototyping, and then to iteration. The focus is mainly on helping designers choose appropriate traditional motifs and apply them to contemporary design and accelerate iteration through technological means.

According to the findings in Chapter 2, designers often face many challenges when incorporating ethnic motifs into contemporary design. They need a systematic approach that can not only improve design efficiency with the help of technology, but also find a balance between cultural heritage and innovation.

In Chapter 3, we analyze several successful cases and discover some typical practical methods. These cases show how to cleverly integrate ethnic motifs into contemporary design. These cases are summarized and categorized, and different application strategies and design techniques are extracted to provide a valuable reference for the subsequent design process.

In Chapter 4, we propose a complete design process based on these case studies. This process covers all aspects of the design process, from preliminary research, selection and transformation of ethnic motifs, prototyping, to final iteration. Through this process, designers can systematically carry out their design work, ensuring that ethnic motifs are effectively

integrated at each stage, and that technological means are used to enhance the innovation and practicality of the design.

Chapter Five demonstrates the design process proposed in Chapter Four through a hypothetical project. The task of the project is to design a piece of seating furniture incorporating ethnic motifs, with the Miao buffalo motif being chosen. This chapter details the entire design process from initial research, motif selection and transformation, and prototype creation, to improvement.

The design requirements and market demands were analyzed in the initial research phase. Following this, the historical and cultural background of the Miao motifs was studied and then chosen and studied about the Miao buffalo motif. The buffalo motif was simplified and adapted to fit contemporary seating design. 3D models were created using 3D modeling software, and the prototype was produced through 3D printing, CNC, and handcrafting methods. The prototype was tested, and feedback and results were gathered.

Through detailed steps and visual displays, Chapter Five helps readers understand each stage of the design process and provides practical design techniques and inspiration.

6.1 Further research

Although this study provides designers with a systematic set of design guidelines to help them incorporate ethnic motifs into contemporary design and use technology to improve design efficiency and accuracy, there are still some areas that deserve further exploration.

First, this study mainly focuses on furniture design and home decoration, and in the future, it can be expanded to other design fields, such as architectural design, urban planning, and

interaction design, to explore the potential and challenges of ethnic motifs in more application scenarios.

With the continuous advancement of technology, new digital tools and manufacturing technologies are emerging. Future research can explore the potential of these new technologies in the redesign and application of traditional motifs, such as the application of virtual reality (VR), augmented reality (AR) and artificial intelligence (AI) in the design process. At the same time, this study mainly focuses on the design process. In the future, field research and market testing can be used to collect user experience and market feedback to evaluate the practical effect and application value of the design guidelines and further optimize the design method.

These further research directions can deepen the understanding and practice of the application of ethnic motifs in contemporary design, promote design diversity and cultural exchange, and promote cultural heritage and innovation on a global scale.

REFERENCES

121clicks. (n.d.). Metal coil animal sculptures by Lee Sangsoo [Photograph]. Retrieved from https://121clicks.com/art/metal-coil-animal-sculptures-lee-sangsoo

Adobe Stock. (n.d.). Scandinavian folk art [Photograph]. Retrieved from https://stock.adobe.com/search/images?k=scandinavian+folk+art&asset_id=434084426

All About Birds. (n.d.). Snowy Owl [Photograph]. Retrieved from https://www.allaboutbirds.org/guide/Snowy_Owl/id#

Apple. (2016). MacBook series [Photograph]. https://support.apple.com/en-us/103257

Apple. (n.d.). Apple Watch [Photograph]. Retrieved from https://www.apple.com/shop/buy-watch/apple-watch

Auger, D. (2016). *The Kazaks of Istanbul: A Case of Social Cohesion, Economic Breakdown and the Search for a Moral Economy*. Dissertations and Theses. https://doi.org/10.15760/etd.2752

Benna, C. (2009, May 8). What Is the Definition of Contemporary Design? *Hunker*. https://www.hunker.com/13411166/what-is-the-definition-of-contemporary-design

British Museum. (n.d.). Fuji Wave compact umbrella [Photograph]. Retrieved from https://www.britishmuseumshoponline.org/fuji-wave-compact-umbrella.html?_gl=1*172k7t1*_up*MQ..*_ga*MTQ2NDcwODEyNC4xNzA5NDg0Njk3*_ga_JHR77E3EZ1*MTcxMTA0NjA0NC4xLjEuMTcxMTA0NjY2Ny4wLjAuMA..*_ga_08TLB9R8X1*MTcxMTA0NjAzNy4zLjEuMTcxMTA0NjY2Ny4wLjAuMA..

British Museum. (n.d.). The Great Wave Tote Bag [Photograph]. Retrieved from https://www.britishmuseumshoponline.org/fuji-wave-packable-bag-british-museum-

exclusive.html?_gl=1*1p58s9s*_up*MQ..*_ga*NjcxOTA1NjgzLjE3MTE2NjAzNjU.*_ga_JHR77E3EZ1*MTcxMTY2MDM2NC4xLjEuMTcxMTY2MDQ0OC4wLjAuMA..*_ga_08TLB9R8X1*MTcxMTY2MDM2NC4xLjEuMTcxMTY2MDQ0OC4wLjAuMA..

British Museum Shop. (n.d.). *Gayer-Anderson cat statue replica*. British Museum. https://www.britishmuseumshoponline.org/gayer-anderson-cat-statue-replica.html

British Museum. (n.d.). Rosetta Stone USB memory stick [Photograph]. Retrieved from https://www.britishmuseumshoponline.org/rosetta-stone-usb-memory-stick-16gb.html?_gl=1*slzopn*_up*MQ..*_ga*MTQ2NDcwODEyNC4xNzA5NDg0Njk3*_ga_JHR77E3EZ1*MTcxMTY1NzQ1OS4xLjEuMTcxMTY1NzQ3OS4wLjAuMA..*_ga_08TLB9R8X1*MTcxMTY1NzQ1NS43LjEuMTcxMTY1NzQ3OS4zNi4wLjA.

British Museum. (n.d.). *The Gayer-Anderson cat*. British Museum. https://www.britishmuseum.org/collection/animals/gayer-anderson-cat

Catmega. (n.d.). Anderson Cat Weather Forecast Bottle [Photograph]. Retrieved from https://www.catmega.com/products/anderson-cat-weather-forecast-bottle?variant=1000010054251889

Cekić, N. (2017). DETOX TECHNOLOGY IN NEW ARCHITECTURE BUILDINGS. Contemporary Materials, 8(1). https://doi.org/10.7251/COMEN1701059C

China Pavilion at Shanghai World Expo. (2010) [Photograph]. Retrieved from https://www.gov.cn/ztzl/shsbh/content_875854.htm

Choi, G. S., Oehlmann, R., & Cottington, D. (2008). Free Association Versus Recognition: Sensitivity for Chance Discovery in Cross-Cultural Color Design. In I. Lovrek, R. J. Howlett, & L. C. Jain (Eds.), *Knowledge-Based Intelligent Information and Engineering Systems* (pp. 727–733). Springer. https://doi.org/10.1007/978-3-540-85565-1_90

Dezeen. (2021, October 1). UAE Pavilion at Dubai Expo 2020 by Santiago Calatrava. Retrieved from https://www.dezeen.com/2021/10/01/uae-pavilion-dubai-expo-2020-santiago-calatrava/

Dong, H., Liang, X., Liu, Y., & Wang, D. (2022). 5G Virtual Reality in the Design and Dissemination of Contemporary Urban Image System under the Background of Big Data. *Wireless Communications and Mobile Computing*, 2022, e8430186. https://doi.org/10.1155/2022/8430186

Etsy. (n.d.). Chinese tribal Miao minority hand embroidered panel from Guizhou Province, SW China [Photograph]. Retrieved from https://www.etsy.com/listing/628073746/chinese-tribal-miao-minority-hand

Etsy. (n.d.). Scandinavian mug: Hygge floral folk art [Photograph]. Retrieved from https://www.etsy.com/listing/1677318608/scandinavian-mug-hygge-floral-folk-art?ga_order=most_relevant&ga_search_type=all&ga_view_type=gallery&ga_search_query=Scandinavian+Style+Mug&ref=sr_gallery-1-35&pro=1&sts=1&content_source=c3c52ca022bbaf90f26feed5eb4fe0118d95bf4a%253A1677318608&organic_search_click=1

Etsy. (n.d.). Viking mug: Viking coffee cup, Nordic mug [Photograph]. Retrieved from https://www.etsy.com/listing/1099773817/viking-mug-viking-coffee-cup-nordic-mug

Fan, R. (2019). Research on the Expression Tendency of Minimalism in Logo Design Under the Influence of Contemporary Aesthetic Trends. 756–759. *Proceedings of the Second International Conference on Comtemporary Education, Social Sciences, and Ecological Studies (CESSES 2019)*. https://doi.org/10.2991/cesses-19.2019.171

Friedman, A. T. (2017). American Glamour 2.0: Architecture, spectacle, and social media. *Consumption Markets & Culture*, *20*(6), 575–584. https://doi.org/10.1080/10253866.2017.1316349

Goguen, K. (2012). *The influence of color on purchasing decisions related to product design.* (p.5) Theses. https://repository.rit.edu/theses/6103

Grain and Frame. (n.d.). Natural industrial dining set [Photograph]. Retrieved from https://www.grainandframe.com/kitchen-and-dining-sets/nautral-industrial-dining-set/

Guangdong Rosewood Association. (n.d.). Traditional Chinese armchair [Photograph]. Retrieved from http://www.gdrosewood.com/wapNews.asp?dataID=662

Guo, X. (2023). Exploring the innovative application of traditional motifs in the design of cultural and creative products. *Frontiers in Art Research, 5*(5), 85-90. https://doi.org/10.25236/FAR.2023.050515

Hhlloo. (n.d.). Expo 2020 Dubai Japan Pavilion [Photograph]. Retrieved from https://www.hhlloo.com/a/Expo-2020-Dubai-Japan-Pavilion.html

Hidayat, J., Tjakra, G., Darmawan, R., & Dharmawan, C. (2020). *Hybrid Design Model in Cross Cultural Collaboration: Case Study - Contemporary Bamboo-Ceramic-Batik-Silver Crafts Made by Indonesian and Japanese Artists. 394–399*. https://www.scitepress.org/Link.aspx?doi=10.5220/0008885703940399

Hindsley, P., McEvoy, D. M., & Morgan, O. A. (2020). Consumer Demand for Ethical Products and the Role of Cultural Worldviews: The Case of Direct-Trade Coffee. *Ecological Economics, 177*, 106776. https://doi.org/10.1016/j.ecolecon.2020.106776

Huang, J., & Tong, L. (2022). Analysis of Dunhuang fresco elements in contemporary illustration design research. *BCP Social Sciences & Humanities, 18*, 306–309. https://doi.org/10.54691/bcpssh.v18i.1000

Jebens-Zirkel Imm, P., & Zirkel Zirkel, A. J. (2022). Casa Nautilus Solar – Organic contemporary Architecture based on Vernacular Heritage. *Proceedings HERITAGE 2022 - International Conference on Vernacular Heritage: Culture, People and Sustainability*, 1–6. https://doi.org/10.4995/HERITAGE2022.2022.14420

Jefferson, Q.-F., Alejandro, V.-A., Wilmer, L.-C., & Vanessa, G.-P. (2022). Technological Tools for Knowledge Apprehension and Promotion in the Cultural and Heritage Tourism Sector: Systematic Literature Review. *Human Behavior and Emerging Technologies*, *e2851044.* https://doi.org/10.1155/2022/2851044

Jin, P., & Liu, Y. (2022). Fluid space: Digitisation of cultural heritage and its media dissemination. *Telematics and Informatics Reports*, 8, 100022. https://doi.org/10.1016/j.teler.2022.100022

Kantaros, A., Ganetsos, T., & Petrescu, F. I. T. (2023). Three-Dimensional Printing and 3D Scanning: Emerging Technologies Exhibiting High Potential in the Field of Cultural Heritage. *Applied Sciences*, *13*(8), Article 8. https://doi.org/10.3390/app13084777

Lee, S. H., Han, D. B., & Nayga Jr., R. M. (2014). Cultural inflow effects on Japanese import demand for consumer products: Importance of halo effects. *Journal of the Asia Pacific Economy, 19*(3), 506–521. https://doi.org/10.1080/13547860.2014.908534

Li, Z., & Pan, X. (2018). Research on CMF Design and Charging Method in Smartphone—Centered on iPhone. *2018 2nd International Conference on Systems, Computing, and*

Applications (SYSTCA 2018). 2018 2nd International Conference on Systems, Computing, and Applications. https://doi.org/10.25236/systca.18.027

Light ZOOM Lumière. (n.d.). Pyramide du Louvre de Ieoh Ming Pei: Hommage à l'architecte [Photograph]. Retrieved from https://www.lightzoomlumiere.fr/realisation/pyramide-du-louvre-de-ieoh-ming-pei-hommage-a-larchitecte/

Liu, W., Zhao, Y., Wang, G., & Yang, L. (2023). Exploration of AI aided design path for graphic designers. *Ergonomics In Design*, *77*(77). https://doi.org/10.54941/ahfe1003386

Live Science. (n.d.). Pyramids of Giza and the Sphinx [Photograph]. Retrieved from https://www.livescience.com/22621-pyramids-giza-sphinx.html

Lucia, T., & Sara, T. (2019, April 3). *W*e Bet You Didn't Know These Differences Between Modern and Contemporary Design. *ELLE Decor*. https://www.elledecor.com/design-decorate/trends/a13098062/contemporary-vs-design/

Majid, A., & Dina, W. (2023). Cultural Studies and Symbolism of Tapis Cloth Motifs in the Culture of Lampung People. *Enigma in Cultural, 1*(1), Article 1. https://doi.org/10.61996/cultural.v1i1.16

Marion, T. J., & Fixson, S. K. (2021). The Transformation of the Innovation Process: How Digital Tools are Changing Work, Collaboration, and Organizations in New Product Development. *Journal of Product Innovation Management, 38*(1), 192–215. https://doi.org/10.1111/jpim.12547

Mashable. (n.d.). Saudi Arabia observed World Migratory Bird Day with a focus on protection of endangered bird species [Photograph]. Retrieved from https://me.mashable.com/culture/13904/saudi-arabia-observed-world-migratory-bird-day-with-a-focus-on-protection-of-endangered-bird-species

Maslak, V. (2023). Ethnic motifs in contemporary packaging typeface design. *Humanities Science Current Issues, 2*(70), 66–73. https://doi.org/10.24919/2308-4863/70-2-8

Milošević, M., Lukić, D., Đurđev, M., & Vukman, J. (2020). Digital Transformation of Manufacturing Towards Industry 4.0 Concept. IOP Conference Series: *Materials Science and Engineering, 749*(1), 012019. https://doi.org/10.1088/1757-899X/749/1/012019

Minnakhmetova, R., Usenyuk-Kravchuk, S., & Konkova, Y. (2019). A context-sensitive approach to the use of traditional ornament in contemporary design practice (with reference to Western Siberian Ethnic Ornaments). *Special Issue on Artice Arts Summit, 2019* (1), 49–62. https://doi.org/10.54916/rae.119273

Motruk, Y. (2019). Ecological approach in the design of spaces of minimalism. V*estnik MGSU, 14*(11), 1408–1417. https://doi.org/10.22227/1997-0935.2019.11.1408-1417

Nekhvyadovich, L. (2013). Ethnic Origins of Art as Urgent Problem of Art Studies. https://www.semanticscholar.org/paper/Ethnic-Origins-of-Art-as-Urgent-Problem-of-Art-Nekhvyadovich/b2d1f83b89fba553ea65ddbcb415dd5824692ffe

Olympic Museum. (2008). Olympic Games torch - 2008 Beijing. Retrieved from https://www.olympic-museum.de/torches/olympic-games-torch-2008.php

Pinterest. (n.d.) Chinese arched structure. [Photograph]. Retrieved from https://www.pinterest.com/pin/676243700321160047/

Ruan, M. (2023). Analysis of Contemporary Design and Future Trends. *Design*, *08*, 3286. https://doi.org/10.12677/Design.2023.84404

Segmehl, J. S. (2017). *Wood and wood-derived cellulose scaffolds for the preparation of multi-functional materials* [Doctoral Thesis, ETH Zurich]. https://doi.org/10.3929/ethz-b-000230544

Shu, W., & Sun, F. (2020). On the Integration and Innovation of Huizhou Woodcarving in the Design of Modern Cultural and Creative Products. *E3S Web of Conferences, 179*, 02078. https://doi.org/10.1051/e3sconf/202017902078

Silva, D., Paio, A., & Sousa, J. P. (2019). *Reprogramming practice: Revising design thinking through digital fabrication.* 37th Conference on Education and Research in Computer Aided Architectural Design in Europe, *1*, 379–386. https://ciencia.iscte-iul.pt/publications/reprogramming-practice-revising-design-thinking-through-digital-fabrication/60904

Sivasankar, A. (2020). *Global migration and multicultural environments: Integrating design systems to facilitate cultural hybridization.*Theses and Dissertations. https://doi.org/10.31274/etd-20200624-218

Skarlatos, D., Agrafiotis, P., Balogh, T., Bruno, F., Castro, F., Petriaggi, B. D., Demesticha, S., Doulamis, A., Drap, P., Georgopoulos, A., Kikillos, F., Kyriakidis, P., Liarokapis, F., Poullis, C., & Rizvic, S. (2016). Project iMARECULTURE: Advanced VR, iMmersive Serious Games and Augmented REality as Tools to Raise Awareness and Access to European Underwater CULTURal heritagE. In M. Ioannides, E. Fink, A. Moropoulou, M. Hagedorn-Saupe, A. Fresa, G. Liestøl, V. Rajcic, & P. Grussenmeyer (Eds.), *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection* (pp. 805–813). Springer International Publishing. https://doi.org/10.1007/978-3-319-48496-9_64

Sohomod. (n.d.). Butterfly chair by Santo Jean Ya [Photograph]. Retrieved from https://www.sohomod.com/blog/butterfly-chair-by-santo-jean-ya/

Tawfiq, M. J., & Muhammad, R. R. (2021). The Product of Formal Innovation in Contemporary Interior Design Techniques. J*ournal of Techniques, 3*(3), Article 3. (p.1) https://doi.org/10.51173/jt.v3i3.393

Theakston, A. (n.d.). Ceramic sculpture [Photograph]. Retrieved from https://www.anthonytheakstonceramics.co.uk/ceramic-sculpture?lightbox=dataItem-ll6mf1w0

TrendHunter. (n.d.). Yezo cabin [Photograph]. Retrieved from https://www.trendhunter.com/amp/trends/yezo-cabin

Twentytwentyone. (n.d.). Hans Wegner PP503 The Round Chair [Photograph]. Retrieved from https://www.twentytwentyone.com/products/pp-mobler-hans-wegner-pp503-the-round-chair

UNESCO. (2019). *International trade in cultural goods.* UIS. http://data.uis.unesco.org/Iindex/aspx?DataSetCoe=CTRD_DS#

UNESCO. (2022). Reshaping Policies for Creativity Report: Addressing culture as a global public good. UNESDOC Digital Library. https://unesdoc.unesco.org/ark:/48223/pf0000380474

Vanka, S., & Klein, D. (1995). Colortool: An Information Tool for Cross Cultural Design. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, *39*(5), 341–345. https://doi.org/10.1177/154193129503900510

Wiśnicka, A. (2018). Design w kontekście zrównoważonego rozwoju i ergonomii – projekty Simo Heikkilä. *Artifex Novus, 2*, 102–123. https://doi.org/10.21697/an.7831

Xiong, L. (2021). Research on the Application of Cultural and Creative Products Based on the Pattern Design of Qiang Culture. *Proceedings of the 6th International Conference on Arts, Design, and Contemporary Education (ICADCE 2020)*, 538–542. https://doi.org/10.2991/assehr.k.210106.105

Xu, H., Zhang, Y., Lu, Z., & Chen, H. (2022). Cross-domain migration design of Yi lacquerware patterns on leather bags based on digital technology. *International Conference on Advanced Manufacturing Technology and Manufacturing Systems (ICAMTMS 2022)*, 12309, 324–330. https://doi.org/10.1117/12.2645763

Yu, Q., Vongphantuset, J., Geng, S., & Wang, Y. (2023). Creative application of Yao ethnic festival portraits in Souvenir design. *Asian Journal of Arts and Culture, 23*(1), Article 1. https://doi.org/10.48048/ajac.2023.260962

Zeng, J., & Wang, L. (2018). A Brief Analysis on the Chinese Influence of the Nordic Chair Furniture. 2*018 3rd International Social Sciences and Education Conference (ISSEC 2018). 2018 3rd International Social Sciences and Education Conference.* https://doi.org/10.25236/issec.2018.093

Zhao, X., & Ghazali, M. M. B. M. (2023). The Development for Artistic Symbol of Chinese Tradition in Contemporary Decoration Design. *Art and Performance Letters*, *4*(9), 47–52. https://doi.org/10.23977/artpl.2023.040909

Zheng, X. (2017). Guarantee Mechanism of Government Support Funds for the Supply of Public Cultural Products. *Proceedings of the 2017 2nd International Conference on Education Sports, Arts, and Management Engineering (ICESAME 2017),* 40–43. https://doi.org/10.2991/icesame-17.2017.10

Zhou, S. (2007). Application of Digital Colors in Contemporary Product Design. *Art and Design.* https://www.semanticscholar.org/paper/Application-of-Digital-Colors-in-Contemporary-Shunfe/4588a20e648786daeb15e855b1f3d26911ec9e13

Zhou, Y., Tang, H., Gong, L., & Zhang, G. (2006). Digital technology and digital product design. *2006 7th International Conference on Computer-Aided Industrial Design and Conceptual Design*, 1–5. https://doi.org/10.1109/CAIDCD.2006.329422

Zhyvko, M. A., & Zastavnyy, A. R. (2023). Fragmentation of the Middle East: Social and economic aspects. *Regional Economy, 2*(108), 146–154. https://doi.org/10.36818/1562-0905-2023-2-15

Appendix A: Product Information Form

The purpose of this form is to systematically collect and organize the information obtained during product research to help designers in the subsequent design process.

Product:	What is the product that needs to be designed or redesigned? _____ _____
Typology:	What type of product is this? (Choose as many as necessary) Utility Products: ☐ The main emphasis of these products is on functionality and utility. Entertainment Products: ☐ Products that primarily provide entertainment, recreation or gaming functions. Educational Products: ☐ Products designed to provide knowledge, skill learning or educational functions. Luxury Products: ☐ High-end, high-priced products that emphasize brand value, quality and uniqueness. Eco-friendly Products: ☐ Products that emphasize the concept of environmentally friendly, sustainable, or green living.
User Information:	Age: Age range of the target group _____ Gender: If the product is targeted at gender-specific users. _____ Revenue: Economic situation and consumption capacity of the target group _____ Context: The environment in which the product is used and how it is used. _____ _____ _____ _____ _____ _____

Similar Products:	Similar products in the market _____ _____ _____ _____ _____ _____ _____
Price Range:	Price range of existing products _____ _____
Common Materials:	What are the common materials for similar products available? _____ _____ _____
Common Colors:	What are the common colors for similar products available? _____ _____
Production:	What are the available production processes and manufacturing methods? _____ _____
Design Trends:	What are the design trends associated with the product? _____ _____ _____ _____
Product Related Standards	What are the design standards associated with the product? (safety standards, environmental standards, ADA standards, etc.) Depends on the product field. _____ _____ _____ _____ _____

Appendix B: Motif Information Form

The purpose of this form is to systematically collect and organize the information obtained during the motif research process to assist the designer in the subsequent design process.

Cultural Context:	What is the basic information about ethnic groups and their common motifs? _____
Motif:	What is the chosen motif? _____
Origin:	What is the origin of the motif? _____ _____
Semantics:	What is the meaning of this motif in the culture that it belongs to and the story behind it? What is the story behind it? _____ _____
Application:	What is this motif for? (multiple choice) Decorative: ☐Acts to beautify and decorate objects, spaces, etc. Signage: ☐Labeling of specific information, social identity, ethnic affiliation, etc. Functional: ☐With specific utility functions. Ceremonial: ☐Related to religious beliefs. Artistic:☐ Artistic and aesthetic value.
Usage Scenarios:	What are common usage scenarios for the motif? _____ _____
Limits:	What are the limitations on the use of these motifs? _____ _____ _____
Material:	Document the materials traditionally used in motifs, including but not limited to textiles, metals, wood, ceramics, and more. _____ _____
Material Semantics:	Is the motif affected by the material? Yes ☐ No ☐ If yes, what are the semantics of this motif's Material? _____ _____

Texture:	Does the motif have texture? Yes ☐ No ☐ If yes, what are the textures? _____ _____
Color:	Does the motif have color? Yes ☐ No ☐ If yes, what is the color? _____ _____ If yes, please complete the next research selection.
Color Semantics:	Is the motif affected by the color? Yes ☐ No ☐ If yes, what are the semantics of this motif's color? _____ _____ _____
Composition of motifs:	What elements make up this motif? _____ _____ _____ Which are the subjects of its semantics? _____ _____ _____ Which are the decorative elements? _____ _____ _____
Market cases:	Examples of relevant motif applications in the existing market, including but not limited to the fashion industry, interior design, product packaging or other areas.

Appendix C: Suggestion form one

Product Type	Types of Motifs	Purpose of Applying Motifs
Utility Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Used to reinforce brand identity by incorporating motifs with a specific social or ethnic identity to strengthen the brand image of a product.
	Functional ☒	Enhancing product interactions through specific cultural connections.
	Ceremonial ☐	
	Artistic ☐	
Entertainment Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Reinforce users' cultural identification with the product, especially in travel gear, and convey the cultural characteristics of a specific region through ethnic motifs.
	Functional ☒	Enhancing product interactions through specific cultural connections.
	Ceremonial ☐	
	Artistic ☒	Enhance the aesthetic value of the product and the user's visual experience.
Educational Products	Decorative ☐	
	Signage ☒	Convey a specific social message or educational meaning that reinforces the cultural context of the educational content.
	Functional ☒	Enhancing product interactions through specific cultural connections.
	Ceremonial ☒	Teaching specific cultural or religious knowledge.
	Artistic ☒	Increasing the attractiveness of educational products.
Luxury Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Reinforce the brand image and the unique identity of the product.
	Functional ☐	
	Ceremonial ☐	
	Artistic ☒	Enhance the uniqueness and artistic appreciation value of the product.
Eco-friendly Products	Decorative ☒	Beautify the appearance of the product to make it more attractive.
	Signage ☒	Labeling products with environmental attributes and sustainability features.
	Functional ☒	Reinforce the environmental message of the product.
	Ceremonial ☐	
	Artistic ☐	

Appendix D: Suggestion form two

Types of Motifs	Characteristic	Application
Decorative	It is used to beautify and decorate objects or spaces with a strong visual appeal.	Direct Use
		De-complex
		Abstraction
		Imagery Integration
Signage	Used to identify specific information, social identity, ethnic affiliation, etc.	Direct Use
		De-complex
		Abstraction
		Imagery Integration
Functional	With specific utility functions that are not just for aesthetics.	Direct Use
		De-complex
		Abstraction
		Imagery Integration
Ceremonial	Associated with religious beliefs, ceremonial activities, or specific cultural practices, it has a certain sense of sacredness or ritual.	Direct Use
		De-complex
		Abstraction
		Imagery Integration
Artistic	Emphasizing artistry and aesthetic value, it has a unique creative style and aesthetic concept.	Direct Use
		De-complex
		Abstraction
		Imagery Integration

Appendix E: Assessment Suggestion Form

Visual effect:	Is the overall visual effect of the motif in the product aesthetically pleasing and in harmony with the overall design style of the product? **Yes** ☐ **No** ☐ Is the recognizability of the motif in the design acceptable? **Yes** ☐ **No** ☐
Cultural accuracy:	Does the motif retain its original cultural characteristics and symbolism and correctly represent the culture to which it belongs? **Yes** ☐ **No** ☐ Does the use of the motif avoid cultural misuse and ensure that it does not cause cultural misunderstanding or offense? (Compare the limits in the motif information form.) **Yes** ☐ **No** ☐
Functionality:	Does the use of the motif affect the basic function and user experience of the product? **Yes** ☐ **No** ☐ Is the motif durable in actual use? **Yes** ☐ **No** ☐
User experience:	Is the target user group positive about the ethnic motifs in the product design? **Yes** ☐ **No** ☐ Do users from the cultural background of the ethnic group think that the design respects and appropriately displays their culture? **Yes** ☐ **No** ☐
Technical feasibility and production feasibility:	Is the motif feasible to realize in practice? **Yes** ☐ **No** ☐ Is the use of the motif feasible in terms of cost control? **Yes** ☐ **No** ☐
Contemporary design evaluation:	Does the product fit into the contemporary design trend? ● Neutral Colors ☐ ● Material Combination ☐ ● Organic Shapes ☐ ● Minimalism ☐ ● Mixing of Cultures ☐
Weaknesses:	