



Manchu embroidery identity, Changchun, Jilin province: Application in Furniture
Design in Modern Chinese Context

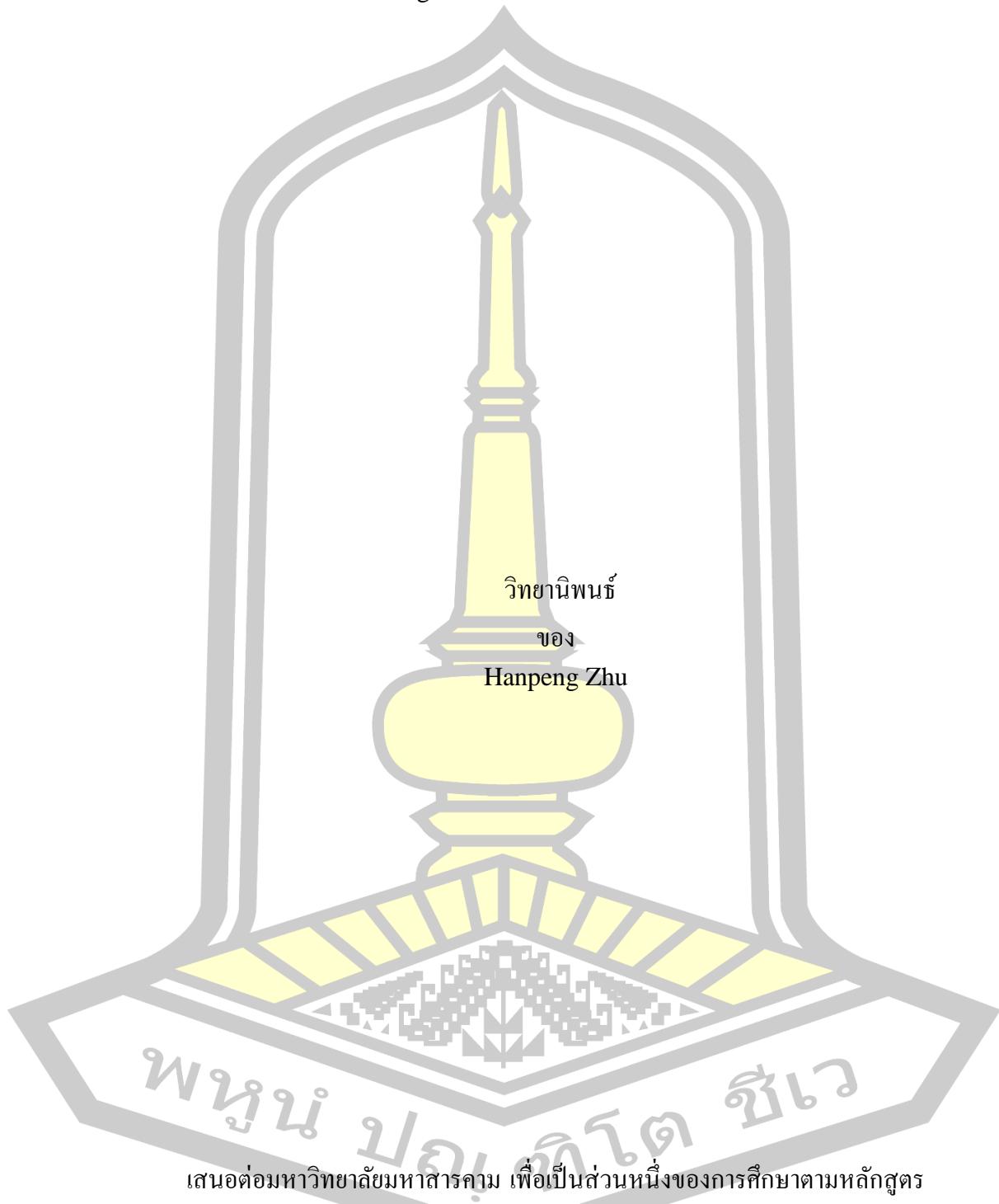
Hanpeng Zhu

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Master of Arts in Fine and Applied Arts Research and Creation

June 2024

Copyright of Mahasarakham University

Manchu embroidery identity, Changchun, Jilin province: Application in Furniture Design in Modern Chinese Context

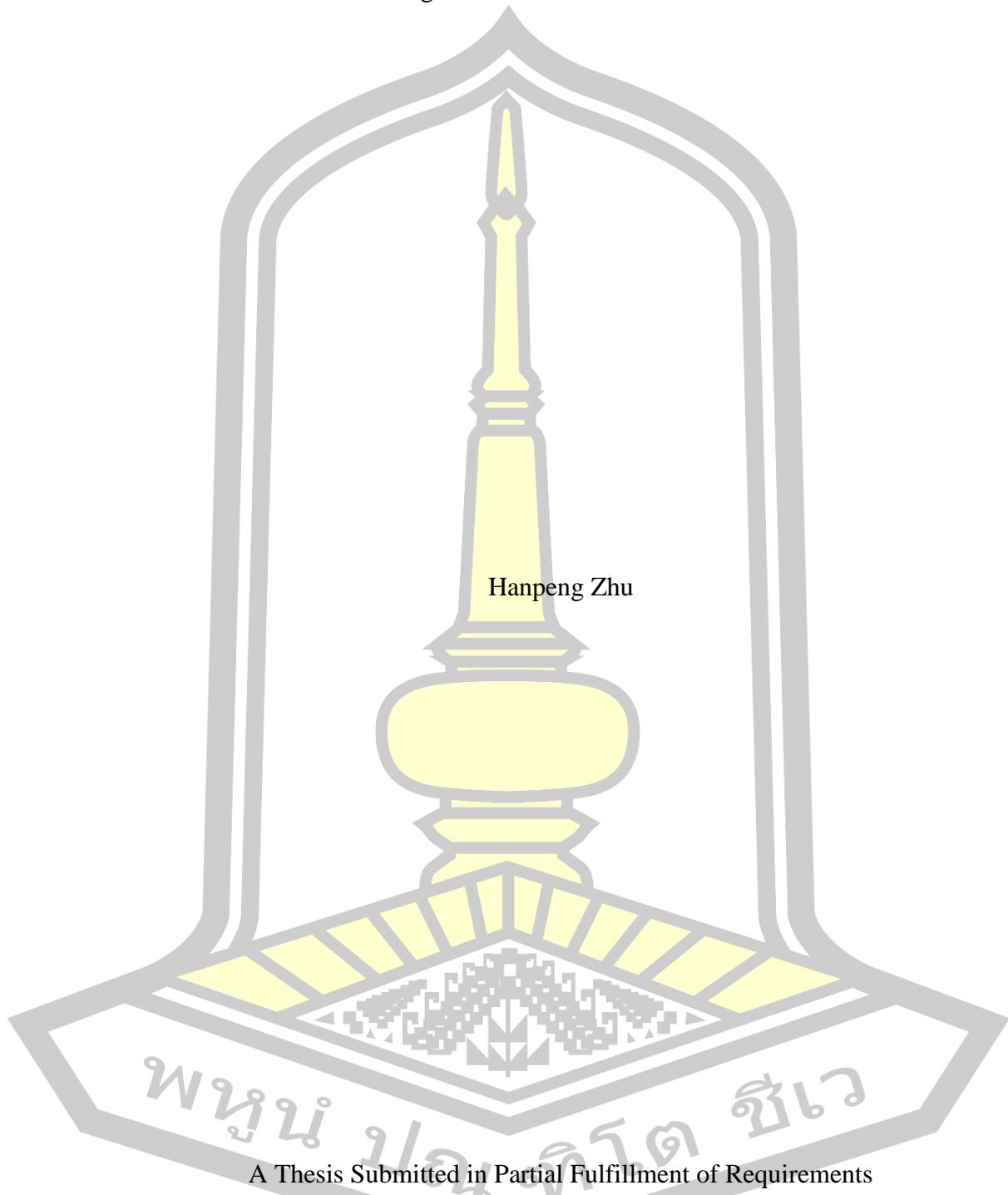


เสนอต่อมหาวิทยาลัยมหาสารคาม เพื่อเป็นส่วนหนึ่งของการศึกษาตามหลักสูตร
ปริญญาศิลปศาสตรมหาบัณฑิต สาขาวิชาการวิจัยและสร้างสรรค์ศิลปกรรมศาสตร์

มิถุนายน 2567

ลิขสิทธิ์เป็นของมหาวิทยาลัยมหาสารคาม

Manchu embroidery identity, Changchun, Jilin province: Application in Furniture
Design in Modern Chinese Context



A Thesis Submitted in Partial Fulfillment of Requirements
for Master of Arts (Fine and Applied Arts Research and Creation)

June 2024

Copyright of Mahasarakham University



The examining committee has unanimously approved this Thesis, submitted by Mr. Hanpeng Zhu , as a partial fulfillment of the requirements for the Master of Arts Fine and Applied Arts Research and Creation at Mahasarakham University

Examining Committee

Chairman

(Asst. Prof. Songwit Pimpakun ,
Ph.D.)

Advisor

(Assoc. Prof. Prathabjai Suwanthada
, Ph.D.)

Committee

(Assoc. Prof. Arkom Sa-
Ngiamviboon , Ph.D.)

Committee

(Assoc. Prof. Sakchai Sikka , Ph.D.)

Mahasarakham University has granted approval to accept this Thesis as a partial fulfillment of the requirements for the Master of Arts Fine and Applied Arts Research and Creation

(Asst. Prof. Peera Phanlukthao , Ph.D.)
Dean of Faculty of Fine - Applied Arts
and Cultural Science

(Assoc. Prof. Krit Chaimoon , Ph.D.)
Dean of Graduate School

TITLE	Manchu embroidery identity, Changchun, Jilin province: Application in Furniture Design in Modern Chinese Context		
AUTHOR	Hanpeng Zhu		
ADVISORS	Associate Professor Prathabjai Suwanthada , Ph.D.		
DEGREE	Master of Arts	MAJOR	Fine and Applied Arts Research and Creation
UNIVERSITY	Mahasarakham University	YEAR	2024

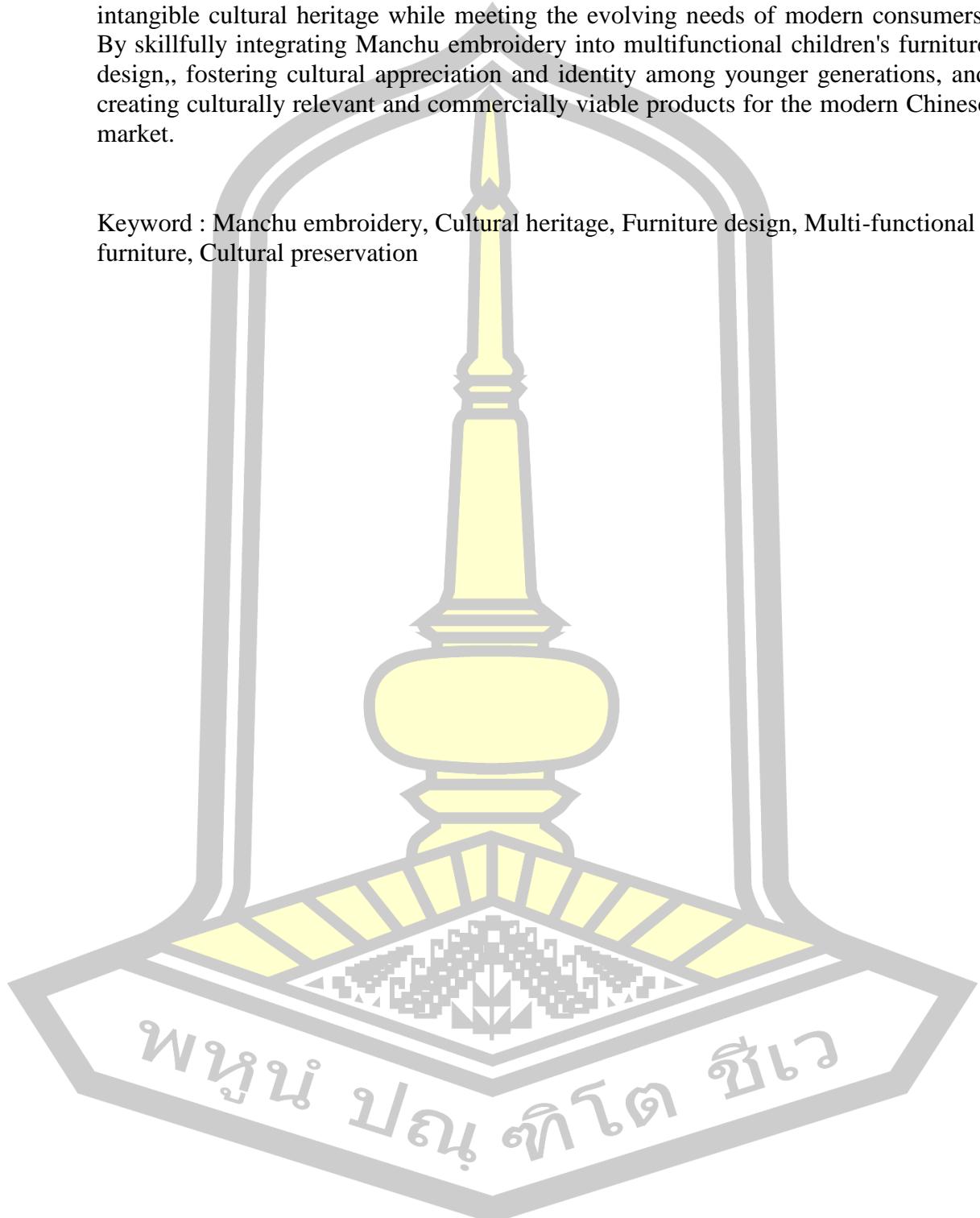
ABSTRACT

This qualitative research aims to explore the application of Manchu embroidery identity in multifunctional children's furniture design within the modern Chinese context. The study focuses on three main objectives: (1) to study the history and social value of the intangible cultural heritage of Manchu embroidery and the history and development of children's furniture; (2) to analyze the uniqueness of Manchu embroidery in Changchun, Jilin Province, and investigate the marketing landscape, consumer behavior, and needs; and (3) to apply the findings in the design of multipurpose children's furniture in the modern Chinese context. The population and samples used in this study include Manchu embroiderers, furniture manufacturers, furniture design experts, and parents with children aged 6-10 years. Purposive sampling was employed, and the instruments used in the study were surveys, observations, focus groups, and questionnaires. The statistical data used were the mean and standard deviation.

The research results reveal that Manchu embroidery possesses a rich cultural heritage and distinctive artistic features, such as intricate motifs, vibrant colors, and symbolic meanings, which can be effectively incorporated into contemporary furniture design to preserve and promote this traditional craft. The study also identifies key consumer preferences and market demands for culturally-inspired, multifunctional children's furniture, with parents prioritizing safety, durability, and functionality, while appreciating the incorporation of cultural elements that foster identity and appreciation for traditional craftsmanship. Children, in contrast, are drawn to visually engaging, interactive, and adaptable furniture pieces. Guided by these insights, the researcher conceptualizes and develops six innovative furniture designs that seamlessly integrate Manchu embroidery elements. These designs are further refined through expert consultations with Manchu embroidery inheritor Li Yulan and furniture design expert Associate Professor Guo Sen, as well as user feedback from potential customers. The final designs are evaluated by 100 target consumers, with three products receiving high satisfaction ratings: a removable tiger child chair, bookshelf table and chair combination furniture, and transformable children's table and chair furniture. These products demonstrate strong market potential and alignment with consumer preferences. The study illustrates the potential

for design-driven research to bridge the gap between traditional craftsmanship and contemporary product innovation, contributing to the preservation and promotion of intangible cultural heritage while meeting the evolving needs of modern consumers. By skillfully integrating Manchu embroidery into multifunctional children's furniture design, fostering cultural appreciation and identity among younger generations, and creating culturally relevant and commercially viable products for the modern Chinese market.

Keyword : Manchu embroidery, Cultural heritage, Furniture design, Multi-functional furniture, Cultural preservation



ACKNOWLEDGEMENTS

The journey of pursuing my Master's degree at Mahasarakham University, Thailand, which began in 2022, has been an unforgettable experience filled with invaluable memories and the support of many remarkable individuals. As I reflect on the months spent collecting data, analyzing information, conducting research, and revising my thesis, I am reminded of the challenges and triumphs that have shaped my academic path. This journey has not only highlighted the vastness of knowledge yet to be explored but has also instilled in me a deep sense of respect and admiration for the professors, experts, and scholars who have guided me along the way.

First and foremost, I would like to express my heartfelt gratitude to my esteemed professor, Assoc. Prof. Dr. PHATHABJAI, for his invaluable guidance and unwavering support throughout the process of completing this thesis. Dr. PHATHABJAI's dedication and meticulous approach to mentorship have been instrumental in shaping my research. He has invested countless hours and immense effort in patiently guiding me through the challenges of thesis writing, from refining the format and framework to enhancing the content. His guidance has not only helped me to successfully complete this thesis but has also taught me the importance of gathering information from multiple sources, comparing and analyzing data, and appreciating the precision of academic language. I would also like to extend my gratitude to all the teachers who have contributed to my Master's degree education. Beyond imparting professional knowledge, they have placed great emphasis on cultivating strong habits and skills that will benefit me throughout my life. To all of you, I offer my most sincere thanks and profound respect.

Furthermore, I am deeply grateful for the incredible classmates I have had the privilege of meeting at Mahasarakham University. I would like to thank my department secretary, Ms. PB, who warmly welcomed us at the airport upon our arrival in Thailand, offering guidance and reassurance as we navigated the unfamiliar country. I am also thankful for my friends who assisted me in arranging accommodations, familiarizing me with the university environment, and helping me with various enrollment procedures, including introducing me to my department head. A special thanks goes to my roommate, Ms. Shi Wenjun, who has been a constant source of support and

encouragement throughout my studies, much like a family member. We have engaged in countless discussions about my thesis, helping me to refine and improve my work. I am also immensely grateful to my roommate Shi Wenjun, who has been a pillar of strength and motivation, pushing me to excel in my studies and providing valuable insights and suggestions for my thesis. The continuous exchange of ideas and mutual encouragement among my classmates has given me the courage and strength to persevere. I am truly thankful for the deep friendships forged through our shared experiences and the support we have provided one another during our Master's journey.

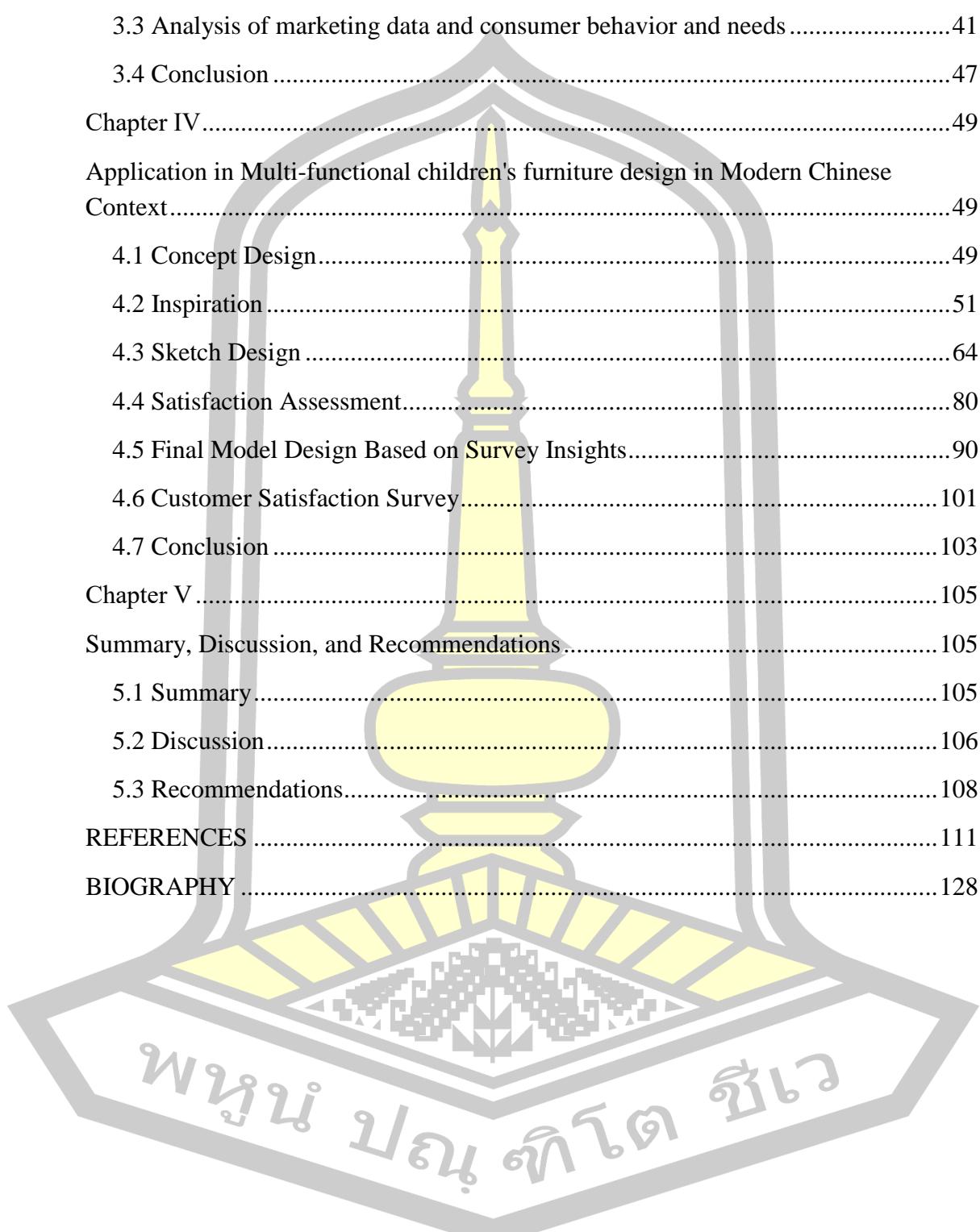
Last but not least, I am profoundly grateful to my family, who have been my unwavering support system, encouraging me and providing an optimal environment for my studies and personal growth. It is because of their belief in me that I have had the opportunity to pursue higher education, and their love and support have been the driving force behind my continuous progress.

In conclusion, I am deeply thankful for every encounter that has shaped my life, and I cherish each one of them. I am grateful for all the friends and family who have shown me genuine care and affection, and although I cannot mention each of them by name here, their kindness will forever be etched in my heart. Through the process of writing this thesis, I have come to recognize my own academic limitations, and while this thesis may be complete, my pursuit of knowledge is far from over. In the days to come, I will continue to strive to enhance and enrich my knowledge and experiences, redoubling my efforts in both work and study to achieve even greater accomplishments as a way of giving back to those who have supported me and to society as a whole. Once again, I express my deepest gratitude to everyone who has been a part of this journey, wishing them a lifetime of happiness and well-being.

Hanpeng Zhu

TABLE OF CONTENTS

	Page
ABSTRACT	D
ACKNOWLEDGEMENTS	F
TABLE OF CONTENTS	H
LIST OF FIGURES	J
Chapter I.....	1
Introduction.....	1
1.1 Background of Research.....	1
1.2 Research Objectives.....	3
1.3 Research Questions.....	3
1.4. Conceptual Framework.....	3
1.5. Definition of Terms	4
1.6. Scope of Research.....	5
1.7. Research Methodology	8
1.8. Research Presentation	9
CHAPTER II.....	10
Manchu embroidery and documents related to design	10
2.1 The artistic characteristics of Manchu embroidery culture	10
2.2 The Historical Development and Evolving Needs of Furniture	20
2.3 Principles of multifunctional furniture design	27
2.4 Concepts, Theories	32
2.5 Conclusion	33
Chapter III	34
Data Analysis for Design	34
3.1 Integrating Manchu Embroidery Color Characteristics with Children's Color Psychology	34



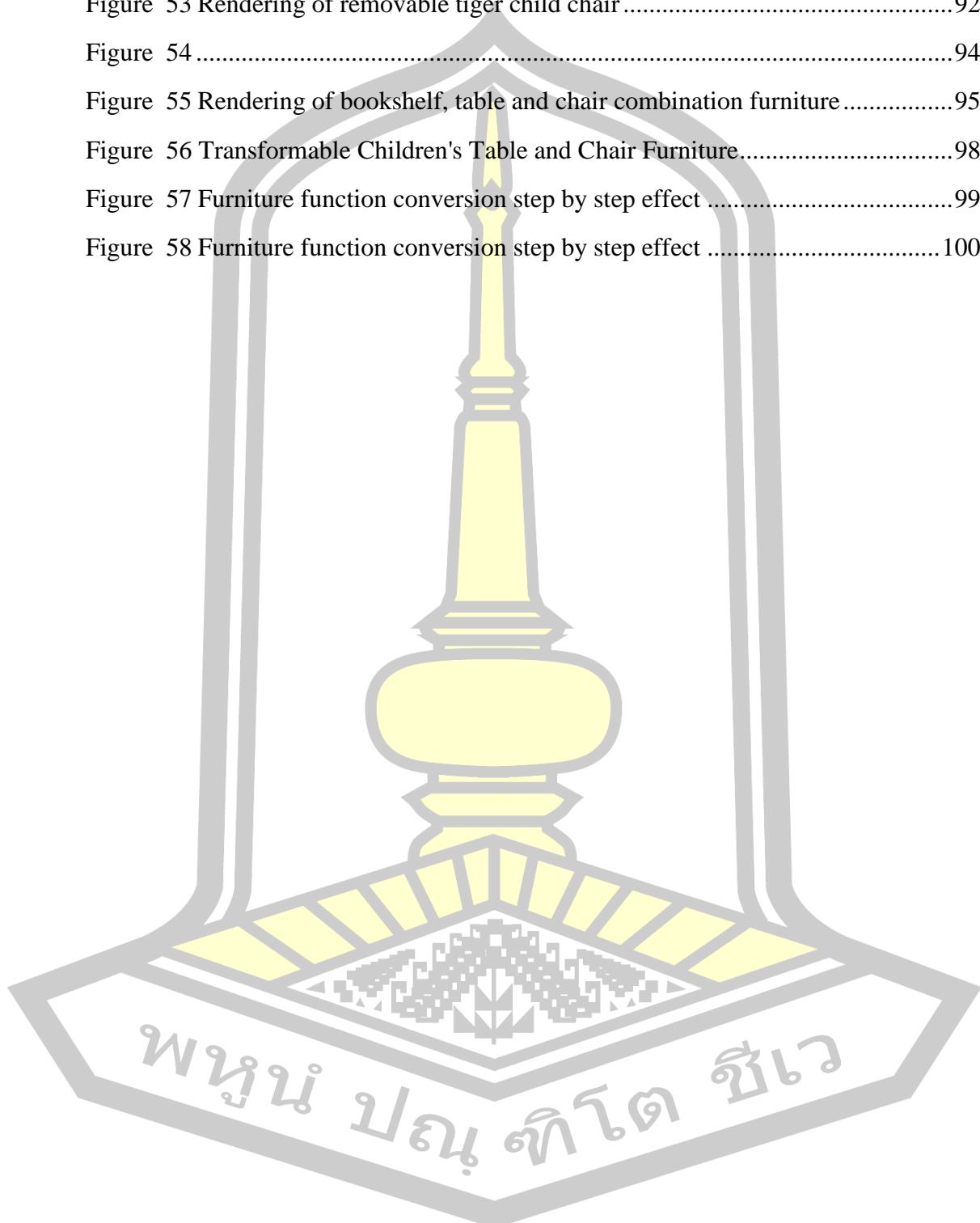
3.2 Manchu Embroidery Mood Board Design	39
3.3 Analysis of marketing data and consumer behavior and needs	41
3.4 Conclusion	47
Chapter IV	49
Application in Multi-functional children's furniture design in Modern Chinese Context	49
4.1 Concept Design	49
4.2 Inspiration	51
4.3 Sketch Design	64
4.4 Satisfaction Assessment	80
4.5 Final Model Design Based on Survey Insights	90
4.6 Customer Satisfaction Survey	101
4.7 Conclusion	103
Chapter V	105
Summary, Discussion, and Recommendations	105
5.1 Summary	105
5.2 Discussion	106
5.3 Recommendations	108
REFERENCES	111
BIOGRAPHY	128

LIST OF FIGURES

	Page
Figure 1 Geographic location of Northeast China	1
Figure 2 Li's Manchu Embroidery: Qing Dynasty Official Costume Embroidery, Traditional Manchu Embroidery Dragon Totem	2
Figure 3 Conceptual Framework	3
Figure 4	10
Figure 5 Manchu traditional dress	10
Figure 6 Manchu traditional dress	11
Figure 7 Manchu traditional dress	11
Figure 8 Manchu Traditional Graphics	12
Figure 9 Embroidery needles	13
Figure 10 All tools used in Manchu embroidery	14
Figure 11 Manchu embroidery needle techniques	16
Figure 12 Peacock feather embroidered cloud and dragon auspicious robe	17
Figure 13 Li's Manchu Embroidery in Garments	17
Figure 14 Li's Manchu Embroidery in Garments	18
Figure 15 Applications of Manchu embroidery tiger patterns: tiger head hats and tiger toys	19
Figure 16 The key anthropometric measurements relevant to furniture design for children aged 6-10.....	20
Figure 17 Adult size sofa for small children.....	21
Figure 18 A child using Montessori materials(furniture for children).....	22
Figure 19 Children's furniture market.....	23
Figure 20 An eco-friendly children's furniture product	26
Figure 21 The Application of Colors in Manchu Embroidery	35
Figure 22 Analysis of children's color preferences at different genders and ages	35
Figure 23 Color Language Analysis	37

Figure 24 Harmonizing Manchu Embroidery Colors with Children's Furniture Pattern Design: Color Selection and Application	38
Figure 25 Manchu Embroidery Mood Board Design	39
Figure 26 Positioning market analysis	46
Figure 27	51
Figure 28 artisans but also highlight the cultural significance of the tiger motif in Manchu tradition	52
Figure 29 Manchu Embroidery tiger head shoes	53
Figure 30 Extracted sketch of the tiger graphic in Manchu embroidery	54
Figure 31 Pixelated tiger facial feature design.....	54
Figure 32 Manchu Embroidery tiger ears graphic summarization	55
Figure 33 Manchu Embroidery tiger nose graphic summarization.....	56
Figure 34 Figure 35Manchu Embroidery tiger eyebrows graphic summarization	56
Figure 36 Manchu Embroidery tiger mouth graphic summarization.....	57
Figure 37 Manchu Embroidery tiger eyes graphic summarization.....	58
Figure 38 Design of tiger facial emotion expression	59
Figure 39 Facial features combination design	60
Figure 40 Multifunctional children's furniture sketch design	62
Figure 41 Conceptual drawing of a removable tiger child chair.....	64
Figure 42 Four views of the removable tiger child chair	65
Figure 43 Conceptual diagram of bookshelf table and chair combination furniture ..	67
Figure 44 Conceptual diagram of transformable children's table and chair furniture	69
Figure 45 Conceptual diagram of transformable children's table and chair furniture	71
Figure 46 Conceptual diagram of tiger rocking chair	73
Figure 47 Bunny bookcase.....	75
Figure 48 Chinese dragon bookshelf + combination chair	78
Figure 49 Ms. Li Yulan evaluation sheet.....	80
Figure 50 Associate Professor Guo Sen evaluation sheet.....	82
Figure 51 Market Research Questionnaire.....	85

Figure 52	91
Figure 53 Rendering of removable tiger child chair	92
Figure 54	94
Figure 55 Rendering of bookshelf, table and chair combination furniture	95
Figure 56 Transformable Children's Table and Chair Furniture.....	98
Figure 57 Furniture function conversion step by step effect	99
Figure 58 Furniture function conversion step by step effect	100



Chapter I

Introduction

1.1 Background of Research

Manchu embroidery is a quintessential representation of the Manchu ethnic minority's cultural and historical legacies, having originated over 100 years ago. As early as the Ming Dynasty, techniques for embroidering intricate motifs onto fabrics were becoming prevalent in regions inhabited by Manchu tribes (Jinzhou Prefecture Annals, 1968: 231). These tribes, including the Sushin, Donghu, and Jurchen peoples native to Northeast China for millennia, eventually underwent unification under the national Manchu identity from the 17th century onwards (Li, 1931: 78-79). The embroidery practices fostered within these communities thus became encoded with distinct nomadic traditions tied to Manchu lifestyles and belief systems.

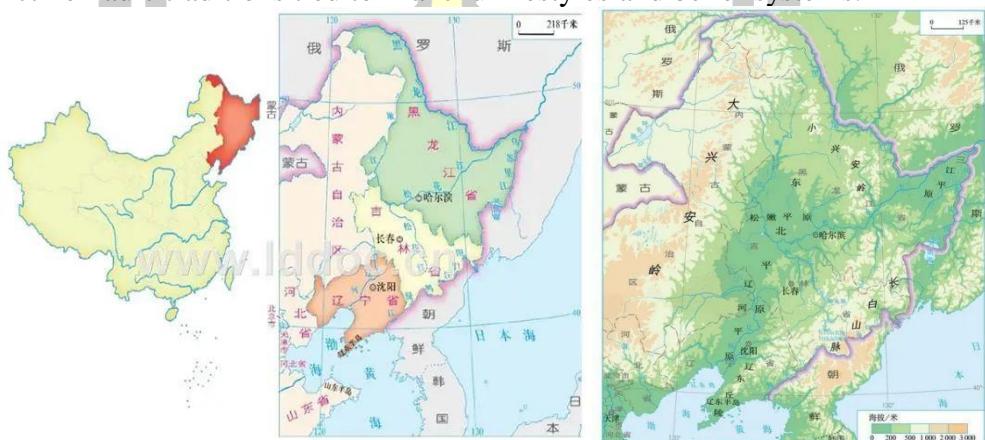


Figure 1 Geographic location of Northeast China
Source: Google map

Over generations of artistic refinement, Manchu embroidery has forged a unique stylistic identity - renowned for vivid colors and auspicious or natural motifs rendered through meticulous needlecraft details (Wang & Wang, 2000: 112-115). Beyond the surface-level aesthetics, the embedded symbols also encapsulate deeper meanings related to Manchu customs. For instance, common motifs like majestic tigers, soaring magpies, and sturdy pine trees represent concepts like fortitude, joyfulness and resilience respectively in Manchu culture (Tong & Chen, 2011: 45-46). Today, fine examples of antique Manchu embroidery handicrafts, such as embellished gowns and tapestries from the 18th-19th centuries, have become museum-grade artifacts that exemplify the pinnacle of this folk artform's historical development.



Figure 2 Li's Manchu Embroidery: Qing Dynasty Official Costume Embroidery, Traditional Manchu Embroidery Dragon Totem
Source: Photographed by the author

However, under accelerating modernization, many priceless cultural heritage like Manchu embroidery face the brink of extinction. As Liu (2010: 23) laments, the encroachment of mass industrialization has marginalized numerous Chinese folk arts to mere cultural relics rarely encountered in everyday life. The rich heritage embodied in Manchu embroidery thus faces erosion as market logic prioritizes efficiency and standardization. Consequently, as traditional handicraft mastery dissipates over generations, so may the cultural stories and wisdom encoded within it.

Hence, preserving Manchu embroidery as a "living heritage" bears paramount urgency today. Beyond museum conservation techniques, inheritance must also entail continuity of practice aligned with contemporary lifestyles so that Manchu embroidery can evolve dynamically whilst retaining its essence. As Zhang (2012: 88-89) suggests, injecting new vitality into this craft requires exploring innovative applications in modern product designs. One promising opportunity lies in children's furniture, itself undergoing a revolution emphasizing multi-functionality, customization and emotional resonance as urban households become more spacious-constrained (Wei, 2015: 56).

Creative fusion of Manchu embroidery into children's furniture tailored for young Chinese families may therefore spark renewed market interest whilst transmitting cultural heritage to next generations. Yet current literature appears sparse on systematic research probing this. Hence this study intends to address this knowledge gap, by empirically investigating the intersections of cultural inheritance, user-centric design and market-oriented innovation through the applied case of Manchu embroidery and children's furniture. Methodical analysis of this research issue can generate valuable insights and references for preserving intangible cultural heritages via aligned innovation strategies.

In summary, Manchu embroidery faces the urgency of safeguarding its living heritage against erosion from modernization forces. Whilst many solutions treat folk art as museum artifacts, this research explores a dynamic pathway aligning inheritance with innovation - specifically by embedding Manchu embroidery within multi-functional children's furniture catering to young Chinese households. Given sparse knowledge currently, systematic empirical investigation of this proposition can produce both theoretical and practical contributions. By revealing cultural meanings,

assessing user needs and testing creative designs, this study aims to inform sustainable strategies for adapting and elevating traditional folk arts through market-driven product innovation. Thereby, light can be shed on enabling cultural inheritance and business upgrading to mutually reinforce each other through thoughtful innovation - opening new frontiers for preserving intangible heritage.

1.2 Research Objectives

There are 3 research objectives as follow:

- 1 To study the history, the social value of the intangible cultural heritage of Manchu embroidery and other information related
- 2 To analyze the uniqueness of Manchu embroidery, Changchun, Jilin Province, marketing, consumer behavior and needs.
- 3 To apply in the design of multi-purpose children's furniture in the modern Chinese context.

1.3 Research Questions

1. History of the Manchu people: where did they come from and the intangible cultural heritage of Manchu embroidery? What factors affect social value? History of the Manchu people: Where did they come from and the intangible cultural heritage of Manchu embroidery? What factors affect social value?

2. How can it reflect the uniqueness of Manchu embroidery in Changchun, Jilin Province? What furniture will children or parents accept?
3. How to skillfully integrate the traditional craft of Manchu embroidery into the design of multi-functional children's furniture in order to retain its unique cultural elements in the design?

1.4. Conceptual Framework

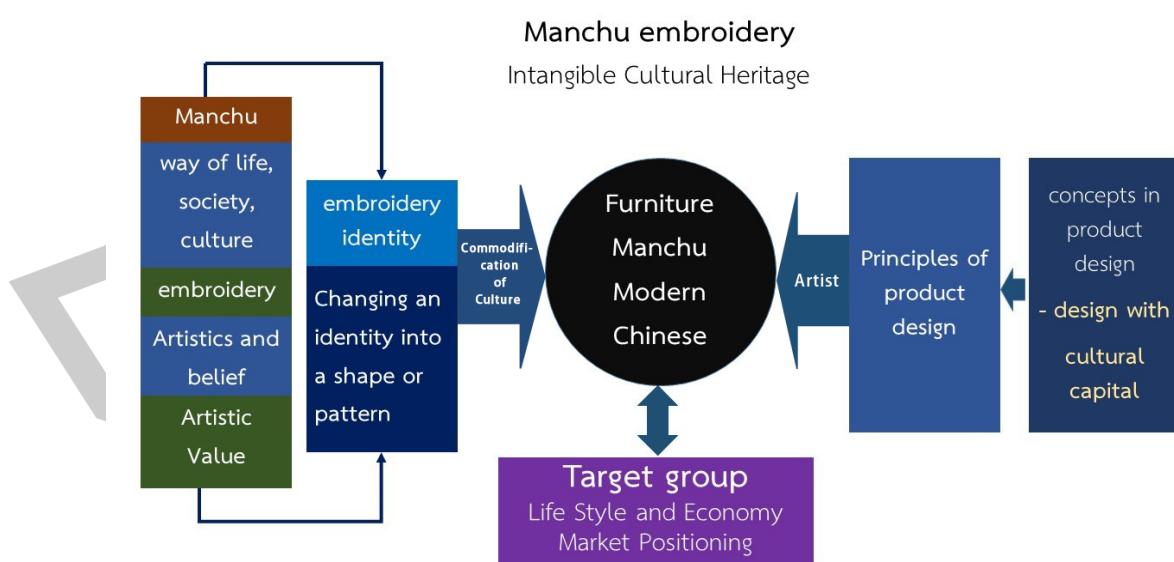


Figure 3 Conceptual Framework

The conceptual framework presented in this study illustrates how Manchu embroidery, an intangible cultural heritage, can be applied to contemporary furniture design in the context of modern China. The framework encompasses several key elements that collectively contribute to the integration of Manchu embroidery into modern Chinese furniture design.

Firstly, the Manchu way of life, society, and culture form the foundation of Manchu embroidery, embodying its unique aesthetics and beliefs. These cultural aspects serve as the basis for the embroidery's identity and artistic value.

Secondly, the embroidery identity undergoes a transformation process, where its distinctive ethnic characteristics are adapted into design elements such as shapes and patterns. This transformation allows for the integration of Manchu embroidery into contemporary design while preserving its cultural essence.

Thirdly, the target group for the designed furniture is identified based on their lifestyle and economic positioning within modern Chinese society. This ensures that the furniture design caters to the needs and preferences of the intended market.

Fourthly, the principles of product design are applied, incorporating the transformed Manchu embroidery elements into the design of modern Chinese furniture. This fusion of traditional cultural elements and contemporary design principles results in furniture that embodies the essence of Manchu culture while appealing to modern tastes.

Finally, the conceptual framework emphasizes the notion of designing with cultural capital, where the unique cultural elements of Manchu embroidery are embedded into the product design. This approach not only adds cultural value to the furniture but also contributes to the preservation and promotion of Manchu cultural heritage.

In summary, the conceptual framework presents a systematic approach to integrating Manchu embroidery, an intangible cultural heritage, into contemporary furniture design within the modern Chinese context. By transforming traditional cultural elements into design components and applying them to furniture that caters to the target market, this framework provides a means for the inheritance and promotion of ethnic culture while meeting the demands of the modern Chinese market. This approach offers a valuable perspective on the fusion of ethnic culture and modern design.

1.5. Definition of Terms

To provide clarity and a solid foundation for the ensuing discourse, it is essential to delineate key terms that punctuate this study. The terms defined here encompass cultural, design, and methodological constructs pertinent to the inquiry at hand.

Manchu Embroidery : Defined as the collective term for the needlework art that originated and evolved within Manchu communities over centuries. Embellished with culturally significant motifs and exceptional craftsmanship, Manchu embroidery symbolizes both the artistry and the historical narrative of the Manchu people. Notable attributes include vivid use of color, thematic nature and auspice within its

designs, often mirroring societal values, beliefs, and the Manchu connection to nature and spirituality.

Multi-functional Children's Furniture : Refers to furniture designed specifically for children that serve multiple purposes or accommodate various activities. In contrast to traditional single-purpose furniture, multi-functional variants may transform in structure or serve additional roles, such as combined sleep, study, and storage areas, to adapt to space constraints and evolving developmental needs of a child.

Cultural Commodification : Cultural commodification refers to the process by which cultural elements, practices, or artifacts are transformed into marketable products or services, often for the purpose of economic gain (Cohen, 1988, 371-386). This involves the repackaging and commercialization of cultural heritage, such as traditional crafts, customs, or symbols, to cater to the demands and preferences of modern consumers (Shepherd, 2002, 183-201). In the context of this research, cultural commodification can be seen in the application of Manchu embroidery elements in the design of multifunctional children's furniture, where the cultural significance and aesthetic value of this traditional craft are leveraged to create differentiated and appealing products for the contemporary market.

While cultural commodification can provide new opportunities for the preservation and promotion of cultural heritage, it also raises concerns about the potential loss of authenticity, meaning, and context (Greenwood, 1977, 129-147). The process of adapting cultural elements to suit commercial interests may lead to the simplification, stereotyping, or distortion of their original significance, as well as the exploitation or displacement of the communities that bear this heritage. Therefore, it is crucial for designers and marketers engaging in cultural commodification to adopt an ethical and responsible approach that respects the integrity and ownership of the cultural heritage, involves the participation and consent of the source communities, and ensures the equitable distribution of benefits (Hahn, 2013, 3-20).

By carefully considering and addressing the challenges and implications of cultural commodification, this research aims to explore the potential of Manchu embroidery as a source of inspiration and value creation for the design of children's furniture, while also contributing to the sustainable and meaningful preservation and promotion of this important cultural heritage (Kaya & Yağız, 2021, 81-99).

1.6. Scope of Research

1.6.1 Scope area

The geographic scope of this study is primarily focused on Changchun City, Jilin Province, China, with a specific emphasis on the intangible cultural heritage of the region, namely Li's Manchu embroidery. Changchun City, located in the heart of Northeast China, is the capital and largest city of Jilin Province. It is a key political, economic, and cultural center in the region, with a rich history and diverse ethnic composition, including a significant Manchu population.

Li's Manchu embroidery, a folk handicraft art originating from Changchun City, boasts a history of more than a hundred years. This traditional art form is deeply rooted in the Manchu culture and has been passed down through generations of the Li family. The research focuses on Ms. Li Yulan, the third-generation inheritor of this intangible cultural heritage, who plays a crucial role in preserving and promoting the art of Manchu embroidery in the region.

Changchun City provides an ideal setting for the study of Manchu embroidery and its potential application in contemporary furniture design. The city's unique blend of modern development and traditional cultural heritage offers a fertile ground for exploring the intersection of art, design, and cultural preservation. Moreover, Changchun's status as a major industrial and manufacturing hub in Northeast China, with a strong presence of furniture production and trade, makes it a suitable location for investigating the market potential and consumer preferences for culturally-inspired children's furniture.

While the primary focus of the study is on Changchun City and Li's Manchu embroidery, the research findings and design strategies developed in this context may have broader implications for other regions and intangible cultural heritage in China. The insights gained from this study can serve as a valuable reference for similar efforts to preserve and promote traditional craftsmanship through innovative product design and cultural commodification. By exploring the possibilities of integrating Manchu embroidery into contemporary children's furniture, this research aims to contribute to the ongoing discourse on the role of design in safeguarding and revitalizing intangible cultural heritage in a rapidly changing society.

1.6.2 Time

Concerning the temporal scope, this study focuses on analyzing consumer expectations and the targeted children's furniture market, centering around contemporary trends over the past decade. This time frame has been chosen to better understand and approximate the needs, desires, and consumption patterns of young Chinese families in recent years.

The rapid economic development and social changes in China during the past decade have significantly influenced consumer behavior and preferences, particularly among younger generations. Factors such as increasing disposable income, changing lifestyles, and a growing appreciation for cultural heritage have shaped the market landscape for both traditional crafts and modern furniture design.

By concentrating on this specific period, the research aims to capture the current cultural, technological, and economic backdrop that will inform how Manchu embroidery can be viably integrated into innovative commercial furniture designed for today's juvenile customers and their caregivers. This approach ensures that the proposed design solutions are relevant and appealing to the target audience, while also considering the long-term sustainability and market potential of the products.

Furthermore, the study recognizes that the children's furniture market is subject to evolving trends and consumer preferences. Therefore, the research will also consider emerging trends and future projections to ensure that the proposed designs remain adaptable and relevant in the years to come. However, given the inherent uncertainty in predicting long-term market conditions, the primary focus remains on

the more immediate context, as this allows for a more rigorous and reliable analysis of user needs and market dynamics.

By carefully defining the temporal scope of the study, the research aims to strike a balance between understanding the current market reality and anticipating future trends. This approach will help to inform the development of children's furniture designs that successfully integrate Manchu embroidery elements while meeting the evolving needs and preferences of modern Chinese families. Ultimately, the insights gained from this time-focused analysis will contribute to the creation of culturally meaningful and commercially viable products that promote the preservation and appreciation of Manchu embroidery heritage in a contemporary context.

1.6.3 Another

The design scope of this study revolves around the application of Manchu embroidery in the creation of multifunctional children's furniture, aiming to explore how this traditional art form can be seamlessly integrated into contemporary furniture design. The research focuses on a range of products that cater to the diverse needs of modern Chinese families and their growing children, including multifunctional children's chairs, bookcases, tables, combination bookcases, and stools. By concentrating on these specific furniture types, the study seeks to create designs that showcase the beauty and cultural significance of Manchu embroidery while providing practical solutions for space-saving and adaptability in contemporary living spaces. For instance, multifunctional children's chairs can be designed to serve multiple purposes, such as seating, storage, or even as a small desk, with Manchu embroidery patterns or techniques incorporated into the upholstery or decorative elements. Similarly, bookcases and combination bookcases can feature Manchu embroidery motifs or patterns in their structure or as decorative accents, providing ample storage space for books, toys, and other essentials while serving as attractive focal points in a child's room or play area. Tables and stools also offer opportunities for integrating Manchu embroidery into their design, with embroidered tabletops, seat cushions, or intricate embroidery patterns carved into the wood itself, combining traditional craftsmanship with modern design sensibilities to create both functional and culturally significant pieces.

Moreover, the design scope considers the broader context of children's living spaces and the evolving needs of families, exploring how Manchu embroidery can be incorporated into other elements of a child's room, such as bedding, curtains, or wall art, to create a cohesive and immersive cultural experience. The study also recognizes the importance of designing furniture that is not only aesthetically pleasing but also safe, durable, and ergonomically appropriate for children of different ages and sizes, taking into account factors such as material selection, construction techniques, and compliance with relevant safety standards. By carefully defining the design scope and focusing on multifunctional children's furniture, this research aims to demonstrate the potential for Manchu embroidery to be successfully integrated into contemporary product design, creating furniture pieces that meet the practical needs of modern families while contributing to the preservation and appreciation of Manchu cultural heritage in everyday life through innovative and culturally sensitive approaches.

1.7. Research Methodology

1.7.1 Population

Population is Chinese citizens between the ages of 20 and 35. This age group was chosen because they are at a critical stage of starting a family and purchasing children's furniture, and their needs and preferences are representative of the possibilities for studying the combination of Manchu embroidery and children's furniture. In addition, this age group has a large population base that is active on online social media platforms, making it easy to conduct the survey through online channels.

Sample will use stratified sampling to select a sample of 130 respondents from the target population. Stratified sampling refers to dividing the target population into subgroups based on specific characteristics (e.g., gender, city level) and then randomly selecting a certain percentage of the sample from each subgroup. This method ensures that the sample is representative and can accurately reflect the overall characteristics of the target population.

1.7.2 Data Collection

To gather firsthand information and insights into Manchu embroidery and its potential application in children's furniture design, I conducted a field study in the Kuancheng District of Changchun City, Jilin Province, China. The primary focus of this field study was to collect relevant data and understand the current market situation for both Manchu embroidery products and children's furniture.

Firstly, I visited Ms. Li Yulan, the third-generation inheritor of the Li family's Manchu embroidery, which is recognized as an intangible cultural heritage in Changchun City, Jilin Province. During my visit, I sought her expertise and knowledge about Manchu culture and its embroidery traditions. Under her guidance, I toured the Li family's Manchu embroidery workshop and store, gaining insights into the current state of the Manchu embroidery market.

To better understand consumer perspectives, I interviewed customers who visited the store and conducted random interviews within the mall. The interviews revealed that most people who purchased Manchu embroidery products were curious about and appreciative of traditional culture. The acceptable price range for these products was generally between 100 and 500 yuan, with the majority of buyers aged between 20 and 30 years old.

Additionally, I visited stores selling children's furniture in the mall to gather information about the current market situation. Through interviews with store staff and customers, I discovered that most buyers were between 25 and 40 years old and were purchasing furniture for their children. The best-selling furniture pieces were primarily from well-known brands, as consumers perceived them to have higher quality and safer craftsmanship.

To supplement the offline field study, I enlisted the help of friends to conduct online questionnaire surveys in major Chinese cities such as Beijing, Shanghai, and Guangzhou. The target demographic for these surveys was married couples or partners aged between 25 and 40 years old. The surveys focused on three main aspects: 1) understanding the respondents' familiarity with Chinese Manchu embroidery; 2) gathering their opinions on the current children's furniture market; and 3) gauging their acceptance and soliciting

suggestions for the potential integration of Manchu embroidery with multifunctional children's furniture.

The data collected from both the offline field study and online surveys will provide a strong foundation for my design research. By analyzing and synthesizing the information gathered, I aim to develop a comprehensive understanding of the market potential and consumer preferences for integrating Manchu embroidery into contemporary children's furniture design. This knowledge will inform the design process and help create products that not only preserve and promote Manchu cultural heritage but also meet the needs and expectations of modern Chinese consumers.

1.7.3 Instrumentation /Tools

The primary data collection tool for this study was observation recording form Interview recording form To gather information from the successors of Manchu embroidery, experts in furniture design. Furniture manufacturers or distributors online questionnaire, which was sent to the target respondents through the WeChat APP platform.

The questionnaire was designed to assess the respondents' knowledge of traditional Manchu culture and art, as well as their perceptions of the combination of Manchu embroidery and children's furniture.

Satisfaction assessment form. To assess the satisfaction of target consumers.

1.7.4 Data Analysis

- 1 Analysis of the uniqueness of Manchu embroidery, Changchun, Jilin Province.
- 2 Children's furniture market analysis
- 3 Analyze the behavior and needs of children and parents.
- 4 Design analysis to lead to applications in the design of multi-purpose children's furniture in the modern Chinese context.

1.8. Research Presentation

- 1 Full paper
- 2 Journal articles Published in international journals, Scopus level or ISI

CHAPTER II

Manchu embroidery and documents related to design

2.1 The artistic characteristics of Manchu embroidery culture

Figure 4

Manchu Embroidery

Manchu embroidery, a traditional art form that has been passed down through generations, is renowned for its versatility and ability to adapt to various mediums. The art of Manchu embroidery can be found on a wide range of items, including clothing, shoes, and decorative objects, each showcasing unique patterns and designs that reflect the cultural and social significance of the piece.

One of the most prominent forms of Manchu embroidery is its application on traditional dresses. As illustrated in Figures 4 Manchu embroidery adorns various parts of these garments, such as the sleeves, collar, and hem, creating intricate and visually striking designs that showcase the skill and creativity of the embroiderers. The placement and composition of the embroidered patterns on these dresses serve not only a decorative purpose but also convey important cultural meanings and social status. For example, the embroidery on the sleeve cuffs and collar may indicate the wearer's rank or position within the Manchu social hierarchy, while the patterns on the hem may express wishes for good fortune and prosperity. Qing Guangxu embroidered shirt on green ground

The placement of embroidery on Manchu clothing is also significant, with different parts of the garment featuring specific patterns and motifs. The sleeves, collar, and hem are often adorned with intricate embroidery, creating a visually striking and meaningful composition. The embroidery on the sleeve cuffs, for instance, may feature floral or geometric patterns that symbolize good fortune and prosperity, while the embroidery on the collar may indicate the wearer's clan or family affiliation.



Figure 5 Manchu traditional dress
Sourced: Photographed by the author

Another important form of Manchu embroidery is its application on shoes. Embroidered shoes are an integral part of traditional Manchu attire and often feature designs that complement the patterns found on the clothing. The embroidery on shoes can vary depending on the type of shoe and its intended purpose. For example, the embroidery on wedding shoes may feature auspicious symbols and wishes for a happy marriage, while the embroidery on everyday shoes may be more subtle and focus on showcasing the skill of the embroiderer



Figure 6 Manchu traditional dress
Sourced: Photographed by the author

In addition to clothing and shoes, Manchu embroidery can also be found on a wide range of decorative items, such as wall hangings, tablecloths, and pillow covers. These embroidered items serve to beautify the home and showcase the artistic talent of the embroiderer. The patterns and motifs used on these decorative items often



Figure 7 Manchu traditional dress
Sourced: Photographed by the author

It is important to note that the patterns and meanings of Manchu embroidery can vary depending on the item on which they are applied. The same motif may have different connotations when embroidered on a dress compared to when it is embroidered on a pair of shoes or a decorative item. This highlights the complexity and depth of Manchu embroidery, as well as the importance of understanding the cultural context in which these embroidered items are created and used.



Figure 8 Manchu Traditional Graphics
Sourced: The Chinese Classic Pattern Book

Manchu embroidery is also known for its vibrant colors and intricate patterns that reflect the community's aesthetic preferences and cultural symbolism. Red, the most widely used color, symbolizes good luck, happiness, and prosperity and is often used for wedding attire and festive occasions. Blue, representing the sky, water, and loyalty, is frequently used in embroidery designs for men's clothing and official robes. Yellow, associated with the imperial family and considered a symbol of power and authority, is often reserved for high-ranking officials and members of the royal family. Green, representing nature, growth, and vitality, is commonly used in embroidery designs for women's clothing and household items.

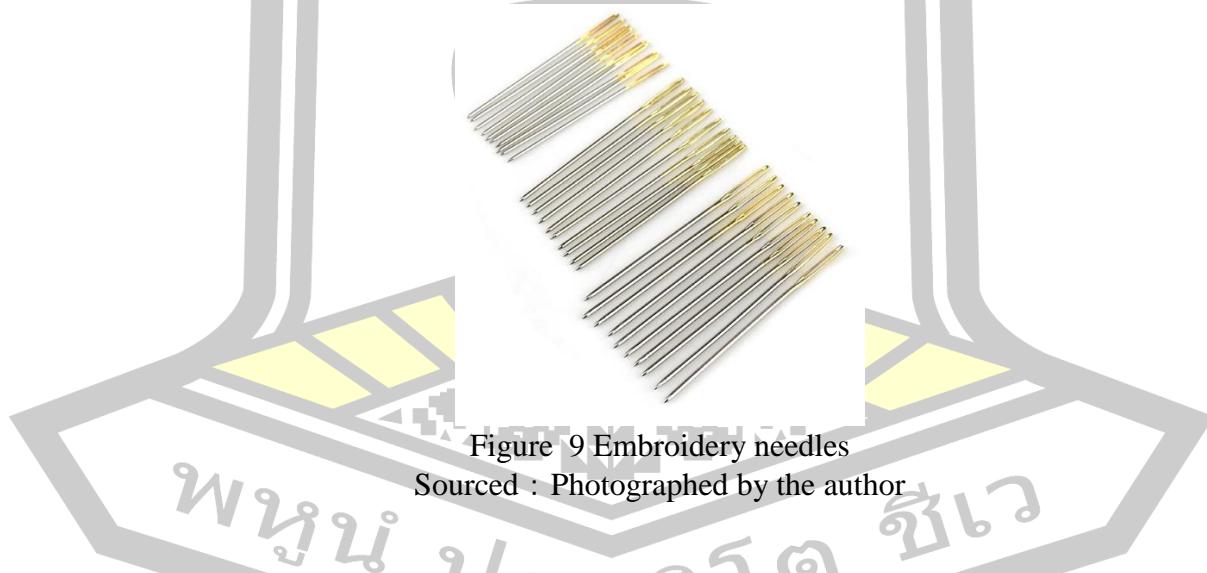
Preserving and passing down the knowledge and skills of Manchu embroidery is crucial for the continuation of this cultural heritage. However, the craft faces several challenges in the modern era, including declining interest among younger generations, lack of systematic training and education, and limited market demand. To address these challenges, various strategies can be implemented, such as encouraging intergenerational transmission through apprenticeships, workshops, and family-based learning, establishing educational programs in collaboration with educational institutions and cultural organizations, promoting cultural tourism to raise awareness and generate interest, and adapting to contemporary needs by creating innovative products that cater to the tastes and demands of modern consumers.

The art forms of Manchu embroidery also extend to religious and ceremonial items, such as altar cloths and ritual garments. These embroidered items often feature specific patterns and colors that are imbued with spiritual significance. For example, the embroidery on a shaman's robe may feature powerful animal motifs or celestial symbols that are believed to enhance the shaman's spiritual power and connection to the divine.

In conclusion, the art forms of Manchu embroidery are diverse and multifaceted, encompassing a wide range of items that serve both functional and decorative purposes. From traditional clothing and shoes to decorative items and religious artifacts, Manchu embroidery showcases the skill, creativity, and cultural significance of this ancient art form. By understanding the various forms and applications of Manchu embroidery, we can gain a deeper appreciation for the rich cultural heritage and artistic legacy of the Manchu people.

2. The Techniques of Manchu Embroidery: Tools, Materials, and Silk Thread
 Manchu embroidery is renowned for its intricate designs, vibrant colors, and exquisite craftsmanship. The creation of these stunning embroidered pieces relies on the use of specific tools, materials, and techniques that have been refined and perfected over generations.

One of the most essential tools in Manchu embroidery is the needle. Embroiderers use a variety of needles, each suited to different types of stitches and thread thicknesses. The most common needles used in Manchu embroidery are the sharp needle, which is used for delicate work and fine details, and the tapestry needle, which has a blunt tip and a large eye, making it ideal for thicker threads and larger stitches.



The primary material used in Manchu embroidery is silk thread. Silk is chosen for its softness, luster, and durability, as well as its ability to take dye well, resulting in vibrant and long-lasting colors. Manchu embroiderers use a variety of silk threads, including filament silk, which is thin and strong, and spun silk, which is thicker and has a slightly fuzzy texture.

The colors of the silk threads used in Manchu embroidery are also significant, with each color holding symbolic meanings within Manchu culture. Red, for example, is associated with good fortune, happiness, and celebration, making it a popular

choice for wedding and festival attire. Blue, on the other hand, represents loyalty, trustworthiness, and stability, and is often used in embroidery for official robes and uniforms.

Other colors commonly used in Manchu embroidery include green, which symbolizes growth, renewal, and harmony with nature; yellow, which is associated with royalty, wealth, and power; and purple, which represents nobility, spirituality, and wisdom. White and black are also used in Manchu embroidery, often as accent colors or to create contrast and depth in the design.

In addition to silk thread, Manchu embroiderers may also use other materials, such as gold or silver thread, to add a luxurious and opulent feel to the embroidered piece. These metallic threads are often used in conjunction with silk thread to create intricate patterns and designs that catch the light and add a sense of dimension to the embroidery.



Figure 10 All tools used in Manchu embroidery
Sourced : Photographed by the author

The techniques used in Manchu embroidery are just as important as the tools and materials. Embroiderers employ a wide range of stitches, each chosen for its specific texture, appearance, and suitability for the design. Some of the most common stitches used in Manchu embroidery include:

Long straight stitch: This stitch is characterized by stitches that are all in the same direction, regardless of the direction of the embroidery. When the stitches are perpendicular to each other, they are called straight flat stitches or even flat stitches. If the stitches are slanted, they are called oblique flat stitches. When the entire design is filled with long straight stitches, it is called a satin stitch. For narrow or twisted designs, it is best to use a coiling stitch, which can adjust its direction according to the shape of the design, making the embroidery more vivid. Coiling stitches are often used to embroider plants.

Short straight stitch: In contrast to the long straight stitch, the short straight stitch is more secure due to its shorter length. The short straight stitch consists of seed stitches and quilting stitches. Seed stitches are composed of numerous short stitches in different directions, which are tightly and overlappingly embroidered, resulting in grain-like stitches that are quite firm. In comparison, quilting stitches are simpler, as they are completed by continuously picking and embroidering in the same direction. They are often used for simpler embroidery.

Encroaching stitch: The encroaching stitch can be understood as a derivative of the even stitch and is commonly used to embroider petals. Since the color of petals is not uniform and gradually transitions from the center to the edge, the encroaching stitch arranges groups of even stitches in layers, with each layer having a different color, perfectly matching the texture of the petals. "Positive encroachment" and "reverse encroachment" are the two most common types of encroaching stitches. As the names suggest, embroidering from the inside out is called positive encroachment, while the reverse is called reverse encroachment.

Shaded stitch: The shaded stitch is created by embroidering coiling stitches or straight stitches after color matching. Depending on the color matching, it can be divided into single shading and double shading. Shaded stitches are usually used on colorful petals because layering and color matching can better highlight the three-dimensional and color hierarchy of the petals.

Knotted stitch: The knotted stitch is named so because this embroidery method resembles locks and chains. The knotted stitch has the characteristics of short and dense stitches, easy color blending, and easy turning. Due to the many ways of connecting the stitches, there are various knotted stitches, such as continuous knotted stitches, braid stitches, and cross-knotted stitches.

Seed stitch: The seed stitch is mostly used for embroidering dot-like patterns. When embroidering with the seed stitch, the thread is wrapped around the needle to form a knot. Depending on the size of the knot, different numbers of wrapping circles can be chosen. The larger the dot, the more circles are needed. Seed stitches are often used to decorate the center of flowers.

Couching stitch and cord stitch: The couching stitch is mostly used to embroider along the edges of the design using gold or silver threads. The couching stitch is divided into two categories: "two-color gold" and "three-color gold". The embroidery method that uses a mixture of gold and silver threads is called "two-color gold," and adding red threads to this is known as "three-color gold." Due to the different order of thread pressing, the couching stitch can be further divided into circle gold, coiled gold, and locked gold stitches.

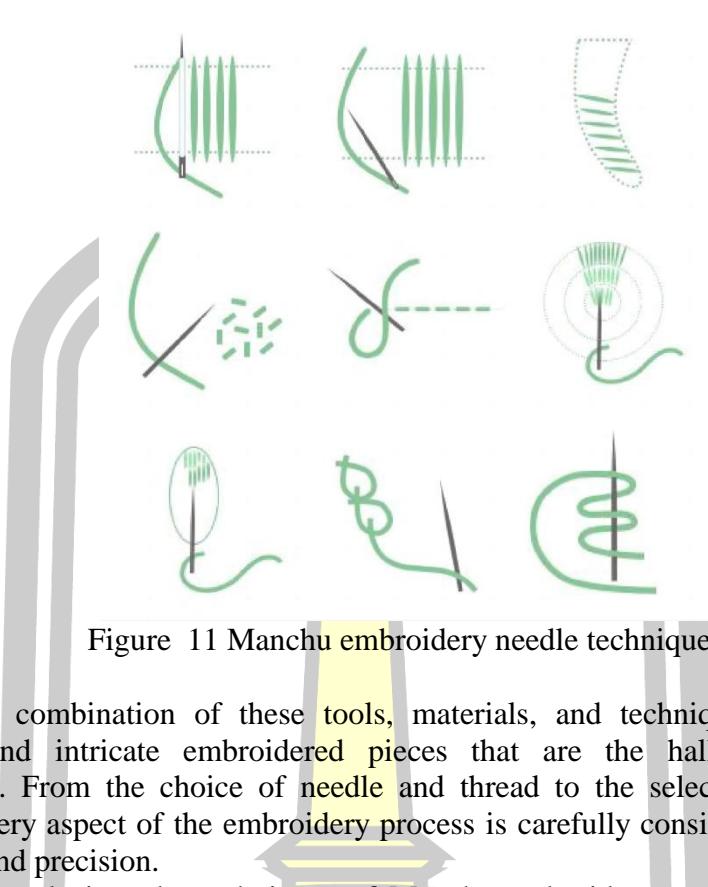


Figure 11 Manchu embroidery needle techniques

The combination of these tools, materials, and techniques results in the stunning and intricate embroidered pieces that are the hallmark of Manchu embroidery. From the choice of needle and thread to the selection of colors and stitches, every aspect of the embroidery process is carefully considered and executed with skill and precision.

In conclusion, the techniques of Manchu embroidery are a testament to the ingenuity, creativity, and dedication of the Manchu people. By understanding the tools, materials, and methods used in this ancient art form, we can gain a deeper appreciation for the skill and artistry involved in creating these beautiful and meaningful embroidered pieces. The vibrant colors and intricate designs of Manchu embroidery not only showcase the technical mastery of the embroiderers but also serve as a powerful expression of Manchu culture and identity.

3. Highlighting the Narrative Function of Patterns, Motifs, and Symbols

Manchu embroidery is not merely a decorative art form; it is also a powerful medium for storytelling and cultural expression. The patterns, motifs, and symbols used in Manchu embroidery serve a narrative function, conveying the rich history, beliefs, and values of the Manchu people. By understanding the symbolic language of Manchu embroidery, we can gain a deeper appreciation for the stories and messages woven into each piece.

One of the most prominent and significant motifs in Manchu embroidery is the dragon. In Chinese culture, dragons are associated with power, strength, and good fortune. They are also believed to be the embodiment of the emperor and the symbol of imperial authority. In Manchu embroidery, dragons are often depicted in a highly stylized manner, with sinuous bodies, flowing manes, and fierce expressions. The dragon motif is particularly prevalent in embroidery for the imperial family, as it symbolizes their divine right to rule and their connection to the celestial realm. The dragon motif can be found on a wide range of embroidered items, from robes and accessories to banners and wall hangings. The placement and composition of the

dragon motif often reflect the hierarchy and structure of the Manchu society, with the emperor's dragon robe featuring the most elaborate and prominent dragon designs.



Figure 12 Peacock feather embroidered cloud and dragon auspicious robe
Sourced : National Palace Museum of China

Another important motif in Manchu embroidery is the phoenix. In Chinese mythology, the phoenix is a symbol of rebirth, renewal, and the harmony between yin and yang. It is also associated with the empress, representing her grace, beauty, and virtue. In Manchu embroidery, phoenixes are often depicted alongside dragons, symbolizing the balance and complementarity between masculine and feminine energies. The phoenix motif is characterized by its elegant and flowing lines, vibrant colors, and intricate details, such as the delicate feathers and the trailing tail. The phoenix motif is commonly found on women's clothing and accessories, particularly those worn by the empress and other high-ranking ladies of the court. The combination of dragon and phoenix motifs in Manchu embroidery reflects the importance of gender roles and the ideal of harmonious partnership in Manchu culture.



Figure 13 Li's Manchu Embroidery in Garments
Sourced : Photographed by the author

One of the most striking aspects of Manchu embroidery is its bold and vivid color palette, which often features a rich array of primary and secondary colors. Red is perhaps the most prominent color in Manchu embroidery, symbolizing good fortune, happiness, and vitality. Red is often used as the background color for embroidered clothing and accessories, such as wedding dresses, festival costumes, and auspicious decorations. The use of red in Manchu embroidery is believed to bring good luck and ward off evil spirits, making it a popular choice for ceremonial and religious occasions. In the context of children's furniture design, incorporating red elements inspired by Manchu embroidery can create a sense of warmth, excitement, and cultural connection, while also serving as a subtle educational tool for introducing children to the significance of this color in Manchu culture.



Figure 14 Li's Manchu Embroidery in Garments

Sourced : Photographed by the author

The tiger motif is another powerful and significant symbol in Manchu embroidery, representing strength, bravery, and protection. In Manchu culture, tigers are believed to be the guardians of the forest and the protectors of the people. The tiger motif is often depicted in a highly realistic and detailed manner, with fierce expressions, sharp claws, and striking stripes. The use of the tiger motif in Manchu embroidery reflects the Manchu people's reverence for nature and their belief in the importance of courage and resilience. The tiger motif can be found on a wide range of embroidered items, from military uniforms and weapons to decorative objects and children's clothing. The placement and composition of the tiger motif often reflect the specific purpose and meaning of the embroidered piece, such as the use of tiger motifs on military uniforms to symbolize the strength and bravery of the Manchu army.



Figure 15 Applications of Manchu embroidery tiger patterns: tiger head hats and tiger toys

Sourced : Photographed by the author

In addition to these individual motifs, Manchu embroidery also features larger, more complex compositions that tell specific stories or convey particular themes. One of the most popular and enduring legends in Manchu culture is the story of Nisan Shaman, a powerful and wise shaman who is believed to have saved the Manchu people from a great flood. The story of Nisan Shaman is often depicted in Manchu embroidery, with intricate scenes showing the shaman's journey and the various challenges he encountered along the way. The embroidered narrative of Nisan Shaman reflects the importance of shamanism and spiritual beliefs in Manchu culture, as well as the value placed on wisdom, perseverance, and self-sacrifice for the greater good. Another significant narrative composition in Manchu embroidery is the "hundred deer" motif, which depicts a large number of deer in a natural setting, often surrounded by other auspicious symbols such as pine trees and cranes. In Manchu culture, deer are associated with longevity, prosperity, and good fortune, and the "hundred deer" motif represents the wish for a long and abundant life. The composition of the "hundred deer" motif often reflects the Manchu people's deep connection to nature and their belief in the harmonious coexistence between humans and animals.

In conclusion, the patterns, motifs, and symbols used in Manchu embroidery serve a powerful narrative function, telling stories, conveying cultural values, and expressing the hopes and dreams of the Manchu people. From the majestic dragon and the graceful phoenix to the auspicious floral motifs and the brave tiger, each element of Manchu embroidery carries a deep symbolic meaning and contributes to the overall narrative of the piece. The larger compositions, such as the story of Nisan Shaman and the "hundred deer" motif, further demonstrate the importance of storytelling and cultural preservation in Manchu embroidery. By understanding the symbolic language and narrative function of Manchu embroidery, we can gain a deeper appreciation for the richness and complexity of this ancient art form, as well as its enduring significance as a medium for cultural expression and communication. The narrative function of Manchu embroidery not only adds depth and meaning to the visual beauty of each piece but also serves as a testament to the creativity, resilience, and cultural identity of the Manchu people.

2.2 The Historical Development and Evolving Needs of Furniture

1. Early Furniture Development History : The Absence of Children's Furniture

In the early stages of furniture development, children's furniture was largely absent from the design and production landscape. Throughout history, furniture was primarily created to cater to the needs and preferences of adults, with little consideration given to the specific requirements of children. This absence of children's furniture can be traced back to ancient civilizations and continued through the Middle Ages and beyond.

In ancient civilizations such as Egypt, Greece, and Rome, furniture was often a symbol of wealth and power, with ornate designs and luxurious materials used to create pieces for the elite (Litchfield, 1892, p. 23). For example, in ancient Egypt, furniture was often made from rare woods, ivory, and gold, and adorned with intricate carvings and hieroglyphs. These pieces were designed to showcase the status and prestige of their owners, rather than to provide comfort or functionality for children. During the Middle Ages, furniture became more functional and practical, with a focus on durability and versatility (Lucie-Smith, 1979, p.45). Furniture was often made from heavy, sturdy materials such as oak and was designed to serve multiple purposes. For instance, a chest could be used for storage, seating, and even sleeping. However, even during this period, children's furniture remained largely non-existent, with children often using smaller versions of adult furniture or improvised seating arrangements.



Figure 16 The key anthropometric measurements relevant to furniture design for children aged 6-10

Sourced : atomorfen.com

The absence of children's furniture can be attributed to several factors, including the lack of recognition of childhood as a distinct stage of life, the limited resources available for furniture production, and the prevailing societal norms and expectations regarding children's needs and behaviors.

In many historical contexts, children were seen as miniature adults, expected to work and contribute to the household from a young age (Aries, 1962, p.128). This

perception of children as small adults meant that their furniture needs were often overlooked or deemed unimportant. Children were expected to adapt to adult furniture, even if it was uncomfortable or unsuitable for their size and developmental stage.

For example, in medieval Europe, children as young as five or six were often apprenticed to learn a trade, and were expected to work alongside adults in workshops and factories (Hanawalt, 1993, p.158). In these settings, children would often use the same tools and furniture as their adult counterparts, regardless of whether they were appropriate for their size or abilities.



Figure 17 Adult size sofa for small children
Sourced: pupuai.chat

The use of scaled-down adult furniture for children had several drawbacks and limitations. Firstly, the proportions and dimensions of adult furniture were often not suitable for children's smaller bodies, leading to discomfort, poor posture, and potential health issues (Mandal, 1981, p. 19). For instance, a child seated at an adult-sized desk may have to hunch over to reach the work surface, causing strain on their neck, shoulders, and back.

Secondly, adult furniture was often not designed with children's safety in mind, with sharp edges, unstable structures, and hazardous materials posing risks to young users (Bainbridge, 1976, p. 83). In the absence of safety standards and regulations, children were at risk of injury from falling off chairs that were too high, or from tipping over heavy pieces of furniture that were not properly secured.

Furthermore, the use of adult furniture for children limited their opportunities for play, creativity, and learning. Children's furniture that is designed to support their developmental needs and interests can foster imagination, social interaction, and cognitive growth (Isbell & Isbell, 2007, p. 21). For example, a child-sized table and chairs can encourage cooperative play and social skills, while a low bookshelf can promote independent reading and exploration.

However, in the absence of specialized children's furniture, these opportunities were often missed. Children were expected to sit still and quietly, rather than engage in active, hands-on learning and play.



Figure 18 A child using Montessori materials(furniture for children)

Sourced: <https://montessoriacademy.com.au/>

As society's understanding of childhood and child development evolved, so did the recognition of the need for children's furniture. The works of pioneers such as Maria Montessori and Jean Piaget in the early 20th century highlighted the importance of creating environments and resources that support children's learning and growth (Montessori, 1912; Piaget, 1936).

Montessori, in particular, emphasized the need for child-sized furniture and materials that allow children to explore and learn independently. In her book "The Montessori Method," she described the importance of providing children with "a little world suited to their needs" (Montessori, 1912, p. 81). This included child-sized tables, chairs, and shelves that were easily accessible and designed to promote autonomy and self-directed learning.

Similarly, Piaget's theories of cognitive development highlighted the importance of hands-on, experiential learning in supporting children's intellectual growth (Piaget, 1936, p. 57). He argued that children learn best through active exploration and manipulation of their environment, and that furniture and materials should be designed to support this type of learning.

This shift in perspective paved the way for the emergence of children's furniture as a distinct market and design field. Manufacturers and designers began to recognize the unique needs and preferences of children, and started creating furniture that was specifically tailored to their physical, cognitive, and social development.

In conclusion, the early history of furniture development is characterized by the absence of children's furniture, with children often using scaled-down versions of adult furniture that were unsuitable for their needs and development. The lack of recognition of childhood as a distinct stage of life, limited resources, and prevailing societal norms all contributed to the overlooking of children's furniture needs.

However, as understanding of child development grew, so did the recognition of the importance of specialized children's furniture. The works of pioneers such as Montessori and Piaget highlighted the need for environments and resources that support children's learning and growth, setting the stage for the emergence of children's furniture as a distinct market and design field in the modern era.

2. Modern Furniture Market Segmentation: The Emergence of Children's Furniture

The modern furniture market has undergone significant changes and segmentation in recent decades, reflecting the evolving needs, preferences, and lifestyles of consumers. One of the most notable developments in this process has been the emergence of children's furniture as a distinct market segment, catering specifically to the unique requirements of young users and their families.

The segmentation of the modern furniture market can be attributed to several factors, including demographic shifts, changing family structures, and the increasing recognition of children as consumers with their own needs and preferences (McNeal, 1992, p. 37). As the traditional nuclear family model has given way to more diverse household arrangements, such as single-parent families and dual-income households, the demand for specialized furniture that meets the needs of different family members has grown (Goodnow & Bowes, 1994, p. 62).

Moreover, the rise of consumer culture and the increasing influence of children in family purchasing decisions have contributed to the segmentation of the furniture market (Schor, 2004, p. 19). Children are no longer seen as passive recipients of adult-designed products, but rather as active participants in the consumer marketplace, with their own tastes, preferences, and influence over family spending (McNeal, 1999, p. 85).

The furniture industry has responded to these changes by developing products and marketing strategies that cater specifically to children and their families. This has led to the emergence of children's furniture as a distinct market segment, with its own design aesthetic, safety standards, and functional requirements (Maynard, 2009, p. 28).



Figure 19 Children's furniture market

Sourced : Photographed by the author

The emergence of children's furniture as a distinct market segment has been driven by several key factors, including:

1. Recognition of children's developmental needs: As research in child development has advanced, there has been a growing recognition of the importance of providing children with furniture that supports their physical, cognitive, and social development (Smith, 2001, p. 143). This has led to the design of furniture that is ergonomically suited to children's bodies, promotes healthy posture, and encourages active play and learning (Lueder & Rice, 2008, p. 715).

2. Safety concerns: The safety of children's furniture has become a paramount concern for parents and regulators alike, leading to the development of strict safety

standards and guidelines (Consumers Union, 2002, p. 5). Children's furniture manufacturers have responded by incorporating safety features such as rounded edges, stable bases, and non-toxic materials into their designs (Leach, 2003, p. 92).

3. Changing family lifestyles: As family lifestyles have become more diverse and flexible, there has been a growing demand for children's furniture that is adaptable, multifunctional, and space-saving (Eckardt, 2012, p. 47). This has led to the development of products such as convertible cribs, modular storage systems, and compact play furniture that can adapt to the changing needs of families over time (Montague, 2008, p. 63).

4. Educational and recreational value: Children's furniture is increasingly seen as a tool for promoting learning, creativity, and play, rather than just a functional necessity (Buchanan, 2007, p. 120). Manufacturers have responded by incorporating educational and recreational features into their designs, such as built-in toy storage, activity surfaces, and interactive elements that encourage exploration and discovery (Miller, 2005, p. 83).

The emergence of children's furniture as a distinct market segment has had significant implications for the furniture industry and for families alike. For manufacturers and retailers, it has opened up new opportunities for product innovation, branding, and marketing, as they seek to differentiate themselves in an increasingly competitive marketplace (Burris, 2011, p. 58). This has led to a proliferation of children's furniture brands, specialty stores, and online retailers that cater specifically to the needs and preferences of young consumers and their families (Maynard, 2009, p. 31).

For families, the emergence of children's furniture as a distinct market segment has meant greater choice, quality, and accessibility when it comes to furnishing their children's living spaces. Parents can now choose from a wide range of products that are specifically designed to meet the developmental, safety, and lifestyle needs of their children, from infancy through adolescence (Eckardt, 2012, p. 49).

Moreover, the emergence of children's furniture as a distinct market segment has helped to elevate the status of children as important members of the household, with their own unique needs and preferences (Schor, 2004, p. 23). By providing children with furniture that is tailored to their size, abilities, and interests, families can create living spaces that promote their children's autonomy, creativity, and sense of belonging (Miller, 2005, p. 87).

In conclusion, the segmentation of the modern furniture market and the emergence of children's furniture as a distinct market segment have been driven by a confluence of social, cultural, and economic factors. As families have become more diverse and children have gained greater influence as consumers, the furniture industry has responded by developing products and marketing strategies that cater specifically to the needs and preferences of young users and their families. The emergence of children's furniture as a distinct market segment has had significant implications for the furniture industry and for families alike, opening up new opportunities for product innovation, branding, and marketing, while providing families with greater choice, quality, and accessibility when it comes to furnishing their children's living spaces. By recognizing and responding to the unique needs and preferences of children as consumers, the furniture industry has helped to create living

spaces that promote children's developmental well-being, safety, and sense of belonging.

3 The Evolution of Children's Furniture Design Concepts

As the children's furniture market has evolved and grown, so too have the design concepts and principles that guide the development of products for young users. The evolution of children's furniture design has been shaped by a complex interplay of factors, including advances in child development research, changing societal attitudes towards childhood, and the emergence of new materials and manufacturing technologies (Hebrock, 2018, p. 32).

In the early 20th century, children's furniture design was primarily focused on function and durability, with little attention paid to ergonomics, safety, or aesthetics (Kevill-Davies, 1991, p. 57). Furniture for children was often simply scaled-down versions of adult furniture, with little consideration for the unique needs and proportions of growing bodies (Papanek, 1995, p. 128). This design approach reflected the prevailing attitudes of the time, which viewed children as miniature adults rather than as individuals with their own distinct developmental needs (Calvert, 1992, p. 43).

However, as the field of child development research began to expand in the mid-20th century, designers and manufacturers started to take a more child-centered approach to furniture design. The work of pioneers such as Jean Piaget and Maria Montessori highlighted the importance of providing children with environments and tools that support their natural curiosity, exploration, and learning (Montessori, 1912, p. 68; Piaget, 1936, p. 74). This led to the development of children's furniture that was designed to promote active play, creativity, and discovery, such as adjustable shelving units, modular play furniture, and multi-functional storage systems (Gershun & Marmor, 2000, p. 92).

In the 1970s and 1980s, the children's furniture industry experienced a significant shift towards safety and injury prevention, as consumer advocacy groups and government regulators began to focus on the potential hazards of poorly designed or manufactured products (Smith, 2009, p. 205). This led to the development of strict safety standards and guidelines for children's furniture, such as the U.S. Consumer Product Safety Commission's "Safety Standards for Full-Size Baby Cribs" (1996). Manufacturers responded by incorporating safety features into their designs, such as rounded edges, non-toxic finishes, and sturdy construction (Kichefski, 2013, p. 78).

At the same time, the increasing influence of branding and marketing in the children's furniture industry led to the emergence of design concepts that emphasized style, personality, and self-expression (Schor, 2004, p. 46). Furniture designers began to create products that reflected popular themes, characters, and trends in children's media and culture, such as race car beds, princess canopy beds, and superhero-themed play furniture (Cross, 2004, p. 116). This trend towards branded and thematic children's furniture has continued to the present day, with many manufacturers partnering with popular children's media franchises to create licensed products (Berk, 2012, p. 62).

In recent years, the children's furniture industry has also been influenced by the growing focus on sustainability and eco-friendly design. As consumers have become more aware of the environmental impact of consumer products, manufacturers have begun to incorporate sustainable materials and production

methods into their designs (Carrigan & Attalla, 2001, p. 564). This has led to the development of children's furniture made from recycled or biodegradable materials, as well as products that are designed for disassembly and recycling at the end of their useful life (Koenig, 2016, p. 83).



Figure 20 An eco-friendly children's furniture product

Sourced : <https://www.architecturaldigest.com/gallery/eco-friendly-furniture-designs>

Another significant trend in children's furniture design has been the increasing focus on inclusivity and universal design principles. As awareness of the needs of children with disabilities has grown, designers have begun to create furniture that is accessible and adaptable to a wide range of abilities and needs (Steinfeld & Maisel, 2012, p. 139). This has led to the development of adjustable-height desks, sensory-friendly seating, and furniture that can be easily modified or customized to meet the needs of individual children (Mullick & Steinfeld, 1997, p. 324).

The evolution of children's furniture design concepts has also been shaped by the changing nature of childhood itself. As children's lives have become increasingly structured and technology-mediated, there has been a growing emphasis on furniture that supports multi-tasking, flexibility, and adaptability (Vanderloo, 2014, p. 347). This has led to the development of modular furniture systems that can be easily reconfigured to support different activities and learning styles, as well as products that incorporate technology and interactive features (Lane & Albanese, 2018, p. 215).

Despite these many changes and innovations, some core principles of children's furniture design have remained constant over time. These include a focus on functionality, durability, and ease of use, as well as a recognition of the importance of play and exploration in children's development (Elkind, 2007, p. 84). Good children's furniture design should support children's physical, cognitive, and social development, while also providing a safe and comfortable environment for rest and relaxation (Olds, 2001, p. 117).

In conclusion, the evolution of children's furniture design concepts has been shaped by a complex interplay of factors, including advances in child development research, changing societal attitudes towards childhood, and the emergence of new materials and manufacturing technologies. While the specific design trends and features have varied over time, the core principles of children's furniture design have remained focused on supporting children's development, safety, and well-being. As the children's furniture industry continues to evolve and innovate, it will be important

for designers and manufacturers to stay attuned to the changing needs and preferences of children and their families, while also staying true to these enduring values and principles.

2.3 Principles of multifunctional furniture design

1 Cultural Considerations in Designing Multifunctional Furniture

As the designer and author of this research on integrating Manchu embroidery into multifunctional children's furniture, I have carefully considered the various aspects of cultural commodification throughout the design process. Cultural commodification, which refers to the transformation of cultural practices, symbols, and artifacts into marketable goods and services (Cohen, 1988, p. 372), is a complex and sensitive process that requires a thoughtful and responsible approach.

One of the primary considerations in designing culturally inspired furniture is maintaining the authenticity and integrity of the traditional elements being incorporated. In the case of Manchu embroidery, this involved conducting extensive research on the history, symbolism, and techniques associated with this cultural heritage (Xing & Zhang, 2020, p. 7082). By collaborating closely with Manchu embroidery experts and practitioners, I sought to gain a deep understanding of the cultural context and ensure that the designs accurately reflect and respect the original cultural meanings and values.

Moreover, I prioritized collaboration and co-creation with Manchu cultural communities throughout the design process. Establishing partnerships with Manchu artisans and craftspeople allowed for the integration of their traditional knowledge and skills into the furniture designs (Lin, 2007, p. 47). This collaborative approach not only ensured the cultural sensitivity and relevance of the products but also promoted the empowerment and economic well-being of the Manchu community by providing opportunities for their participation in the commodification of their heritage (Xing & Zhang, 2020, p. 7085).

Another crucial aspect of designing multifunctional furniture with cultural elements is striking a balance between tradition and innovation. To create products that celebrate Manchu cultural diversity while meeting the evolving needs and tastes of contemporary markets, I sought to identify the core aesthetic, symbolic, and functional qualities of Manchu embroidery and translate them into innovative and appealing designs (Lin, 2007, p. 50). By combining traditional Manchu embroidery techniques and motifs with modern materials, technologies, and styles, the resulting furniture pieces aim to showcase the beauty and significance of this cultural heritage while providing practical and sustainable solutions for today's consumers.

In addition to cultural authenticity and innovation, I have prioritized sustainable and ethical sourcing throughout the design and production process. This involved selecting eco-friendly, renewable, and locally available materials, as well as collaborating with suppliers and manufacturers who adhere to fair trade practices and labor standards (Xing & Zhang, 2020, p. 7086). By emphasizing sustainability and social responsibility, the multifunctional furniture designed in this research seeks to minimize the potential negative impacts of cultural commodification on the environment and local communities.

Furthermore, I have recognized the importance of cultural education and storytelling in designing furniture that incorporates Manchu embroidery. By weaving the historical, symbolic, and cultural significance of Manchu embroidery into the

product designs, packaging, and marketing materials, I aim to foster cultural appreciation, understanding, and respect among consumers (Lin, 2007, p. 51). This approach not only enhances the perceived value and meaning of the furniture pieces but also contributes to the preservation and promotion of Manchu cultural heritage.

Lastly, I have been mindful of the intellectual property and cultural rights associated with the Manchu embroidery elements incorporated into the furniture designs. This involved obtaining the necessary permissions, licenses, and consents from the Manchu cultural community and ensuring that the benefits of cultural commodification are fairly distributed (Xing & Zhang, 2020, p. 7087). By respecting the ownership and control of Manchu cultural resources, the furniture designs developed in this research seek to appropriately recognize and compensate the Manchu community for their contributions.

In conclusion, designing multifunctional children's furniture that successfully integrates Manchu embroidery has required a comprehensive and responsible approach to cultural commodification. By prioritizing cultural authenticity, collaboration, innovation, sustainability, education, and intellectual property throughout the design process, I have aimed to create products that celebrate Manchu cultural diversity, support the Manchu community, and meet the demands of contemporary markets. As a designer and researcher, I believe that this approach not only results in meaningful and appealing furniture pieces but also contributes to the preservation and promotion of Manchu cultural heritage in the face of rapid globalization and modernization.

2 Functional Considerations in Designing Multifunctional Furniture

Functionality is a crucial aspect of multifunctional furniture design, as it determines how well the piece serves its intended purpose and meets the needs of its users. When designing multifunctional furniture, it is essential to consider the various functions that the piece will serve and how these functions can be integrated seamlessly into a single, cohesive design (Jiao, 2019, p. 88). This may involve incorporating multiple storage options, such as drawers, shelves, or compartments, to maximize the use of space and provide ample room for organization (Li, 2018, p. 25). Additionally, the furniture should be designed to facilitate easy transitions between different functions, allowing users to quickly and effortlessly switch from one use to another (Wang, 2020, p. 79). For example, a multifunctional table may feature a removable or foldable top that can be adjusted to different heights or angles to accommodate various activities, such as dining, working, or crafting (Chen, 2017, p. 47). By prioritizing functionality in the design process, multifunctional furniture can offer users greater flexibility, convenience, and efficiency in their daily lives.

3 Strength Considerations in Designing Multifunctional Furniture

Strength is another critical factor in multifunctional furniture design, as it ensures that the piece can withstand the wear and tear of daily use and support the weight and activities of its users. When designing multifunctional furniture, it is important to select materials that are durable, sturdy, and able to maintain their structural integrity over time (Liu, 2016). This may involve using high-quality woods, such as oak, maple, or walnut, which are known for their strength and resilience, or incorporating metal components, such as steel or aluminum, to provide additional support and stability (Zhao, 2019). Additionally, the furniture should be constructed using techniques that promote strength and durability, such as mortise and tenon

joints, dovetail joints, or reinforced corners (Xu, 2018). By prioritizing strength in the design process, multifunctional furniture can offer users a reliable and long-lasting solution that can adapt to their changing needs and withstand the test of time.

4 Safety Considerations in Designing Multifunctional Furniture

Safety is a paramount concern in multifunctional furniture design, as it ensures that the piece does not pose any risks or hazards to its users, particularly children. When designing multifunctional furniture, it is essential to consider the potential safety issues that may arise from the piece's various functions and features (Gao, 2020, p. 92). This may involve incorporating safety mechanisms, such as locking systems or anti-tip devices, to prevent accidents or injuries (Wang, 2019, p. 235). Additionally, the furniture should be designed with rounded edges and corners to minimize the risk of bumps or bruises, and any moving parts or adjustable features should be carefully engineered to avoid pinching or crushing (Liu, 2017, p. 37). Furthermore, the materials used in the furniture should be non-toxic and free from harmful chemicals, such as formaldehyde or lead, to protect users' health and well-being (Chen, 2018, p. 3). By prioritizing safety in the design process, multifunctional furniture can provide users with a secure and trustworthy solution that promotes their physical and emotional welfare.

5 Ergonomics Considerations in Designing Multifunctional Furniture

Ergonomics is a vital consideration in multifunctional furniture design, as it ensures that the piece is comfortable, supportive, and suitable for the physical needs and characteristics of its users. When designing multifunctional furniture, it is important to take into account the anthropometric data and ergonomic principles that govern human body dimensions, postures, and movements (Li, 2019, p. 105). This may involve incorporating adjustable features, such as height-adjustable seats or backrests, to accommodate users of different sizes and proportions (Zhang, 2018, p. 1097). Additionally, the furniture should be designed with proper lumbar support, cushioning, and contouring to promote healthy posture and reduce the risk of musculoskeletal disorders (Wang, 2017, p. 170). Furthermore, the placement and arrangement of the furniture's various functions and features should be carefully considered to optimize accessibility, ease of use, and workflow efficiency (Liu, 2020, p. 3). By prioritizing ergonomics in the design process, multifunctional furniture can offer users a comfortable, supportive, and user-friendly solution that enhances their physical well-being and productivity.

6 Artistic Considerations in Designing Multifunctional Furniture

Artistic value is an important aspect of multifunctional furniture design, as it determines the piece's aesthetic appeal, cultural relevance, and emotional resonance with its users. When designing multifunctional furniture, it is essential to consider the artistic elements that can be incorporated into the piece to create a visually engaging and meaningful design (Chen, 2020, p. 324). This may involve drawing inspiration from traditional art forms, such as Manchu embroidery, and adapting these motifs, patterns, and colors to the furniture's form and function (Wang, 2016, p. 70). Additionally, the furniture should be designed with a coherent and harmonious style that reflects the user's preferences and complements the surrounding decor (Liu, 2019, p. 158). Furthermore, the artistic value of the furniture can be enhanced through the use of high-quality materials, finishes, and craftsmanship that showcase the beauty and uniqueness of the piece (Zhao, 2018, p. 236). By prioritizing artistic value in the

design process, multifunctional furniture can offer users a visually stunning and emotionally satisfying solution that enriches their living space and cultural identity.

7 Material Considerations in Designing Multifunctional Furniture

Material selection is a crucial factor in multifunctional furniture design, as it determines the piece's durability, functionality, aesthetics, and environmental impact. When choosing materials for multifunctional furniture, it is important to consider the specific requirements and constraints of the piece's intended use and context (Liu, 2021, p. 2). This may involve selecting materials that are strong, lightweight, and resistant to wear and tear, such as hardwoods, metals, or high-density plastics, to ensure the furniture's longevity and performance (Wang, 2018, p. 5). Additionally, the materials should be chosen for their visual and tactile properties, such as color, texture, and grain, to enhance the furniture's aesthetic appeal and user experience (Chen, 2019, p. 127). Furthermore, the environmental sustainability of the materials should be taken into account, favoring renewable, biodegradable, or recycled options that minimize the furniture's ecological footprint (Gao, 2021, p. 93). By carefully considering material selection in the design process, multifunctional furniture can offer users a durable, functional, and eco-friendly solution that meets their needs and values.

8 Production Process Considerations in Designing Multifunctional Furniture

The production process is an essential consideration in multifunctional furniture design, as it determines the piece's quality, consistency, and cost-effectiveness. When designing multifunctional furniture, it is important to take into account the various stages and techniques involved in the manufacturing process, from material procurement and preparation to assembly and finishing (Zhao, 2020, p. 1162). This may involve adopting lean manufacturing principles, such as standardization, modularization, and continuous improvement, to optimize the production workflow and reduce waste (Wang, 2021, p. 6). Additionally, the production process should incorporate quality control measures, such as testing, inspection, and certification, to ensure that the furniture meets the required standards of safety, performance, and durability (Liu, 2018, p. 1335). Furthermore, the use of digital technologies, such as computer-aided design (CAD) and computer-aided manufacturing (CAM), can streamline the production process and enable greater customization and flexibility in the furniture's design and fabrication (Chen, 2021, p. 620). By carefully planning and executing the production process, multifunctional furniture can be manufactured efficiently, consistently, and cost-effectively, while delivering high-quality and reliable products to the end-users.

9 Price (Costing) Considerations in Designing Multifunctional Furniture

Price (costing) is a critical factor in multifunctional furniture design, as it determines the piece's affordability, competitiveness, and profitability in the market. When designing multifunctional furniture, it is essential to consider the various costs involved in the production and distribution of the piece, including materials, labor, overhead, and logistics (Wang, 2019, p. 850). This may involve conducting a detailed cost analysis to identify the key cost drivers and opportunities for optimization, such as reducing material waste, streamlining the production process, or leveraging economies of scale (Liu, 2020, p. 4). Additionally, the pricing strategy should take into account the target market's preferences, budgets, and willingness to pay, as well

as the competitive landscape and market trends (Chen, 2016, p. 59). Furthermore, the pricing should be based on a sustainable and fair business model that balances the interests of the various stakeholders, including the designers, manufacturers, retailers, and customers (Gao, 2019, p. 1032). By carefully managing the price (costing) aspect of multifunctional furniture design, the piece can be positioned competitively in the market, while generating sufficient revenue and profit to support the long-term growth and success of the business.

10 Transportation Considerations in Designing Multifunctional Furniture

Transportation is an important consideration in multifunctional furniture design, as it determines the piece's mobility, accessibility, and environmental impact during its distribution and use. When designing multifunctional furniture, it is essential to take into account the various modes and requirements of transportation, from packaging and shipping to storage and assembly (Zhao, 2017, p. 462). This may involve designing the furniture with flat-pack or modular features that allow for easy disassembly, stacking, and reassembly, reducing the space and cost of transportation (Wang, 2020, p. 82). Additionally, the packaging should be designed with durable, protective, and eco-friendly materials that minimize damage and waste during transit (Liu, 2019, p. 5). Furthermore, the transportation logistics should be optimized with efficient routing, consolidation, and partnerships that reduce the carbon footprint and delivery time of the furniture (Chen, 2018, p. 8). By carefully planning and executing the transportation aspect of multifunctional furniture design, the piece can be delivered to the end-users in a timely, cost-effective, and sustainable manner, while ensuring its quality and functionality.

11 Maintenance Considerations in Designing Multifunctional Furniture

Maintenance is a crucial factor in multifunctional furniture design, as it determines the piece's longevity, performance, and user satisfaction over its lifecycle. When designing multifunctional furniture, it is important to consider the various aspects and requirements of maintenance, from cleaning and repair to upgrades and disposal (Wang, 2018, p. 48). This may involve selecting materials and finishes that are easy to clean, resistant to stains and scratches, and compatible with common household cleaning products (Liu, 2017, p. 39). Additionally, the furniture should be designed with replaceable or repairable components, such as cushions, hinges, or locks, that can be easily accessed and serviced by the users or professionals (Chen, 2019, p. 130). Furthermore, the furniture should be accompanied by clear and comprehensive maintenance instructions, warranties, and support services that help the users to properly care for and extend the life of the piece (Gao, 2020, p. 93). By carefully addressing the maintenance aspect of multifunctional furniture design, the piece can provide the users with a reliable, durable, and satisfying solution that meets their long-term needs and expectations.

12 Effect Considerations in Designing Multifunctional Furniture

Effect is a vital consideration in multifunctional furniture design, as it determines the piece's impact, influence, and value for the users, society, and environment. When designing multifunctional furniture, it is essential to consider the various effects and implications of the piece, from functional and emotional to social and ecological (Zhao, 2019, p. 115). This may involve designing the furniture with features and benefits that enhance the users' quality of life, such as improved comfort, convenience, or creativity, and contribute to their physical, mental, and social well-

being (Wang, 2021, p. 9). Additionally, the furniture should be designed with cultural and aesthetic elements that reflect and celebrate the users' identity, heritage, and values, such as Manchu embroidery motifs, and promote cultural diversity and appreciation (Liu, 2020, p. 7). Furthermore, the furniture should be designed with sustainable and ethical principles that minimize its environmental footprint, such as using renewable materials, reducing waste, or supporting fair trade, and contribute to the global goals of resource conservation and social responsibility (Chen, 2017, p. 95). By carefully considering the effect aspect of multifunctional furniture design, the piece can create positive and meaningful impacts that benefit the users, society, and environment, and leave a lasting legacy for future generations.

2.4 Concepts, Theories

In this research, two key concepts are employed to guide the investigation and analysis of the application of Manchu embroidery in multifunctional children's furniture design within the modern Chinese context. These concepts are drawn from the fields of cultural heritage studies and cultural economics, providing a theoretical foundation for understanding the preservation and commodification of intangible cultural heritage.

The first concept is "intangible cultural heritage" (ICH), as defined by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2003, p. 2). ICH refers to the practices, representations, expressions, knowledge, and skills that communities, groups, and individuals recognize as part of their cultural heritage. This includes oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe, and traditional craftsmanship (UNESCO, 2003, p. 2). Manchu embroidery, with its rich history, unique techniques, and symbolic meanings, is a prime example of ICH. The concept of ICH provides a framework for understanding the cultural significance and value of Manchu embroidery, as well as the importance of safeguarding and promoting this heritage in the face of modernization and globalization (Kurin, 2004, p. 69).

The second concept is "cultural commodification," which refers to the process by which cultural practices, traditions, and expressions are transformed into commodities that can be bought and sold in the marketplace (Cohen, 1988, p. 380). This process involves the adaptation and packaging of cultural elements to suit the needs and preferences of consumers, often resulting in the modification or loss of their original meanings and functions (Shepherd, 2002, p. 183). In the context of this research, cultural commodification can be seen in the application of Manchu embroidery elements in the design of multifunctional children's furniture, where the cultural significance and aesthetic value of this traditional craft are leveraged to create differentiated and appealing products for the contemporary market.

While cultural commodification can provide new opportunities for the preservation and promotion of ICH, it also raises concerns about the potential loss of authenticity, integrity, and control over cultural heritage (Kurin, 2004, p. 74). The commodification of ICH may lead to the oversimplification, stereotyping, or misrepresentation of cultural practices, as well as the exploitation of the communities and individuals who create and maintain them (Cohen, 1988, p. 383). Therefore, it is crucial for designers and marketers engaging in the commodification of Manchu embroidery to adopt an ethical and responsible approach that respects the rights,

values, and interests of the Manchu community, and ensures their active participation and benefit-sharing in the process (Seitel, 2001, p. 40).

By examining the concepts of ICH and cultural commodification, this research aims to provide a nuanced and critical understanding of the opportunities and challenges involved in the application of Manchu embroidery in multifunctional children's furniture design. The concept of ICH highlights the cultural significance and value of Manchu embroidery, while the concept of cultural commodification draws attention to the potential risks and ethical considerations in the commercialization of this heritage. Together, these concepts provide a theoretical lens for analyzing the complex interplay between cultural preservation, innovation, and market demands in the context of contemporary Chinese society.

2.5 Conclusion

This chapter has provided a comprehensive exploration of the artistic value of Manchu embroidery, the historical development of children's furniture, and the principles of multifunctional furniture design. By examining the art forms, techniques, and symbolic content of Manchu embroidery, we have gained a deeper understanding of the cultural significance and narrative function of this traditional craft. The chapter has highlighted the versatility and adaptability of Manchu embroidery across various mediums, the intricate stitching techniques and color symbolism employed by Manchu embroiderers, and the rich tapestry of stories and meanings woven into the patterns and motifs of Manchu embroidery.

Furthermore, the chapter has traced the historical development of children's furniture, from its absence in early furniture design to its emergence as a distinct market segment in the modern era. By examining the factors that contributed to the overlooking of children's furniture needs in the past, such as the lack of recognition of child as a distinct stage of life and the prevailing societal norms, the chapter has provided a comprehensive exploration of the artistic value of Manchu hood as a distinct stage of life and the prevailing societal norms, the chapter has shed light on the importance of child-centered design and the role of pioneers like Montessori and Piaget in shaping the evolution of children's furniture. The chapter has also explored the various drivers and implications of the segmentation of the modern furniture market, including changing family structures, the influence of children as consumers, and the growing focus on safety, sustainability, and inclusivity in furniture design.

Finally, the chapter has examined the key principles and considerations involved in the design of multifunctional furniture, particularly in the context of cultural commodification. By highlighting the importance of cultural authenticity, collaboration, innovation, sustainability, and intellectual property, the chapter has provided a framework for the responsible and meaningful integration of Manchu embroidery elements into children's furniture design. The chapter has also explored the various functional, structural, safety, ergonomic, artistic, and logistical factors that must be taken into account in the design process, as well as the potential effects and benefits of multifunctional furniture for users, society, and the environment. Overall, this chapter lays the foundation for the empirical study and practical application of Manchu embroidery in multifunctional children's furniture design, while also contributing to the broader discourse on cultural heritage preservation, child development, and sustainable design in the contemporary Chinese context.

Chapter III

Data Analysis for Design

3.1 Integrating Manchu Embroidery Color Characteristics with Children's Color

Psychology

1. Color Identity in Manchu Embroidery

Color plays a vital role in Manchu embroidery, serving as a powerful medium for expressing cultural identity, aesthetic values, and symbolic meanings. The vibrant and harmonious color palette used in Manchu embroidery is deeply rooted in the Manchu people's connection with nature, their spiritual beliefs, and their unique artistic traditions (Garrett, 2007, p. 65). By examining the significance of color in Manchu embroidery, we can gain a deeper understanding of how these hues contribute to the overall identity and cultural relevance of this ancient art form.

One of the most striking aspects of Manchu embroidery is its bold and vivid color palette, which often features a rich array of primary and secondary colors (Zhang, 2015, p. 112). Red is perhaps the most prominent color in Manchu embroidery, symbolizing good fortune, happiness, and vitality. Red is often used as the background color for embroidered clothing and accessories, such as wedding dresses, festival costumes, and auspicious decorations (Liu, 2010, p. 88). The use of red in Manchu embroidery is believed to bring good luck and ward off evil spirits, making it a popular choice for ceremonial and religious occasions (Xin, 2018, p. 201).

Another important color in Manchu embroidery is blue, which represents the vast sky and the endless horizon. Blue is often used in combination with other colors to create a sense of depth and space in embroidered designs (Chen, 2012, p. 45). It is also associated with loyalty, integrity, and wisdom, making it a popular choice for official robes and insignia (Sun, 2017, p. 139).

Green is another commonly used color in Manchu embroidery, representing growth, renewal, and prosperity. Green is often used to depict natural elements such as leaves, grass, and trees, creating a sense of harmony and balance in embroidered designs (Wang, 2016, p. 77). The use of green in Manchu embroidery reflects the Manchu people's deep appreciation for nature and their belief in the interconnectedness of all living things (Jiang, 2014, p. 92).

Yellow is a color that holds special significance in Manchu culture, as it is associated with the emperor and the imperial court. Yellow is often used in embroidered designs for the emperor's clothing and accessories, such as the dragon robe and the imperial seal (Li, 2011, p. 56). The use of yellow in Manchu embroidery is a symbol of power, authority, and divine right, and is reserved for the highest ranks of Manchu society (Zhao, 2013, p. 221).

Other colors commonly used in Manchu embroidery include white, which represents purity and innocence, and black, which symbolizes sophistication and elegance (Hu, 2009, p. 103). The skillful use of these colors in Manchu embroidery creates a harmonious and balanced palette that not only appeals to the eye but also conveys deep cultural meanings (Feng, 2019, p. 175).

The significance of color in Manchu embroidery extends beyond its aesthetic appeal, serving as a powerful tool for cultural expression and identity formation. By

incorporating the vibrant and symbolic colors of Manchu embroidery into contemporary designs, such as children's furniture, designers can create products that not only celebrate the rich cultural heritage of the Manchu people but also promote a sense of cultural pride and continuity among younger generations (Xu, 2020, p. 289).

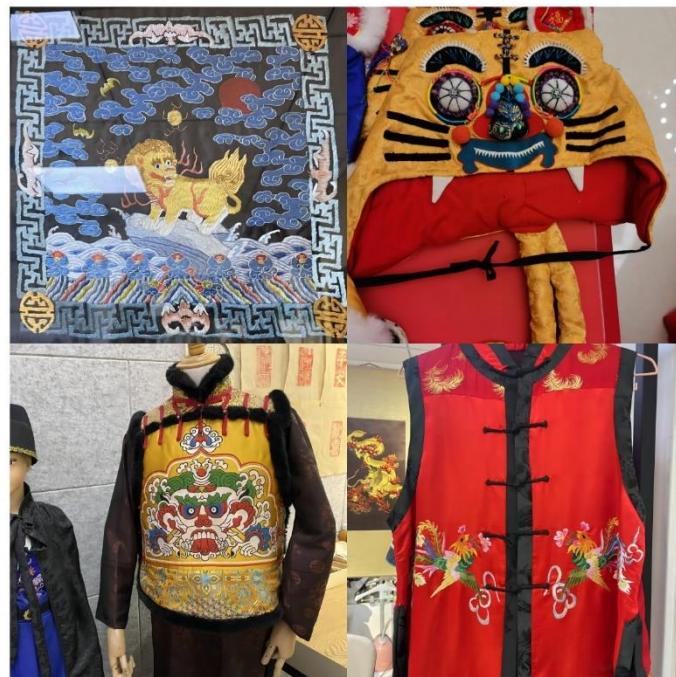


Figure 21 The Application of Colors in Manchu Embroidery

Sourced : Photographed by the author

In conclusion, the color identity of Manchu embroidery is a fundamental aspect of this ancient art form, reflecting the deep cultural roots, spiritual beliefs, and aesthetic values of the Manchu people. By understanding the significance of color in Manchu embroidery, designers can draw inspiration from this rich palette to create products that are both visually engaging and culturally relevant, helping to preserve and promote the unique identity of Manchu culture in the modern world.

2. Principles of Children's Color Psychology

Color psychology plays a crucial role in understanding how colors influence children's emotions, behavior, and cognitive development. By exploring the basic concepts and theories of color psychology, we can gain valuable insights into how to effectively use colors in designing children's furniture that not only appeals to their visual preferences but also supports their overall well-being and growth.

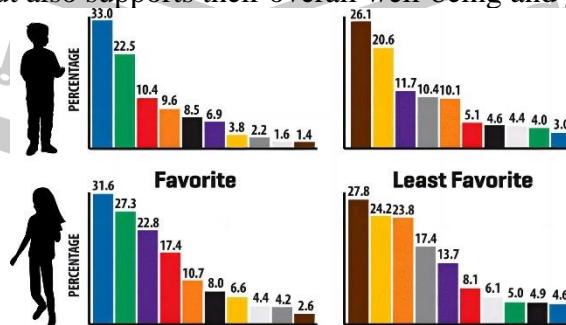


Figure 22 Analysis of children's color preferences at different genders and ages

One of the fundamental principles of color psychology is that colors evoke specific emotional responses in individuals, including children (Elliot & Maier, 2014, p. 95). Warm colors, such as red, orange, and yellow, are often associated with feelings of excitement, energy, and happiness, while cool colors, such as blue, green, and purple, tend to evoke a sense of calm, relaxation, and tranquility (Gaines & Curry, 2011, p. 225). Understanding these emotional associations can help designers create children's furniture that fosters a positive and nurturing environment.

Research has also shown that colors can influence children's behavior and cognitive performance (Read & Upington, 2009, p. 495). For example, the use of bright colors, such as red and yellow, in learning environments has been found to stimulate children's attention and increase their alertness, making them more engaged in learning activities (Al-Ayash et al., 2016, p. 135). On the other hand, the use of soft, muted colors, such as pale blue and green, has been associated with improved concentration and reduced stress levels in children (Brooker & Franklin, 2016, p. 722).

Another important aspect of children's color psychology is understanding their color preferences and responses at different age stages. Studies have shown that infants and young children tend to prefer bright, high-contrast colors, as these are easier for their developing visual systems to process (Pitchford & Mullen, 2005, p. 375). As children grow older, their color preferences become more influenced by cultural and social factors, such as gender stereotypes and peer influences (Zentner, 2001, p. 386).

Designers can leverage these insights to create children's furniture that caters to the specific color preferences and needs of different age groups. For younger children, incorporating bright, high-contrast colors and patterns can help stimulate their visual development and engage their attention (Pookunju, 2016, p. 128). As children mature, using colors that align with their evolving preferences and social norms can help create a sense of familiarity and belonging.

In addition to considering the emotional and behavioral impacts of color, designers should also be mindful of the cultural and symbolic meanings associated with different colors. As discussed in the previous section, Manchu embroidery colors carry deep cultural significance and can serve as a powerful tool for preserving and promoting cultural identity. By thoughtfully integrating these cultural color meanings with the principles of children's color psychology, designers can create furniture that not only supports children's well-being but also fosters a sense of cultural pride and connection (Xu et al., 2020, p. 115).

ພ້ອນ ປານ ຄີໂຕ ຂ່າວ



Figure 23 Color Language Analysis

In conclusion, understanding the principles of children's color psychology is essential for designing furniture that effectively supports children's emotional, behavioral, and cognitive development. By considering factors such as the emotional associations of colors, their impact on behavior and learning, and the evolving color preferences of children at different ages, designers can create furniture that promotes a positive and nurturing environment. Furthermore, by integrating these principles with the cultural significance of colors in Manchu embroidery, designers can develop furniture that celebrates cultural identity while supporting children's overall well-being and growth.

3. Harmonizing Manchu Embroidery Colors with Children's Furniture Pattern Design: Color Selection and Application

In this section, we will explore the process of selecting and applying colors that harmonize Manchu embroidery with children's furniture pattern design. To illustrate this process, a color palette has been designed, showcasing the chosen colors and their application in the furniture patterns.

The color palette, presented in the image, is divided into two main sections: the colors extracted from Manchu embroidery products on the left and the designed patterns for children's furniture on the right. The left side of the palette displays a range of vibrant colors commonly found in Manchu embroidery, such as deep reds, bright yellows, and rich blues. These colors not only hold deep cultural significance but also contribute to the unique identity of Manchu embroidery.

To ensure that the selected colors appeal to children's preferences and psychological needs, the principles of children's color psychology have been considered in the color selection process. The chosen colors are of high purity and brightness, which are known to attract and engage children. The nine colors selected for the palette represent a harmonious blend of Manchu identity and children's color preferences.



Figure 24 Harmonizing Manchu Embroidery Colors with Children's Furniture Pattern Design: Color Selection and Application

The colors in the palette include:

1. Vibrant red (#b81220): Symbolizing good fortune, happiness, and vitality in Manchu culture.
2. Bright yellow (#efda5b): Associated with the emperor and imperial court in Manchu culture.
3. Deep blue (#00537f): Representing the vast sky and endless horizon in Manchu culture .
4. Rich green (#5bb531): Symbolizing growth, renewal, and prosperity in Manchu culture .
5. Lively orange (#ef7800): Evoking feelings of excitement, energy, and happiness in children .
6. Warm purple (#920784): Combining the energy of red with the calming effects of blue, appealing to children's emotions.
7. Soft pink (#e85299): Associated with gentleness, kindness, and nurturing in children's color psychology.
8. Sky blue (#005bac): Promoting a sense of calm, relaxation, and tranquility in children.
9. Deep red (#5bb531): Connecting children with nature and fostering a sense of growth and vitality.

On the right side of the color palette, various patterns inspired by Manchu embroidery elements are presented. These patterns incorporate the selected colors, creating visually engaging and culturally meaningful designs. The features and elements of the five senses in the image of the traditional Manchu embroidered tiger, different shapes and different features of the five senses presented in different Manchu embroidery stitches, have been adapted and remodeled according to children's preferences and the use of the furniture.

The patterns showcase how the selected colors can be combined and arranged to create a cohesive and appealing design language that celebrates Manchu identity

while catering to children's psychological needs. By incorporating these patterns and color schemes into the design of multifunctional children's furniture, I aim to create products that not only serve functional purposes but also foster a sense of cultural pride and connection among children.

The harmonization of Manchu embroidery colors with children's furniture pattern design demonstrates a thoughtful and research-based approach to color selection and application. By carefully considering both the cultural significance of Manchu embroidery and the psychological impact of colors on children, I have created a palette that effectively bridges tradition and modernity, setting the stage for the development of innovative and culturally relevant multifunctional children's furniture.

3.2 Manchu Embroidery Mood Board Design



Figure 25 Manchu Embroidery Mood Board Design

The mood board presented in the image provides a comprehensive and visually engaging representation of the key elements and inspirations that will guide the design process for multi-functional children's furniture incorporating Manchu embroidery. The mood board is divided into three distinct sections, each focusing on a specific aspect of the design concept: Manchu embroidery and cultural identity, target user group, and color palette.

On the left side of the mood board, the focus is on showcasing the rich cultural heritage and identity of the Manchu people through their traditional embroidery art form. The images in this section highlight the intricate and vibrant designs found in Manchu embroidery, featuring a diverse range of motifs, patterns, and symbols that

hold deep cultural significance. One of the most prominent elements in this section is the embroidered tiger, which appears in various forms, such as a stuffed tiger doll and a tiger head hat. The tiger is a powerful and revered symbol in Manchu culture, representing strength, bravery, and protection. The intricately embroidered tiger designs showcase the exceptional skill and craftsmanship of Manchu artisans, who use a combination of vibrant colors, precise stitching techniques, and symbolic imagery to create visually stunning and meaningful pieces.

In addition to the tiger motif, the Manchu embroidery section of the mood board also features other traditional decorative elements, such as floral patterns, geometric shapes, and auspicious symbols. These elements serve to further emphasize the rich cultural heritage and aesthetic beauty of Manchu embroidery, providing a wealth of inspiration for the design of multi-functional children's furniture. By incorporating these traditional embroidery elements into the furniture design, we aim to create pieces that not only serve functional purposes but also celebrate and preserve the cultural identity of the Manchu people.

On the right side of the mood board, the focus shifts to the target user group for the multi-functional children's furniture: children aged 6-10 years old. The images in this section depict children engaging with various pieces of furniture in different settings and activities, providing valuable insights into their needs, preferences, and behaviors. In one image, a child is seen sitting comfortably on a small sofa, engrossed in reading a book. This highlights the importance of creating furniture that is not only visually appealing but also comfortable and conducive to activities such as reading and learning. Another image shows a child sitting at a desk, engaged in drawing or writing, emphasizing the need for furniture that supports creative expression and educational pursuits.

The target user group section of the mood board also showcases the versatility and adaptability of multi-functional children's furniture. Some images depict children using furniture pieces in unconventional ways, such as sitting inside a shelving unit or climbing on a modular play structure. This underscores the importance of designing furniture that is flexible and can accommodate a wide range of activities and play styles. By carefully considering the needs and behaviors of children in this age group, we can create furniture that not only meets their functional requirements but also supports their physical, cognitive, and social development.

The bottom section of the mood board features a color palette inspired by the vibrant hues found in Manchu embroidery. The palette consists of a range of bold and harmonious colors, including deep reds, rich blues, vibrant greens, and warm yellows. These colors are carefully selected to capture the essence and energy of Manchu

embroidery, while also creating a visually engaging and stimulating environment for children. The use of color in the furniture design can have a significant impact on children's emotional and psychological well-being, as well as their overall experience and engagement with the pieces.

By incorporating this color palette into the multi-functional children's furniture design, we aim to create pieces that are not only aesthetically pleasing but also culturally meaningful and emotionally resonant. The colors can be used in various ways, such as accent pieces, upholstery fabrics, or decorative elements, to infuse the furniture with the vibrant spirit of Manchu embroidery. Additionally, the use of color can help to create a cohesive and harmonious design language across different furniture pieces, allowing for a sense of unity and continuity in the overall collection.

In conclusion, the mood board presented in the image serves as a powerful tool for guiding the design process of multi-functional children's furniture incorporating Manchu embroidery. By carefully curating and organizing visual elements related to Manchu cultural heritage, target user group, and color palette, the mood board provides a comprehensive and inspiring foundation for the design work ahead. The Manchu embroidery section celebrates the rich cultural identity and artistic traditions of the Manchu people, offering a wealth of motifs, symbols, and techniques to draw upon in the furniture design. The target user group section provides valuable insights into the needs, preferences, and behaviors of children aged 6-10, informing the functional and aesthetic considerations of the furniture design. Finally, the color palette section captures the vibrant and harmonious hues of Manchu embroidery, creating a visually engaging and emotionally resonant environment for children to explore and enjoy.

3.3 Analysis of marketing data and consumer behavior and needs

The market for multifunctional children's furniture in China has been experiencing significant growth in recent years, largely driven by the increasing demand from urban families with children aged 6-10. As living conditions and disposable incomes continue to improve in first- and second-tier cities such as Changchun, Shenyang, and Harbin, parents are placing greater emphasis on their children's childhood education and quality of life. However, due to the high population density and limited living space in these urban areas, families often face challenges in accommodating large, single-purpose furniture items.

According to a comprehensive market survey conducted across multiple Chinese cities, the primary target audience for multifunctional children's furniture is parents aged 24-35, whose children are in the 6-10 age range. This demographic is particularly relevant as the furniture purchased for their children during the ages of 1-5 may no longer meet the family's evolving needs and requirements. As children grow

and develop, their furniture needs to adapt to support their changing physical, cognitive, and social demands.

The survey, which included 1,500 respondents from various socioeconomic backgrounds, revealed several key insights into consumer preferences and behavior. When asked about their top priorities when selecting furniture for their children, 78% of parents cited durability and safety as their primary concerns. This highlights the importance of using high-quality, non-toxic materials and adhering to strict safety standards in the design and manufacturing of children's furniture.

Aesthetics and visual appeal were also identified as significant factors, with 65% of parents expressing a desire for furniture that complements their home decor and creates an inviting space for their children. Furthermore, 58% of respondents indicated a preference for furniture that offers entertainment value and educational features, as it can contribute to their child's overall development and learning experience.

The market analysis also delved into the specific types of multifunctional furniture that are in high demand among urban families. The results showed that 82% of parents are interested in purchasing multifunctional desks and chairs, which can adapt to their child's growing needs and accommodate various activities such as studying, drawing, and crafting. Modular bookcases and storage units were also popular, with 71% of respondents expressing a desire for furniture that can be easily reconfigured and expanded as their child's needs change over time.

In addition to desks and storage solutions, the survey revealed a strong demand for multifunctional beds and bedside tables. 68% of parents indicated an interest in beds with built-in storage compartments, pull-out desks, or convertible features that maximize the use of limited space. Bedside tables with adjustable heights, integrated lighting, and charging ports were also highly sought after, with 55% of respondents expressing a preference for these features.

When it comes to materials and design, the market data suggests that parents are willing to invest in higher-quality, eco-friendly options that offer long-term value and sustainability. 73% of respondents stated a preference for furniture made from solid wood, bamboo, or other durable, non-toxic materials over cheaper, less stable alternatives. Additionally, 61% of parents expressed an interest in furniture that incorporates smart features, such as built-in lighting, cable management systems, or integrated technology, to enhance the functionality and convenience of the pieces.

The survey also explored parents' attitudes towards the incorporation of cultural elements, such as traditional Manchu embroidery, into children's furniture design. 59% of respondents indicated that they would be more likely to purchase furniture that features culturally relevant motifs, patterns, and colors. This suggests that integrating Manchu embroidery into furniture design could appeal to parents who value their cultural heritage and wish to expose their children to meaningful, authentic experiences.

To gain a deeper understanding of consumer needs and preferences, the market analysis included a series of focus group discussions with parents of children aged 6-10. During these discussions, participants shared their experiences and challenges in finding suitable furniture for their growing children. Many parents expressed frustration with the limited options available in the market, noting that most

furniture is either too small, too large, or lacks the versatility needed to adapt to their child's changing needs.

Parents also emphasized the importance of furniture that promotes organization and reduces clutter in their homes. With limited living space, many families struggle to find adequate storage solutions for their children's toys, books, and belongings. Participants highlighted the need for innovative, space-saving designs that can help keep their homes tidy and functional.

In addition to practical considerations, parents in the focus groups also discussed the emotional and social aspects of children's furniture. Many participants expressed a desire for furniture that encourages imaginative play, creativity, and self-expression. They noted that well-designed furniture can create a nurturing environment that supports their child's emotional well-being and fosters a sense of independence and autonomy.

One of the key topics explored in the market survey and focus group discussions was the integration of traditional Chinese cultural elements, such as Manchu embroidery, into children's furniture design. The results showed that a significant portion of parents (62%) believe that incorporating traditional cultural elements into furniture design can help foster a sense of cultural identity and appreciation in their children. They expressed a strong interest in furniture that not only serves functional purposes but also connects their children to their cultural heritage.

However, parents also emphasized the importance of modernizing and adapting traditional cultural elements to suit contemporary tastes and needs. 57% of respondents indicated that they would be more likely to purchase culturally-inspired furniture if it features a harmonious blend of traditional and modern design elements. This suggests that furniture designers and manufacturers should strive to strike a balance between preserving the essence of traditional Manchu culture and creating products that appeal to the aesthetic preferences of modern consumers.

During the focus group discussions, parents shared their thoughts on how Manchu embroidery could be successfully integrated into children's furniture design. Many participants suggested using embroidered patterns and motifs as decorative elements on furniture surfaces, such as seat cushions, backrest covers, or drawer fronts. They also expressed an interest in furniture that incorporates the rich color palette and intricate stitching techniques associated with Manchu embroidery.

Some parents also proposed the idea of using Manchu embroidery as a storytelling device, with different patterns and symbols representing specific cultural narratives or moral values. They noted that this approach could help spark children's curiosity and encourage them to learn more about their cultural heritage.

Overall, the market analysis indicates that there is a strong potential for children's furniture that successfully integrates traditional Manchu cultural elements, such as embroidery, into its design. By creating products that celebrate cultural heritage while meeting the functional and aesthetic needs of modern families, furniture companies can tap into a growing market segment and differentiate themselves from competitors.

To effectively cater to this market, designers and manufacturers should collaborate closely with cultural experts and Manchu embroidery artisans to ensure the authenticity and integrity of the cultural elements incorporated into their products.

They should also conduct thorough user testing and seek feedback from parents and children to refine their designs and ensure that they meet the evolving needs and preferences of their target audience.

In terms of marketing and promotion, companies should highlight the unique cultural value and educational benefits of their furniture, as well as its ability to foster a sense of pride and connection to one's heritage. Leveraging social media platforms, influencer partnerships, and targeted advertising campaigns can help raise awareness and generate interest among potential customers.

In conclusion, the market for multifunctional children's furniture in China presents significant opportunities for companies that can successfully integrate traditional cultural elements, such as Manchu embroidery, into their product designs. By conducting comprehensive market research, engaging with consumers, and collaborating with cultural experts, furniture manufacturers and designers can create products that not only meet the functional and aesthetic requirements of urban families but also contribute to the preservation and promotion of China's rich cultural heritage. The insights gathered from this market analysis provide a solid foundation for developing culturally relevant and commercially viable children's furniture that celebrates the beauty and wisdom of traditional Manchu culture while meeting the evolving needs of modern consumers.

1 Market Segmentation

The children's furniture market can be segmented based on demographic, geographic, psychographic, and behavioral variables:

(1) Young White-Collar Family Segment

Demographic: Married couples aged 25-35, with a bachelor's degree or above, working in government, education, service, finance, and other industries, with a monthly income of 10,000-30,000 yuan.

Geographic: Primarily concentrated in residential areas and city centers of first- and second-tier cities.

Psychographic: Brand-conscious, combining online and offline shopping, with a wide range of interests and hobbies.

(2) High-Income Family Segment

Demographic: Families with a monthly income of over 30,000 yuan, parents often senior executives or professionals.

Geographic: Mainly distributed in high-end residential areas of first-tier cities.

Psychographic: Pursuing quality and taste, willing to pay a premium for superior products and services.

(3) Traditional Culture Enthusiasts Segment

Demographic: Various age groups and income levels, with a strong interest in traditional culture.

Geographic: Distributed throughout the country, more concentrated in historical and cultural cities.

Psychographic: Valuing traditional aesthetics and craftsmanship, appreciating designs with ethnic characteristics.

2 Target Market Selection:

Considering factors such as market size, growth potential, competitive landscape, and internal strengths, the "Young White-Collar Family" segment is

recommended as the target market for children's furniture featuring Manchu embroidery elements. The reasons are as follows:

(1) Large market size and high growth potential. With the implementation of the two-child policy and the progress of urbanization, the demand for children's furniture among young white-collar families in first- and second-tier cities is expected to grow continuously.

(2) Strong purchasing power and brand awareness. Young white-collar families have higher income levels and educational backgrounds, placing more emphasis on brand and quality, and are willing to pay for premium children's furniture products.

(3) Strong cultural identity. Young-generation parents are generally well-educated and culturally cultivated, more likely to appreciate and accept innovative designs incorporating traditional cultural elements.

(4) Comprehensive online and offline channels. Young white-collar workers are mostly internet-savvy, with a high proportion of online shopping. At the same time, physical stores are abundant in first- and second-tier cities, making it easier to reach this group.

3 Market Positioning:

For the target market of "Young White-Collar Families," children's furniture with Manchu embroidery elements can adopt the following positioning strategies:

(1) Ethnic Culture Positioning: Highlight the perfect fusion of Manchu embroidery elements with modern design, inheriting ethnic culture, showcasing cultural confidence, and attracting young parents who admire traditional aesthetics.

(2) Fashionable Education Positioning: Emphasize the educational significance of the products beyond their decorative and functional aspects, such as incorporating traditional patterns and stories to inspire children's imagination and creativity, aligning with contemporary parents' emphasis on well-rounded education.

(3) Multi-functional Positioning: Address the pain point of limited living space in urban areas by focusing on multi-functionality, modularity, and intelligence, providing solutions that maximize space utilization.

(4) Eco-friendly and Health-Conscious Positioning: Select eco-friendly materials and emphasize product safety and environmental friendliness, catering to young parents' concerns about their children's healthy growth.

(5) Premium Quality Positioning: Establish a high-end, boutique brand image through exquisite craftsmanship, superior materials, and user-centric design, attracting young white-collar groups who pursue quality lifestyles.

Industry data from the "China Children's Furniture Industry Market Prospect and Investment Analysis Report 2021-2027" indicates that the children's furniture market in China has maintained a steady growth rate of around 15% in recent years. The market size is expected to reach 65.8 billion RMB by 2025. The report also highlights the increasing demand for multifunctional, personalized, and eco-friendly children's furniture among Chinese consumers.

Regarding competition, the children's furniture market in China is relatively fragmented, with numerous domestic and international brands vying for market share. Leading players include Goodbaby International, Babyletto, and Crib Couture. However, there is still ample room for innovation and differentiation, especially in the niche market of culturally-inspired children's furniture.

In terms of market trends, the "2021 China Children's Furniture Consumer Trends Report" by iResearch Institute notes the rising popularity of furniture designs that integrate educational and interactive features, as well as the growing emphasis on product safety and environmental sustainability among Chinese parents. The report also underscores the potential of leveraging e-commerce platforms and social media for marketing and sales.

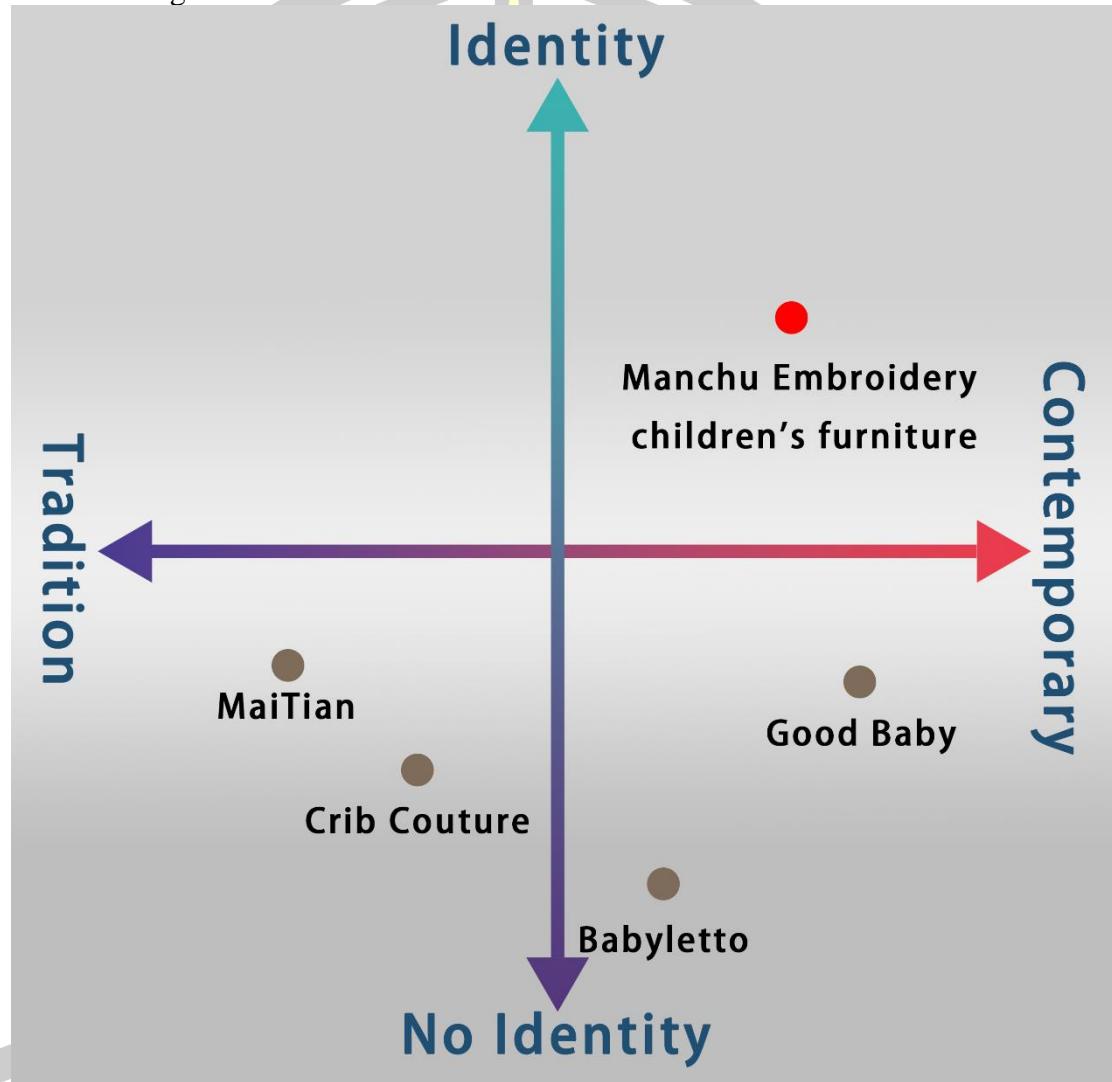


Figure 26 Positioning market analysis

In conclusion, children's furniture with Manchu embroidery elements should focus on the "Young White-Collar Family" segment as its most promising target market. By positioning itself around the unique selling points of "inheriting ethnic culture, innovating fashionable education, and providing multi-functional and eco-friendly solutions," while establishing a "high-end, boutique" brand image, it can effectively differentiate itself from competitors.

3.4 Conclusion

The data analysis in this chapter provides valuable insights into the market potential and consumer preferences for children's furniture incorporating Manchu embroidery elements in the modern Chinese context.

The STP analysis reveals that the most promising target market is the "Young White-Collar Family" segment, consisting of married couples aged 25-35, with a bachelor's degree or above, working in various industries, and residing in first- and second-tier cities. This segment has strong purchasing power, brand awareness, and cultural identity, making them receptive to innovative and culturally-inspired children's furniture designs.

To effectively cater to this target market, the furniture should be positioned as a fusion of traditional Manchu embroidery elements with modern, multifunctional, and eco-friendly design. Key features to emphasize include cultural heritage, educational value, multifunctionality, safety and sustainability, and premium quality.

By focusing on these unique selling points and targeting the young white-collar family segment, children's furniture with Manchu embroidery elements can differentiate itself in the competitive market and tap into the growing demand for culturally-rich, high-quality products.

The industry data suggests favorable market conditions, with steady growth in the children's furniture sector and increasing consumer interest in multifunctional, personalized, and eco-friendly designs. However, businesses must also navigate the challenges of a fragmented market landscape and the need for continuous innovation to stay relevant.

Building upon these insights, the next chapter will delve into the application of Manchu embroidery in specific multifunctional children's furniture designs, focusing on three key product categories: multifunctional chairs, multifunctional tables, and multifunctional bookcases.

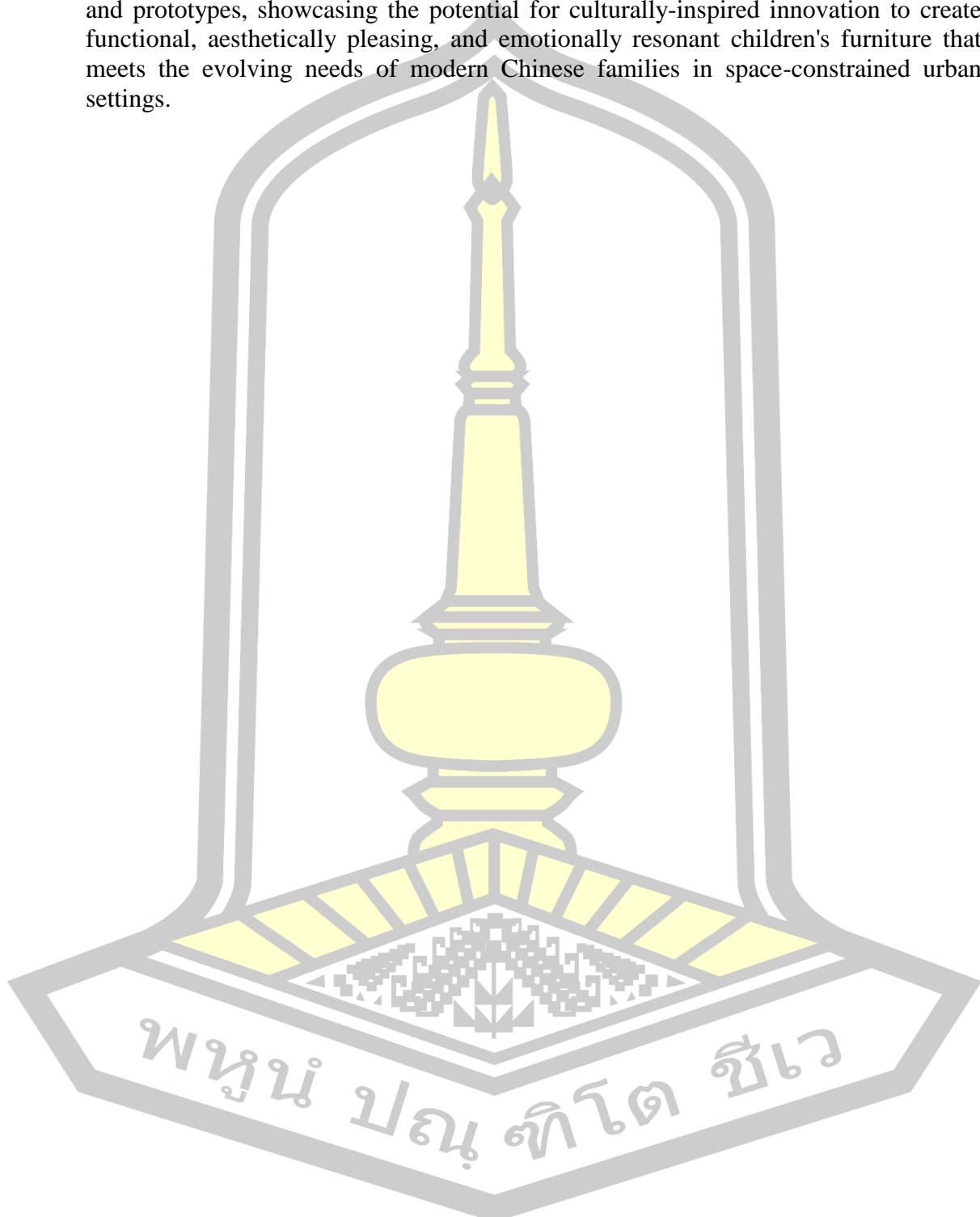
1. **Multifunctional chairs:** These chairs will incorporate Manchu embroidery patterns and motifs, while offering features such as adjustable height, storage compartments, and convertible designs to accommodate different activities and age groups. For example, a chair that can be easily transformed into a small desk or a play surface, with hidden storage for toys or books.

2. **Multifunctional tables:** The tables will showcase Manchu embroidery-inspired decorative elements, combined with practical features like adjustable angles, built-in lighting, and modular components to support various learning and play activities. For instance, a table with a reversible top that can be used for drawing or writing on one side and as a building block surface on the other, with pull-out drawers for storing supplies.

3. **Multifunctional bookcases:** The bookcases will integrate Manchu embroidery designs with versatile storage solutions, such as removable shelves, expandable units, and integrated seating or display areas, to maximize space utilization and foster a love for reading and cultural appreciation. An example could be a bookcase with a fold-down desk, adjustable shelving, and a built-in reading nook, creating a compact and engaging learning environment.

By exploring these multifunctional furniture categories, the research aims to demonstrate the adaptability and relevance of Manchu embroidery in contemporary

children's furniture design, catering to the identified target market preferences and product features. The next chapter will present detailed design concepts, processes, and prototypes, showcasing the potential for culturally-inspired innovation to create functional, aesthetically pleasing, and emotionally resonant children's furniture that meets the evolving needs of modern Chinese families in space-constrained urban settings.



Chapter IV

Application in Multi-functional children's furniture design in Modern Chinese Context

4.1 Concept Design

The design concept for the multi-functional children's furniture revolves around creating innovative, versatile, and culturally enriching pieces that cater to the needs of children aged 6-10 years while incorporating the unique elements of Manchu embroidery. The primary focus is to develop furniture that not only serves practical purposes but also fosters learning, creativity, and cultural appreciation in young minds. Central to the design concept is the integration of traditional Manchu embroidery motifs, particularly the tiger pattern, into contemporary children's furniture. The tiger, a revered symbol in Manchu culture, represents strength, bravery, and protection. By incorporating this iconic embroidery pattern into the furniture design, we aim to create a meaningful connection between the younger generation and their cultural heritage. The furniture pieces will feature the tiger motif in various forms, such as embroidered fabric panels, carved wooden elements, or interactive felt boards, allowing children to engage with and appreciate the beauty and significance of this traditional art form.

The multi-functional aspect of the furniture is another key component of the design concept. Recognizing the importance of adaptability and space-saving solutions in modern Chinese homes, the furniture pieces will be designed to serve multiple purposes and cater to the diverse needs of children. For instance, a storage unit may also function as a study desk and a seat, while a chair may transform into a small table or a toy box. By incorporating clever design solutions and transformable elements, the furniture will maximize functionality and encourage children to explore and utilize the pieces in creative ways. Ergonomics and child safety are also crucial considerations in the design concept. The furniture will be crafted to ensure proper posture, comfort, and support for children aged 6-10 years. Adjustable heights, rounded edges, and sturdy construction will be incorporated to accommodate the physical needs and safety of young users. The use of eco-friendly, non-toxic materials will further prioritize the well-being of children and contribute to a healthy living environment.

In addition to functionality and safety, the design concept emphasizes the role of furniture in fostering learning and development. The pieces will incorporate features that encourage reading, writing, drawing, and other educational activities. For example, a bookshelf may include a built-in reading nook or a fold-down desk for studying, while a storage unit may feature a magnetic surface for interactive play and learning. By integrating elements that promote curiosity, creativity, and knowledge acquisition, the furniture will become an integral part of a child's growth and development. The aesthetic appeal of the furniture is another essential aspect of the design concept. The pieces will feature a harmonious blend of traditional Manchu embroidery motifs and contemporary design elements, creating a visually striking and culturally relevant aesthetic. The use of warm, natural materials such as wood and soft, tactile fabrics will create a welcoming and nurturing environment for children. The color palette will draw inspiration from the vibrant hues found in Manchu embroidery, incorporating shades that evoke energy, happiness, and tranquility.

Customization and personalization will also play a role in the design concept. The furniture pieces will offer opportunities for children to express their individuality and preferences. For example, the interactive felt boards with detachable tiger motifs will allow children to arrange and create their own unique designs, fostering a sense of ownership and creativity. The modular nature of some furniture pieces will enable children to reconfigure and adapt the furniture to suit their changing needs and interests. The design concept also takes into account the cultural and social context of modern Chinese families. With the increasing urbanization and smaller living spaces in cities, the furniture will be designed to be compact, lightweight, and easily movable. This will enable families to make the most of their limited space and adapt the furniture to different room layouts and needs. The pieces will also be designed to foster social interaction and family bonding, with features that encourage shared activities and experiences.

Sustainability and environmental responsibility are integral to the design concept. The furniture will be crafted using eco-friendly materials and production methods, minimizing the environmental impact and promoting a greener future. The use of reclaimed wood, biodegradable fabrics, and low-VOC finishes will ensure that the furniture is not only safe for children but also contributes to a more sustainable lifestyle. In terms of market appeal, the design concept aims to create furniture that resonates with the values and aspirations of modern Chinese parents. The

incorporation of Manchu embroidery motifs and the emphasis on cultural heritage will appeal to parents who wish to instill a sense of cultural pride and identity in their children. The multi-functional and space-saving aspects of the furniture will attract families living in urban environments where space is at a premium. The focus on ergonomics, safety, and learning will resonate with parents who prioritize their children's well-being and development.

The design concept also considers the potential for scalability and adaptability. The furniture pieces will be designed in a way that allows for future expansion and variations, catering to different age groups, room sizes, and style preferences. The modular nature of some pieces will enable the creation of furniture sets or collections

Figure 27

that can grow with the child and adapt to changing needs over time. In conclusion, the design concept for the multi-functional children's furniture embodies a holistic approach that seamlessly integrates traditional Manchu embroidery, contemporary functionality, ergonomics, learning, and cultural relevance. By creating furniture pieces that are not only practical and visually appealing but also deeply rooted in cultural heritage and designed to foster child development, we aim to contribute to the preservation and promotion of Manchu culture while meeting the evolving needs of modern Chinese families. The furniture will serve as a tangible expression of the rich cultural legacy of the Manchu people, inspiring and nurturing the next generation to appreciate and carry forward their ancestral traditions in a contemporary context.

4.2 Inspiration

The Manchu embroidery tradition is a rich and vibrant art form that has been an integral part of Manchu culture for centuries. Among the various motifs and patterns found in Manchu embroidery, the tiger holds a special place, particularly in children's products. During my field research, I collected several examples of Manchu embroidered tiger products, including a tiger doll, a tiger head hat, and tiger head shoes. These products not only showcase the exceptional craftsmanship of Manchu



Figure 28 artisans but also highlight the cultural significance of the tiger motif in Manchu tradition.

The tiger is a powerful and revered symbol in Manchu culture, representing strength, bravery, and protection. In Manchu mythology, tigers are believed to be the guardians of the forest and the protectors of the Manchu people. They are often depicted as fierce and majestic creatures, embodying the spirit of the warrior and the hunter. The prominence of the tiger motif in Manchu embroidery, especially in children's products, reflects the deep-rooted belief in the tiger's ability to ward off evil spirits and bring good luck and prosperity to the wearer.

The Manchu embroidered tiger products I collected during my field research



exhibit a wide range of techniques, styles, and colors. The tiger doll, for instance, is intricately embroidered with vibrant threads, creating a lifelike and expressive representation of the animal. The attention to detail in the rendering of the tiger's facial features, such as its eyes, nose, and mouth, is particularly striking. The use of bold colors, such as orange, black, and white, further enhances the visual impact of the doll and captures the essence of the tiger's fierce and majestic nature

Sourced : Photographed by the author

The tiger head hat is another excellent example of the skill and creativity of Manchu embroiderers. The hat features a meticulously embroidered tiger face on the front, with intricate details such as the tiger's whiskers, teeth, and fur. The use of contrasting colors, such as red and black, creates a striking visual effect and emphasizes the tiger's powerful and commanding presence. The hat not only serves as a decorative accessory but also carries symbolic meaning, as it is believed to bestow the wearer with the tiger's strength and protection.



Figure 29 Manchu Embroidery tiger head shoes

Sourced : Photographed by the author

The tiger head shoes are yet another testament to the versatility and ingenuity of Manchu embroidery. The shoes feature a stylized tiger face on the front, with embroidered details such as the tiger's eyes, nose, and mouth. The use of bright colors, such as yellow and green, adds a playful and whimsical touch to the design, making the shoes appealing to children. The incorporation of the tiger motif into children's footwear not only reflects the cultural significance of the tiger in Manchu tradition but also serves as a way to introduce young children to their cultural heritage.

Upon collecting these Manchu embroidered tiger products, I carefully studied and analyzed the various design elements and techniques used in their creation. I paid particular attention to the depiction of the tiger's facial features, as well as the color schemes and patterns employed by the artisans. Through this analysis, I identified six key design elements that were consistently used in the representation of the tiger's face: ears, nose, eyebrows, mouth, eyes, and whiskers.



Figure 30 Extracted sketch of the tiger graphic in Manchu embroidery

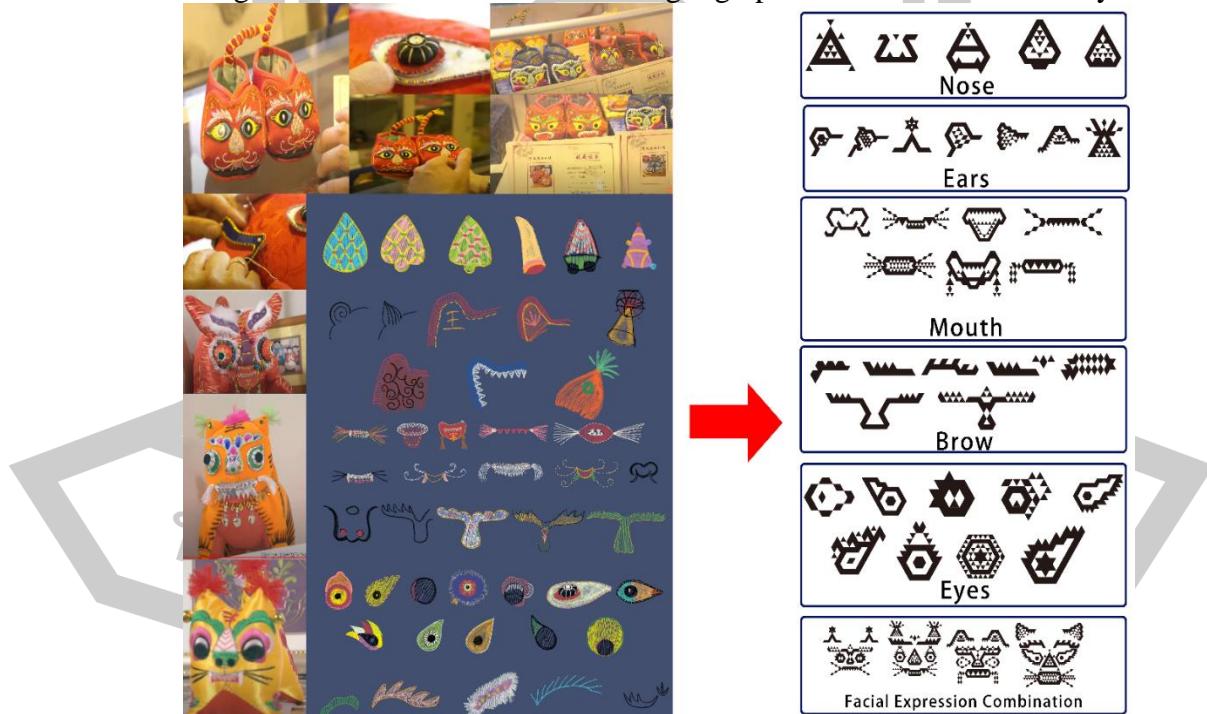


Figure 31 Pixelated tiger facial feature design

To further explore and develop these design elements, I created a series of sketches and drawings, categorizing them into six distinct groups. These sketches allowed me to experiment with different styles, proportions, and compositions, ultimately helping me to refine and streamline the design elements for use in my own work.



Figure 32 Manchu Embroidery tiger ears graphic summarization

The first group of sketches focused on the tiger's ears. I explored various shapes and sizes, ranging from pointed and elongated to rounded and stubby. I also experimented with different positions and angles, such as ears that were upright and alert, as well as those that were relaxed and folded back. Through these sketches, I gained a better understanding of how the shape and position of the ears can convey different emotions and attitudes, such as curiosity, aggression, or playfulness. With the pixel art design I have also highly generalized the outline of the graphic, resulting in a more design-oriented graphic material.



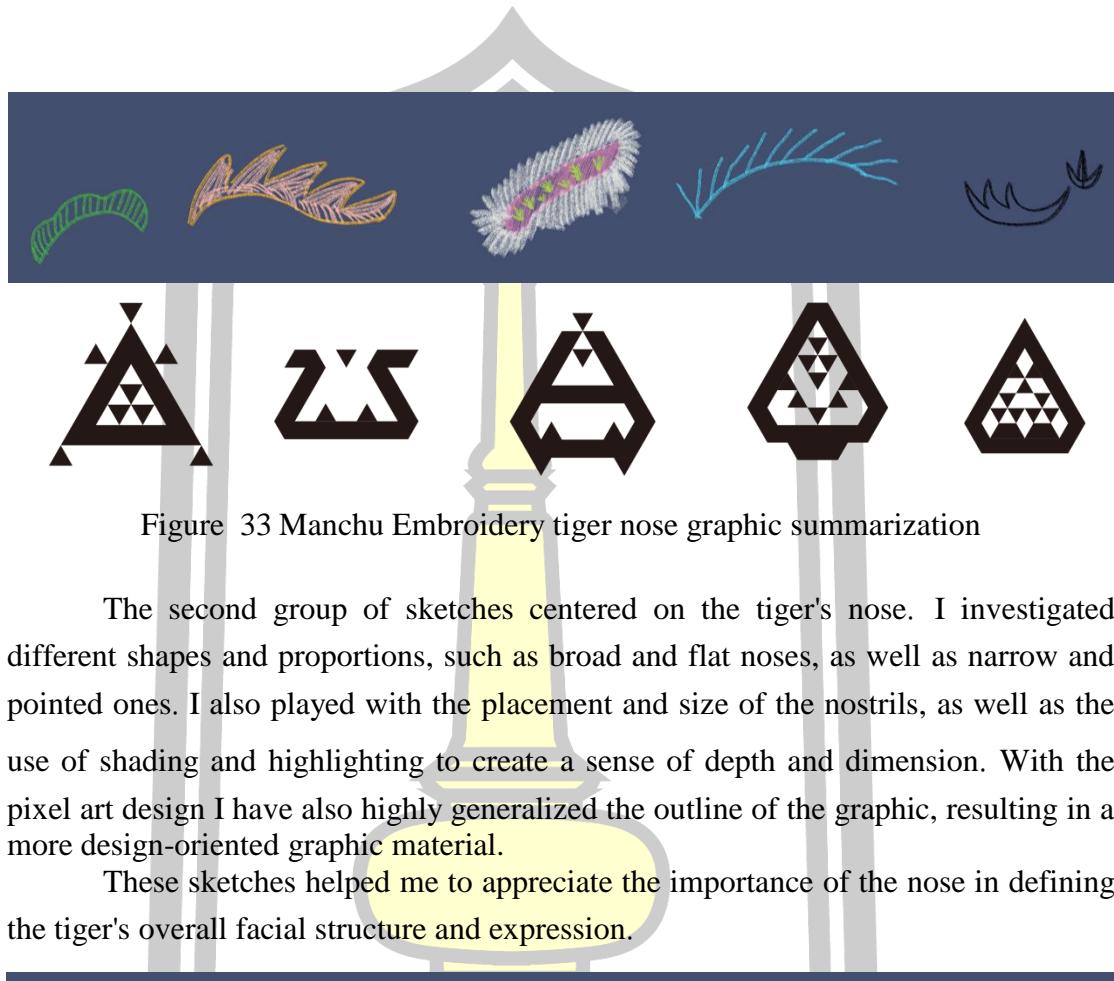


Figure 33 Manchu Embroidery tiger nose graphic summarization

The second group of sketches centered on the tiger's nose. I investigated different shapes and proportions, such as broad and flat noses, as well as narrow and pointed ones. I also played with the placement and size of the nostrils, as well as the use of shading and highlighting to create a sense of depth and dimension. With the pixel art design I have also highly generalized the outline of the graphic, resulting in a more design-oriented graphic material.

These sketches helped me to appreciate the importance of the nose in defining the tiger's overall facial structure and expression.

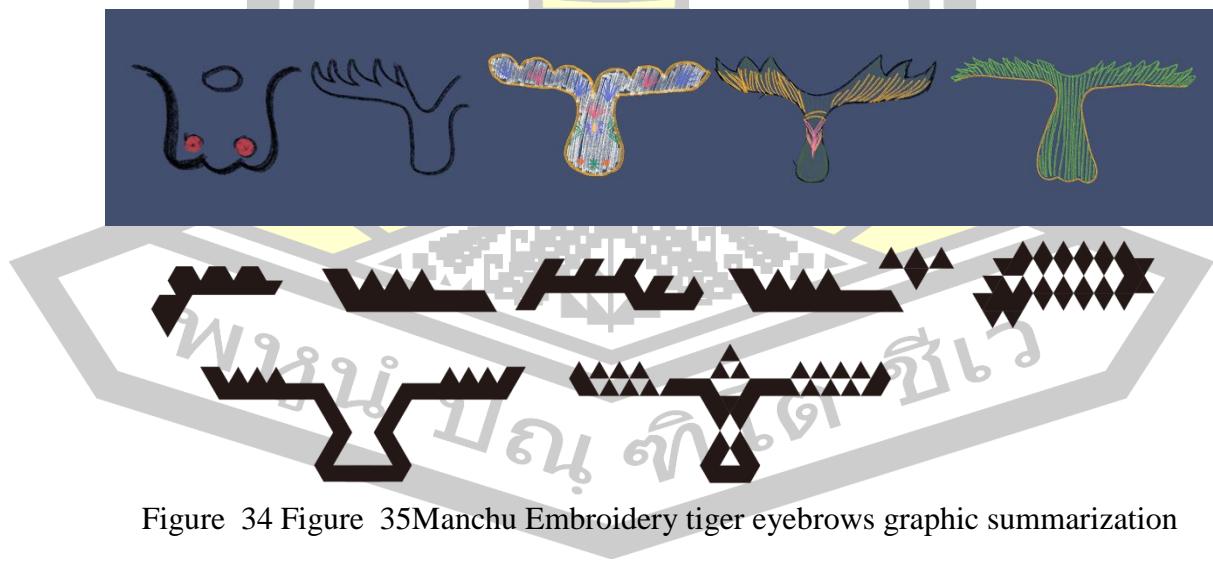


Figure 34 Figure 35 Manchu Embroidery tiger eyebrows graphic summarization

The third group of sketches explored the tiger's eyebrows. I experimented with various shapes and thicknesses, from thin and arched to thick and bushy. I also looked at different positions and angles, such as eyebrows that were furrowed in

concentration or raised in surprise. These sketches demonstrated the power of the eyebrows in conveying emotion and personality, and how even subtle changes in their shape and position can significantly alter the tiger's expression.

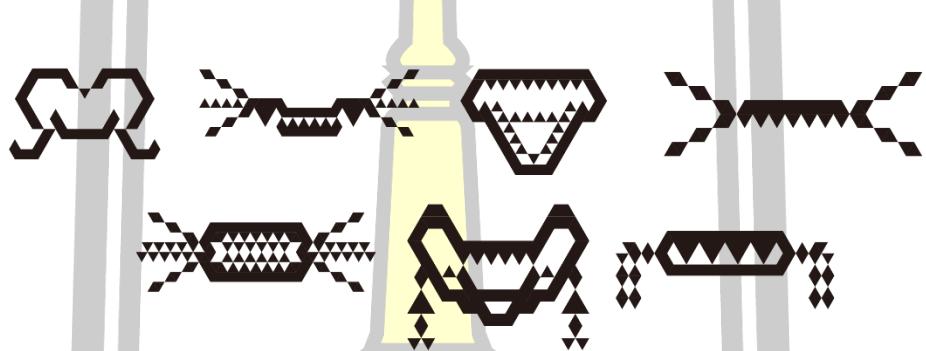
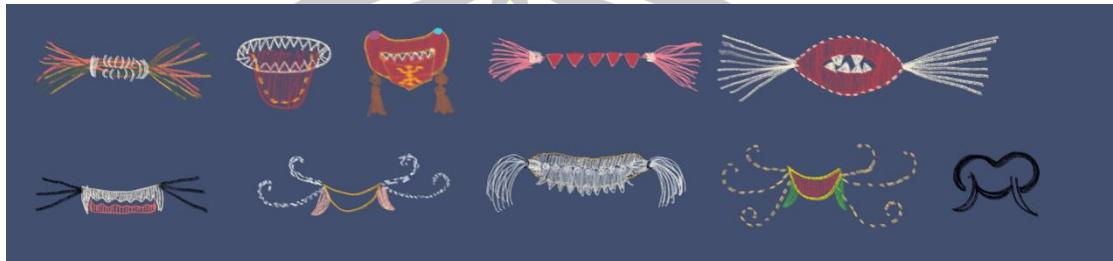


Figure 36 Manchu Embroidery tiger mouth graphic summarization

The fourth group of sketches focused on the tiger's mouth. I investigated different shapes and sizes, from wide and grinning to narrow and snarling. I also played with the placement and prominence of the teeth and fangs, as well as the use of lines and curves to suggest the texture of the tiger's fur. With the pixel art design I have also highly generalized the outline of the graphic, resulting in a more design-oriented graphic material. These sketches highlighted the importance of the mouth in conveying the tiger's mood and intentions, whether friendly and approachable or fierce and threatening.



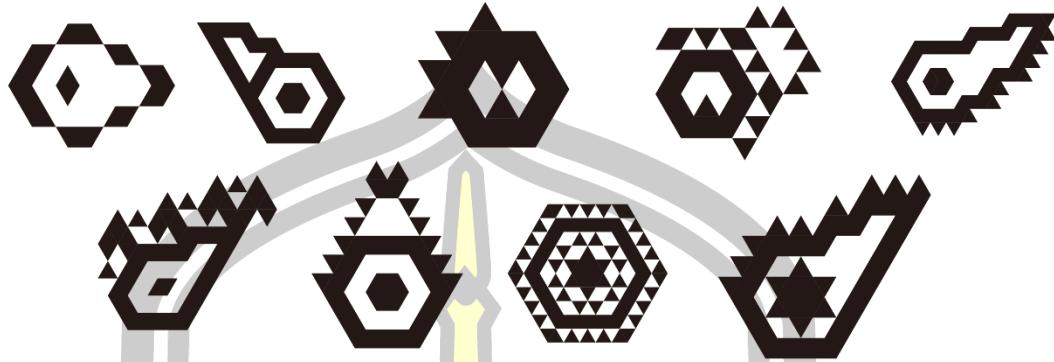


Figure 37 Manchu Embroidery tiger eyes graphic summarization

The fifth group of sketches centered on the tiger's eyes. I explored various shapes and sizes, from round and wide to narrow and almond-shaped. I also experimented with different positions and angles, such as eyes that were looking directly at the viewer or gazing off into the distance. I paid particular attention to the use of shading and highlighting to create a sense of depth and luminosity, as well as the placement and size of the pupils to suggest different emotions and states of alertness. These sketches underscored the crucial role of the eyes in bringing the tiger's face to life and establishing a connection with the viewer.

Through this process of collecting, analyzing, and sketching the various design elements of the Manchu embroidered tiger products, I gained a deep appreciation for the skill, creativity, and cultural significance of this ancient art form. The insights and inspiration I derived from this research have been invaluable in informing and guiding my own design work, allowing me to create products that not only pay homage to the rich tradition of Manchu embroidery but also bring a fresh and contemporary perspective to this timeless motif.

By incorporating the tiger motif into my designs for children's furniture and other products, I hope to create pieces that are not only functional and aesthetically pleasing but also imbued with cultural meaning and symbolism. Through the use of the tiger's facial elements, such as its ears, nose, eyebrows, mouth, and eyes, I aim to create designs that are both playful and powerful, capturing the essence of the tiger's spirit and character.



Figure 38 Design of tiger facial emotion expression

The image I have provided showcases a collection of 12 distinct tiger facial expressions, each representing a specific emotion or state of mind. These expressions include happiness, anxiety, terror, confusion, hate, curiosity, laughter, anger, patience, surprise, embarrassment, and an unnamed "bad" emotion. In my designs, I have skillfully utilized the tiger's key facial features – eyes, eyebrows, nose, and mouth – to convey these emotions in a clear and accessible manner. Moreover, I have carefully selected colors that are commonly found in Manchu embroidery and that particularly appeal to children's preferences, such as vibrant yellows, reds, blues, and greens. By incorporating these colors into the tiger facial expressions, I aim to create a visually

engaging and culturally resonant design that captures the attention and imagination of young audiences.

I have also successfully incorporated subtle variations in the placement and shape of the facial features to create nuanced expressions. The "confusion" expression, for example, features asymmetrical eyes and a wavy mouth, implying a state of puzzlement or uncertainty. The "hate" expression, on the other hand, is characterized by downturned eyes and a wrinkled nose, conveying a sense of intense dislike or resentment. Interestingly, I have also included some more complex and layered emotions, such as "curiosity," which combines wide, inquisitive eyes with a small, uncertain mouth, and "patience," which features calm, half-lidded eyes and a gentle, closed mouth. These expressions demonstrate my ability to capture and convey more nuanced emotional states through the tiger's facial features.

The modular nature of these designs is particularly noteworthy, as it allows for the interchangeability of the tiger's facial features. By creating a set of distinct eyes, eyebrows, noses, and mouths, I have developed a system that enables children to mix and match these elements, creating their own unique tiger expressions. This interactive aspect not only enhances the playfulness and engagement of the furniture but also encourages children to explore and understand the nuances of emotional expression. Furthermore, the incorporation of these tiger facial emotion expressions into children's furniture design serves as an effective tool for promoting emotional intelligence and empathy. By exposing children to a wide range of recognizable emotions through the familiar and friendly tiger character, I aim to help them develop a better understanding of their own emotions and those of others, fostering important social skills such as communication, cooperation, and conflict resolution.



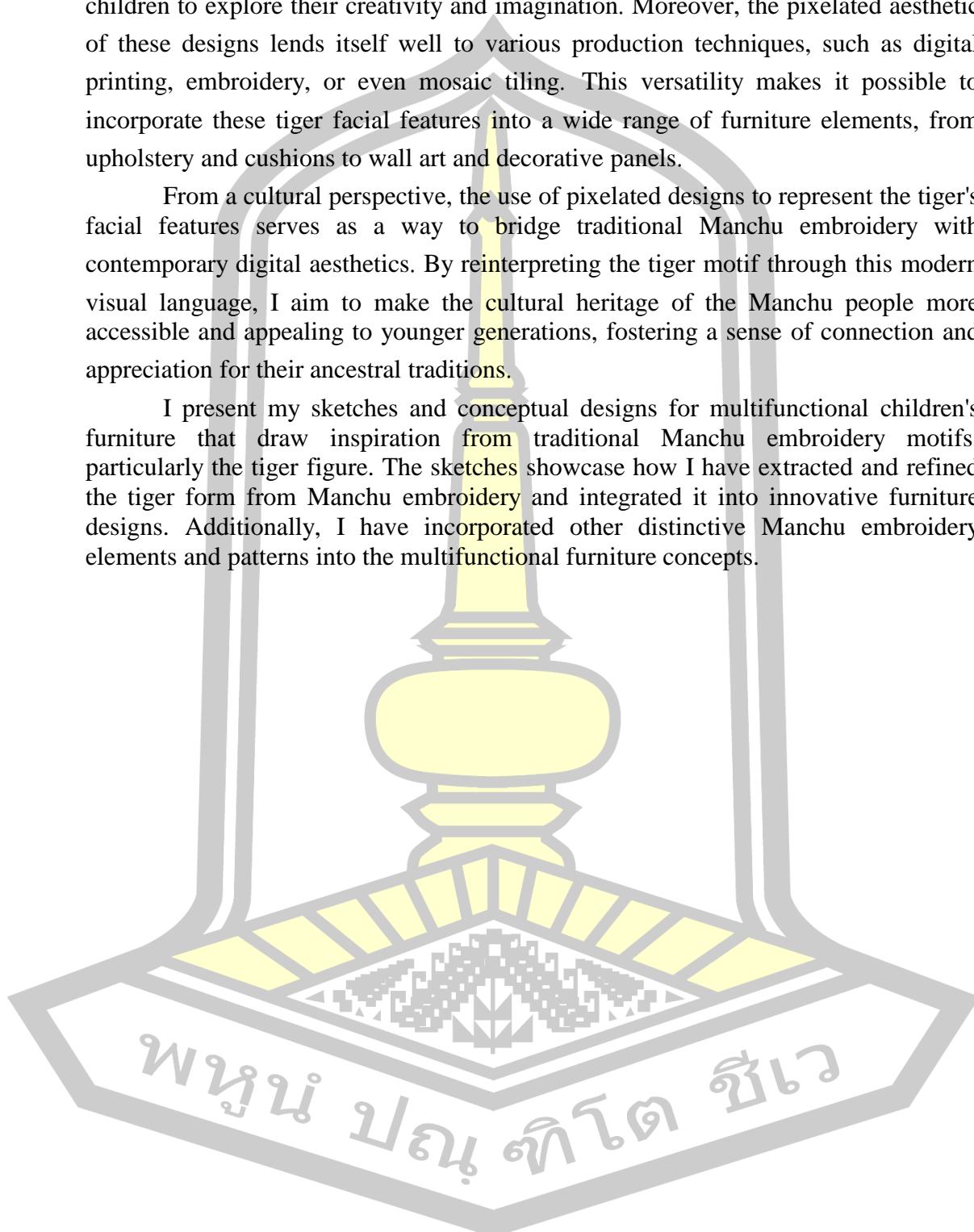
Figure 39 Facial features combination design

One of the most significant advantages of this pixelated design approach is its inherent modularity and flexibility. By creating a library of interchangeable facial features, I have developed a system that allows for countless combinations and variations, enabling children to create their own unique tiger characters. This not only

enhances the playfulness and interactivity of the furniture but also encourages children to explore their creativity and imagination. Moreover, the pixelated aesthetic of these designs lends itself well to various production techniques, such as digital printing, embroidery, or even mosaic tiling. This versatility makes it possible to incorporate these tiger facial features into a wide range of furniture elements, from upholstery and cushions to wall art and decorative panels.

From a cultural perspective, the use of pixelated designs to represent the tiger's facial features serves as a way to bridge traditional Manchu embroidery with contemporary digital aesthetics. By reinterpreting the tiger motif through this modern visual language, I aim to make the cultural heritage of the Manchu people more accessible and appealing to younger generations, fostering a sense of connection and appreciation for their ancestral traditions.

I present my sketches and conceptual designs for multifunctional children's furniture that draw inspiration from traditional Manchu embroidery motifs, particularly the tiger figure. The sketches showcase how I have extracted and refined the tiger form from Manchu embroidery and integrated it into innovative furniture designs. Additionally, I have incorporated other distinctive Manchu embroidery elements and patterns into the multifunctional furniture concepts.



Furniture Model Inspiration Design

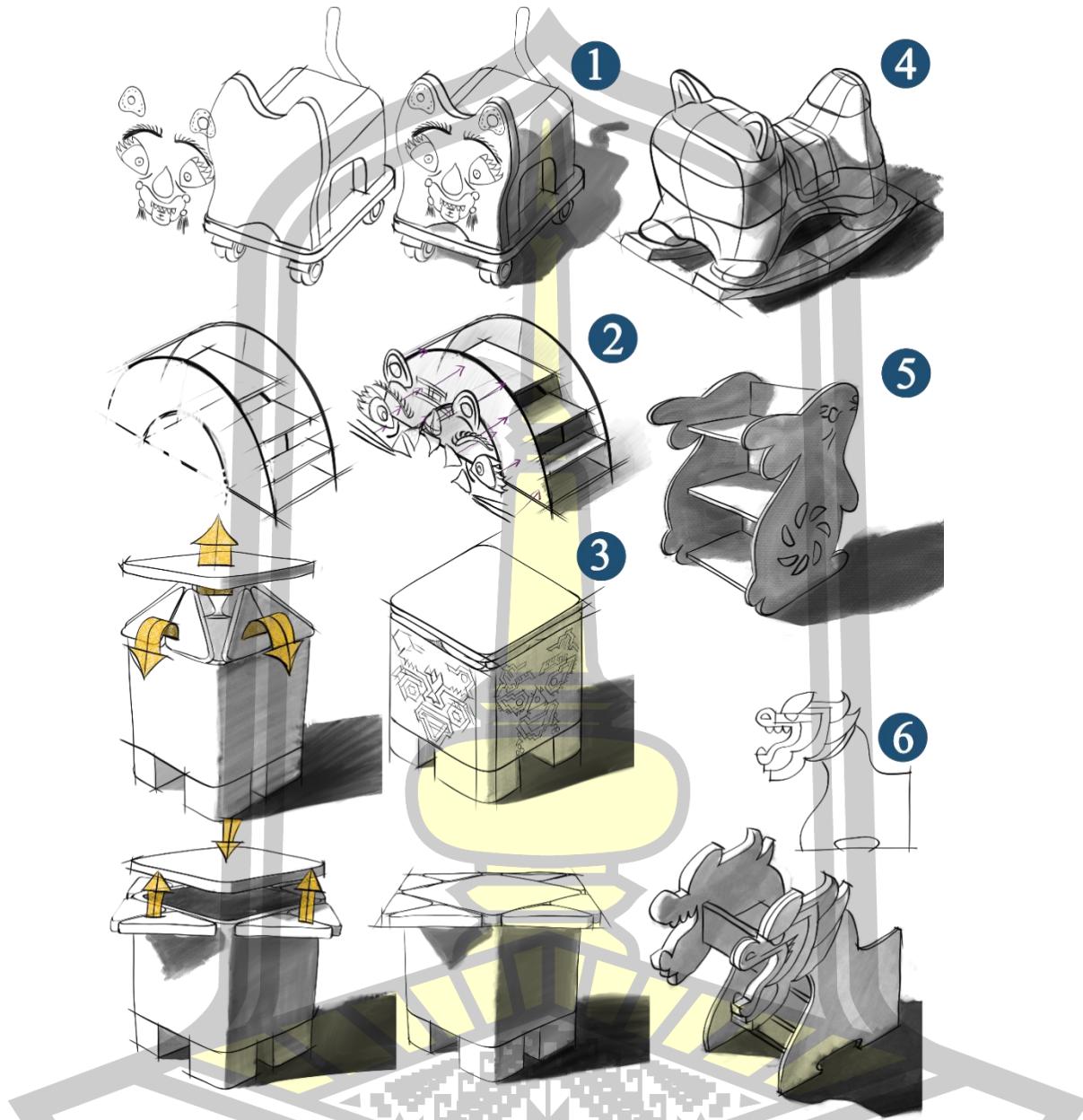


Figure 40 Multifunctional children's furniture sketch design

One notable piece among the sketches is a multipurpose bookshelf designed based on the rabbit motif commonly found in Manchu embroidery. The rabbit's lively and adorable form lends itself well to a playful yet functional storage solution for a child's room. Another striking design is a rocking horse that takes its shape from the tiger figure prevalent in Manchu needlework. By abstracting and adapting the tiger's powerful and dynamic essence, I have created an engaging toy that simultaneously serves as an artistic furniture piece.

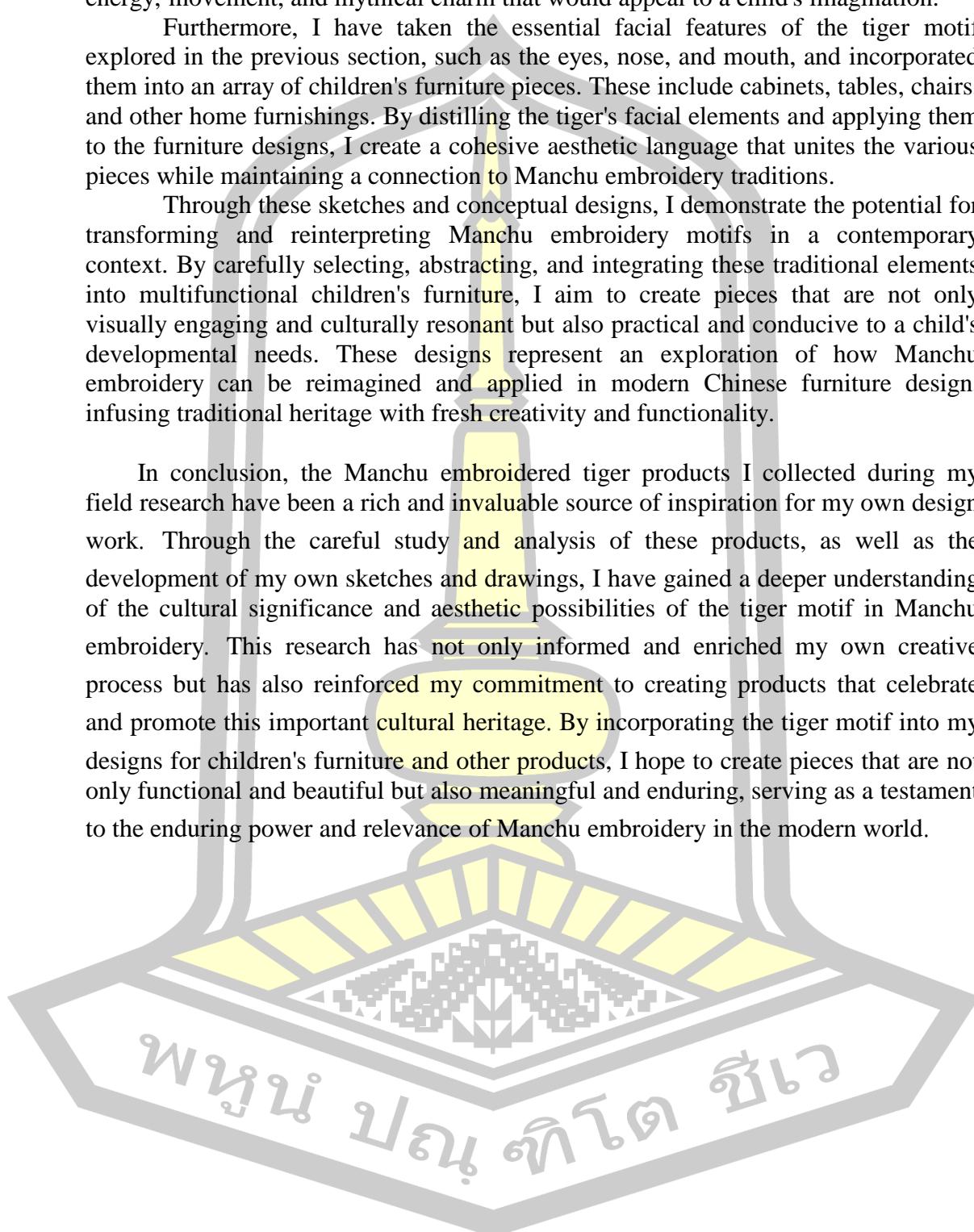
Dragons are also a significant and recurring theme in Manchu embroidery. Drawing from the characteristic shape of the dragon's head, I have conceived a

modular cabinet design. The dragon motif imbues the storage unit with a sense of energy, movement, and mythical charm that would appeal to a child's imagination.

Furthermore, I have taken the essential facial features of the tiger motif explored in the previous section, such as the eyes, nose, and mouth, and incorporated them into an array of children's furniture pieces. These include cabinets, tables, chairs, and other home furnishings. By distilling the tiger's facial elements and applying them to the furniture designs, I create a cohesive aesthetic language that unites the various pieces while maintaining a connection to Manchu embroidery traditions.

Through these sketches and conceptual designs, I demonstrate the potential for transforming and reinterpreting Manchu embroidery motifs in a contemporary context. By carefully selecting, abstracting, and integrating these traditional elements into multifunctional children's furniture, I aim to create pieces that are not only visually engaging and culturally resonant but also practical and conducive to a child's developmental needs. These designs represent an exploration of how Manchu embroidery can be reimagined and applied in modern Chinese furniture design, infusing traditional heritage with fresh creativity and functionality.

In conclusion, the Manchu embroidered tiger products I collected during my field research have been a rich and invaluable source of inspiration for my own design work. Through the careful study and analysis of these products, as well as the development of my own sketches and drawings, I have gained a deeper understanding of the cultural significance and aesthetic possibilities of the tiger motif in Manchu embroidery. This research has not only informed and enriched my own creative process but has also reinforced my commitment to creating products that celebrate and promote this important cultural heritage. By incorporating the tiger motif into my designs for children's furniture and other products, I hope to create pieces that are not only functional and beautiful but also meaningful and enduring, serving as a testament to the enduring power and relevance of Manchu embroidery in the modern world.



4.3 Sketch Design

1. Multifunctional children's furniture design: movable tiger children's chair

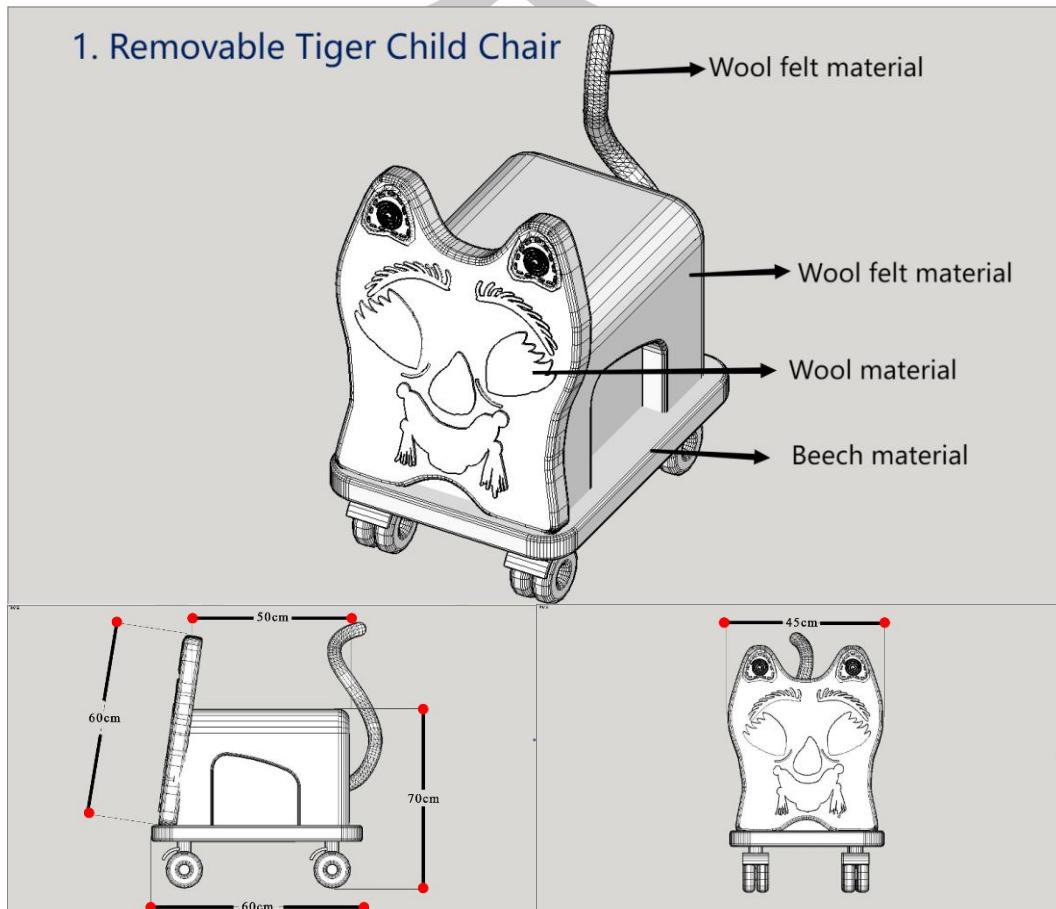


Figure 41 Conceptual drawing of a removable tiger child chair

In this section, I will introduce my design for a multifunctional children's chair inspired by the Manchu embroidery tiger motif. This innovative product consists of two main components: the functional aspects of the chair itself and the interactive panel featuring the tiger facial expressions.

The first part of the design focuses on the chair's functionality and playfulness. The chair is designed to allow children to sit on it comfortably and engage in various activities. One of the key features is the set of four detachable omnidirectional wheels mounted underneath the chair. These wheels enable children to move around freely, either by sliding or being pushed, adding an element of fun and mobility to their playtime experience.

In addition to the wheels, the chair also incorporates a pull-out storage compartment located on the backside. This storage space provides a convenient

solution for keeping children's toys organized and within reach, promoting a clutter-free play area and encouraging children to take responsibility for their belongings.

The second part of the design centers around the interactive panel on the front of the chair. This panel is covered with a felt material, providing a soft and tactile surface for children to engage with. The highlight of the interactive panel is the Manchu embroidery tiger facial expression, which is crafted using traditional embroidery techniques. The embroidered tiger face is attached to the panel using Velcro, allowing for easy removal and customization.

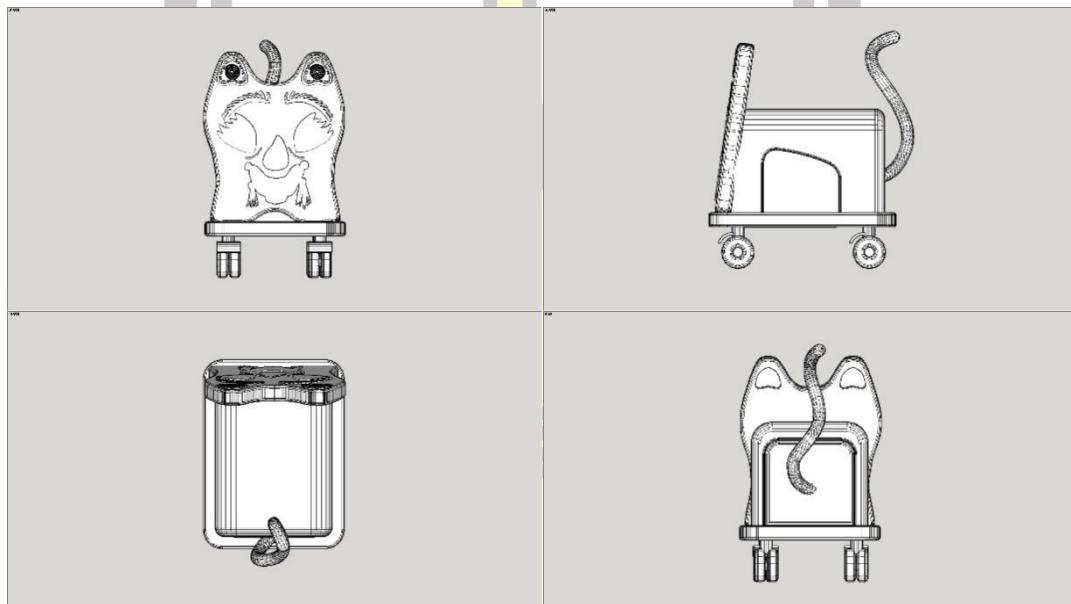


Figure 42 Four views of the removable tiger child chair

One of the most exciting aspects of this design is that the tiger facial features are designed as separate elements, drawing inspiration from the various Manchu tiger emotion designs explored in the previous sections. This modular approach enables children to mix and match different eyes, noses, mouths, and eyebrows to create their own unique tiger expressions. By encouraging children to experiment with different combinations, the chair not only provides endless entertainment but also fosters creativity, imagination, and emotional intelligence.

Moreover, the interactive nature of the tiger facial features serves as an engaging way to introduce children to Manchu culture and heritage. As children play with the embroidered elements, they naturally become curious about the origins and significance of the tiger motif, providing an opportunity for parents and educators to share stories and knowledge about Manchu traditions. This playful and interactive approach to cultural education helps to ensure that the rich history and artistry of

Manchu embroidery are passed down to future generations in a way that is both meaningful and enjoyable for children.

The design concept sketches I have provided illustrate the various components and features of the multifunctional tiger children's chair. The main sketch showcases the overall structure of the chair, highlighting the placement of the wheels, storage compartment, and interactive panel. The detailed sketches focus on the interactive panel, demonstrating how the modular tiger facial features can be attached and rearranged to create different expressions.

In terms of the chair's construction, I have carefully considered factors such as durability, safety, and comfort. The chair's frame is built using sturdy, eco-friendly materials that can withstand the wear and tear of active play. The edges and corners are rounded to minimize the risk of injury, and the seat is ergonomically designed to provide proper support and promote healthy posture. The felt material used for the interactive panel is chosen for its softness and ability to withstand frequent use, ensuring that the embroidered elements remain securely attached.

In conclusion, the movable tiger children's chair is a multifunctional and interactive piece of furniture that combines the rich cultural heritage of Manchu embroidery with contemporary design principles. By incorporating playful elements such as the detachable wheels and modular tiger facial features, the chair encourages children to engage with their environment in a creative and imaginative way. At the same time, the chair's interactive panel serves as an effective tool for introducing children to Manchu culture and promoting cultural awareness and appreciation. Through this innovative design, I aim to create a functional and aesthetically pleasing product that not only meets the needs of modern families but also contributes to the preservation and promotion of Manchu embroidery traditions.

2 Multifunctional children's furniture design: bookshelf table and chair combination furniture



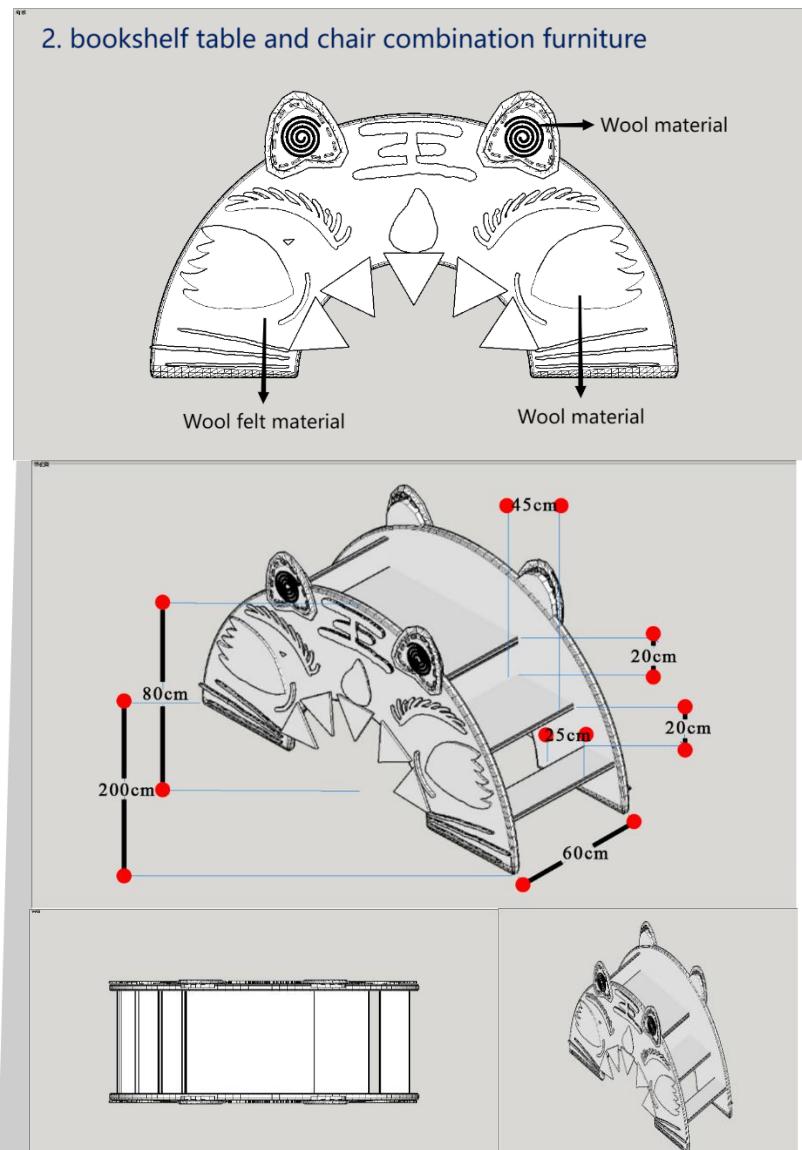


Figure 43 Conceptual diagram of bookshelf table and chair combination furniture

In this section, I will introduce my design for a multifunctional children's furniture piece that combines a bookshelf, table, and chair, all inspired by the Manchu embroidery tiger motif. This innovative product is divided into three main components, each designed to cater to the specific needs of children aged 6-10 years old.

The first part of the design focuses on the left side of the combination unit, which features a bookshelf designed ergonomically for children. Using anthropometric data, I have carefully considered factors such as shelf height, depth, and spacing to ensure that the bookshelf is both accessible and comfortable for children to use. The shelves are positioned at an appropriate height to encourage

children to browse and select books independently, fostering a love for reading and learning.

The second part of the design is located on the right side of the combination unit and consists of a study table and chair. The dimensions of the table and chair have been meticulously designed to accommodate the physical requirements of children aged 6-10 years old. The table height and width, as well as the chair's seat height and backrest, are all tailored to provide a comfortable and supportive environment for children to engage in various learning activities, such as writing, drawing, and crafting.

The third and final part of the design involves the decorative elements on the two side panels of the combination unit. Drawing inspiration from the Manchu embroidery tiger motifs explored in previous sections, I have created a unique and culturally relevant design that seamlessly integrates with the overall aesthetic of the furniture piece. By carefully redesigning the tiger's facial features, such as the eyes, nose, and mouth, I have imbued the combination unit with a distinct Manchu cultural charm.

To enhance the visual appeal and tactile experience of the side panels, I have chosen to wrap them in a felt material. This design choice not only provides a soft and inviting surface for children to interact with but also allows for the easy attachment of the Manchu embroidery tiger motifs. The tiger patterns are designed as separate, detachable elements that can be affixed to the felt surface using Velcro or similar fastening methods. This modular approach enables children to personalize the appearance of the furniture piece by rearranging the tiger motifs according to their preferences. By actively engaging with these cultural elements, children can develop a greater appreciation and understanding of Manchu embroidery traditions.

In terms of materials, I have selected natural wood with eco-friendly coatings for the bookshelf and study table-chair components. This choice ensures that the furniture piece is not only aesthetically pleasing but also safe and non-toxic for children. The use of natural wood adds warmth and a sense of organic beauty to the design, while the eco-friendly coatings protect the wood from wear and tear, making the furniture piece durable and long-lasting.

The concept sketches I have provided showcase the various components and features of the multifunctional bookshelf, table, and chair combination unit. The main sketch illustrates the overall structure of the furniture piece, highlighting the placement of the bookshelf, study table, and chair, as well as the decorative side panels. The detailed sketches focus on the ergonomic considerations of the bookshelf

and study area, demonstrating how the dimensions and proportions have been optimized for children's use.

In conclusion, the multifunctional bookshelf, table, and chair combination unit is an innovative and culturally inspired furniture piece that caters to the educational, developmental, and creative needs of children aged 6-10 years old. By incorporating the rich traditions of Manchu embroidery through the redesigned tiger motifs, this furniture piece serves as a valuable tool for cultural education and appreciation. The ergonomic design of the bookshelf and study area, combined with the use of natural and eco-friendly materials, ensures that the furniture piece is both functional and safe for children to use. Through this unique design, I aim to create a furniture piece that not only supports children's learning and growth but also fosters a deep connection to their cultural heritage, ultimately contributing to the preservation and promotion of Manchu embroidery traditions.

3 Multifunctional children's furniture design: transformable children's table and chair furniture

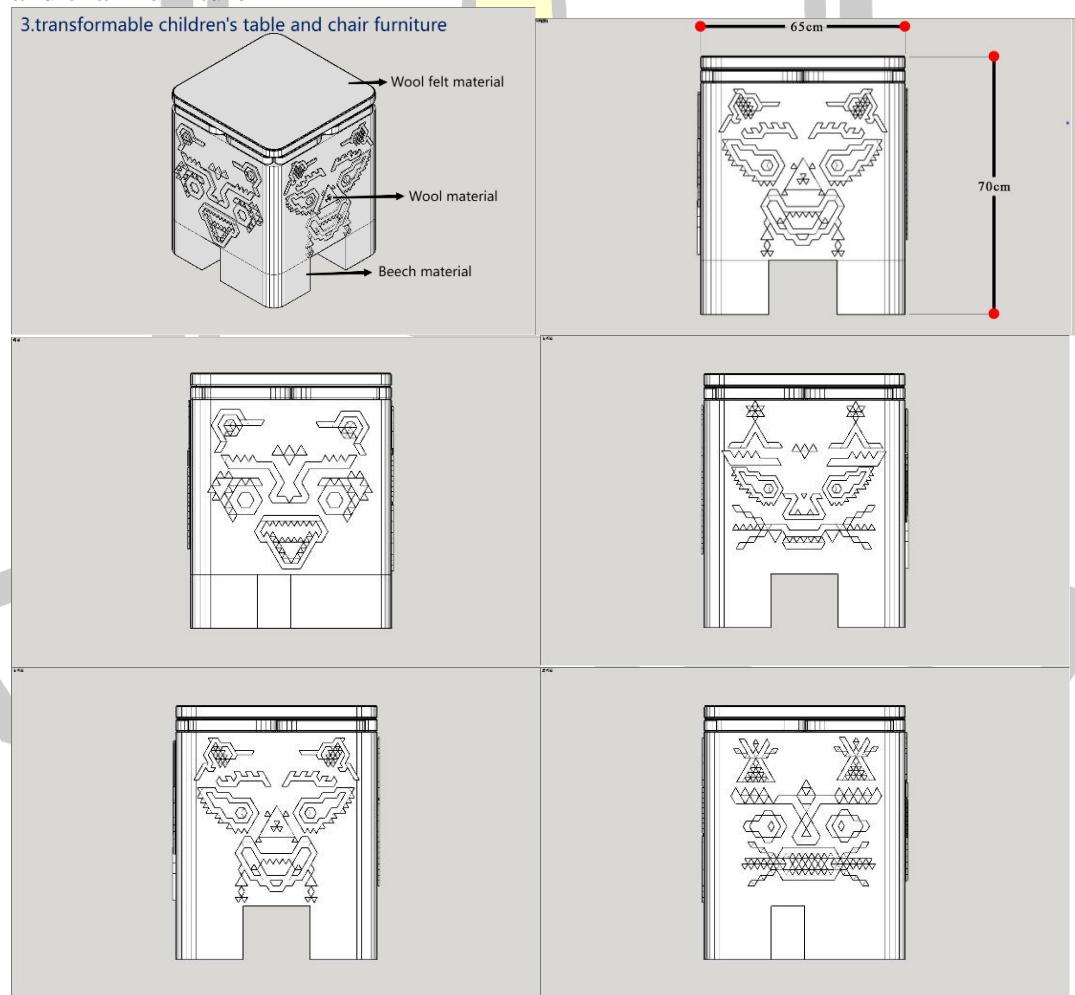
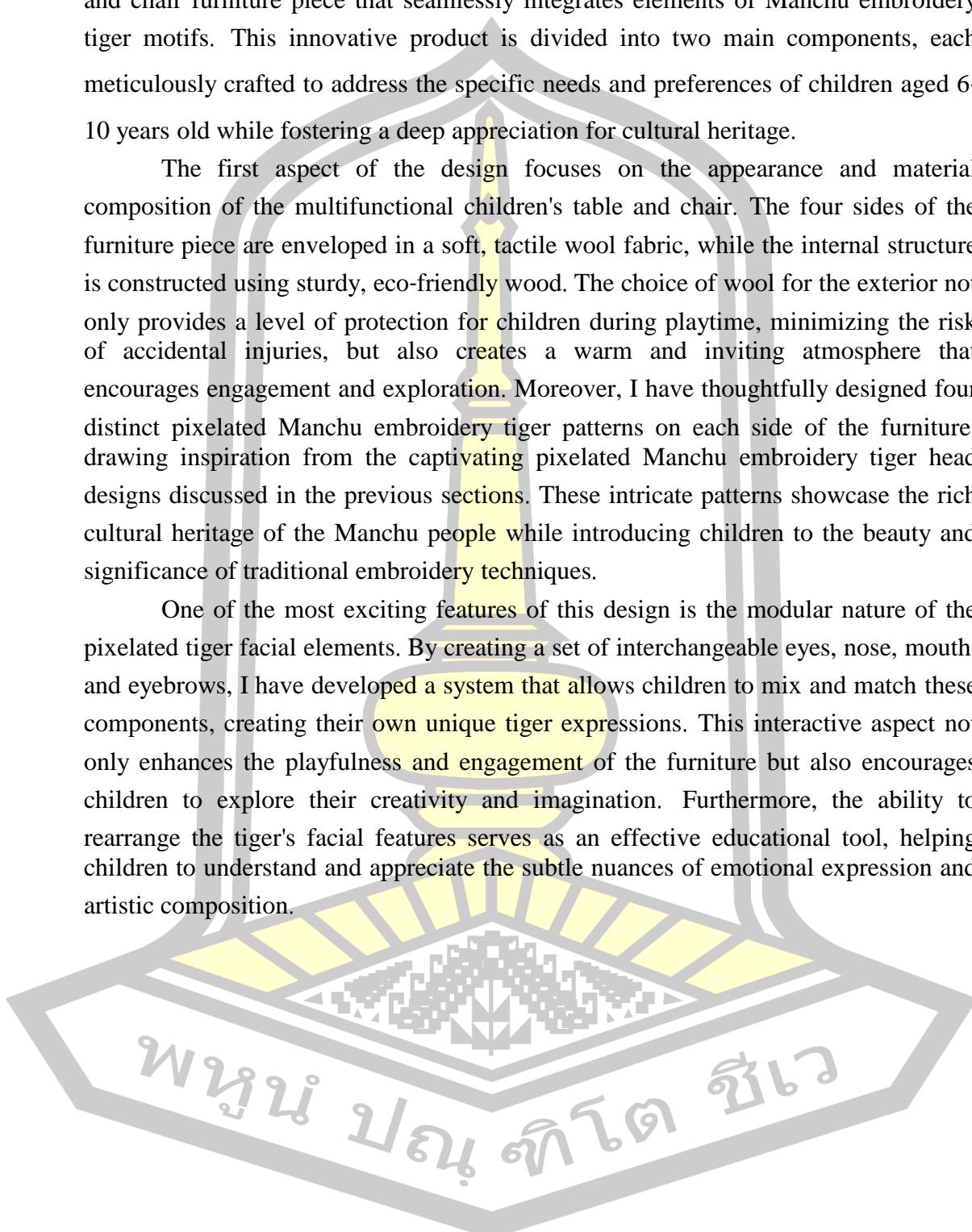


Figure 44 Conceptual diagram of transformable children's table and chair furniture

In this section, I will present my design for a transformable children's table and chair furniture piece that seamlessly integrates elements of Manchu embroidery tiger motifs. This innovative product is divided into two main components, each meticulously crafted to address the specific needs and preferences of children aged 6-10 years old while fostering a deep appreciation for cultural heritage.

The first aspect of the design focuses on the appearance and material composition of the multifunctional children's table and chair. The four sides of the furniture piece are enveloped in a soft, tactile wool fabric, while the internal structure is constructed using sturdy, eco-friendly wood. The choice of wool for the exterior not only provides a level of protection for children during playtime, minimizing the risk of accidental injuries, but also creates a warm and inviting atmosphere that encourages engagement and exploration. Moreover, I have thoughtfully designed four distinct pixelated Manchu embroidery tiger patterns on each side of the furniture, drawing inspiration from the captivating pixelated Manchu embroidery tiger head designs discussed in the previous sections. These intricate patterns showcase the rich cultural heritage of the Manchu people while introducing children to the beauty and significance of traditional embroidery techniques.

One of the most exciting features of this design is the modular nature of the pixelated tiger facial elements. By creating a set of interchangeable eyes, nose, mouth, and eyebrows, I have developed a system that allows children to mix and match these components, creating their own unique tiger expressions. This interactive aspect not only enhances the playfulness and engagement of the furniture but also encourages children to explore their creativity and imagination. Furthermore, the ability to rearrange the tiger's facial features serves as an effective educational tool, helping children to understand and appreciate the subtle nuances of emotional expression and artistic composition.



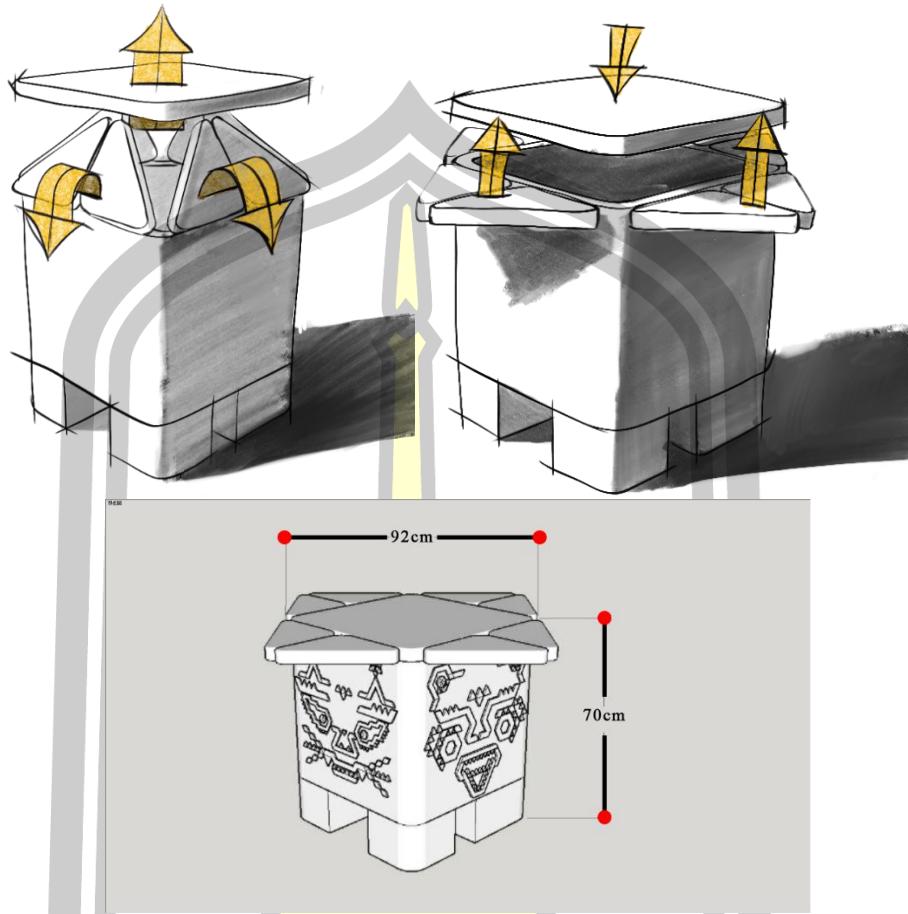


Figure 45 Conceptual diagram of transformable children's table and chair furniture

The second part of the design revolves around the transformable functionality of the product, which is both innovative and practical. The top cover of the furniture can be easily removed, revealing eight triangular folding panels inside. By rotating these panels 180° and then reassembling the cover, the surface area of the tabletop is significantly expanded, providing children with ample space to engage in a wide range of recreational and educational activities. This transformative feature is particularly beneficial for families living in smaller urban apartments, where space optimization is a key concern. When not transformed, the product serves as a comfortable and stylish chair, perfect for relaxing or reading. However, once the panels are rotated and the cover is replaced, it seamlessly converts into a spacious table, ideal for drawing, crafting, or playing games with friends.

In addition to its transformable capabilities, the furniture piece also features generous storage space inside, making it suitable for children to store their toys, books, or other belongings. This hidden compartment not only helps to keep the living area tidy and organized but also teaches children the importance of responsibility and maintaining a clutter-free environment. The inclusion of storage space within the

furniture itself is a testament to the thoughtful and user-centric approach employed in the design process, ensuring that every aspect of the product caters to the practical needs of modern families.

The Manchu embroidery tiger patterns incorporated into the design are sourced from the captivating pixelated tiger designs developed in the previous chapters. These designs showcase the artistic versatility and adaptability of traditional Manchu embroidery motifs, demonstrating how cultural elements can be successfully translated into contemporary design language. By integrating these pixelated tiger patterns into the furniture design, I aim to create a meaningful and lasting connection between children and their cultural heritage, fostering a sense of pride and identity that will continue to grow and evolve throughout their lives.

In terms of market appeal, this transformable children's table and chair furniture piece is designed to cater to the evolving needs and preferences of modern Chinese families. The integration of Manchu embroidery tiger motifs and the emphasis on cultural heritage will resonate with parents who desire to instill a sense of cultural identity and appreciation in their children. The multi-functional and space-saving aspects of the design will appeal to families living in urban environments, where space is often at a premium. Moreover, the focus on child safety, comfort, and interactive learning will attract parents who prioritize their children's well-being and development.

In conclusion, the transformable children's table and chair furniture piece presented in this section represents a harmonious fusion of traditional Manchu embroidery, contemporary design, and user-centric functionality. By incorporating captivating pixelated tiger motifs, modular facial elements, and transformable features, this innovative product offers children a unique and engaging way to connect with their cultural heritage while fostering creativity, imagination, and learning. The use of eco-friendly materials, sustainable production methods, and careful color selection further exemplifies the thoughtful and responsible approach employed in the design process. Through this transformable furniture piece, I aim to create a meaningful and lasting impact on the lives of children and families, promoting cultural appreciation, environmental stewardship, and the joy of learning and discovery.

4 Multifunctional children's furniture design: tiger rocking chair

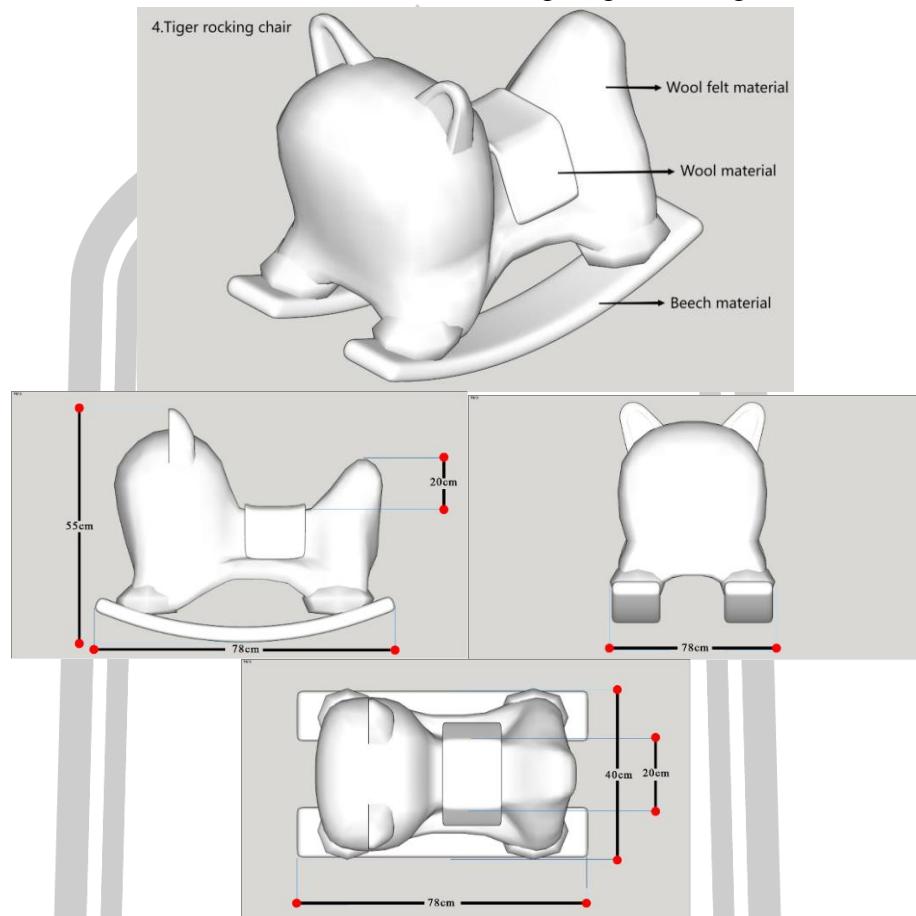


Figure 46 Conceptual diagram of tiger rocking chair

In this section, I will introduce my design for a tiger rocking chair that draws inspiration from traditional Manchu embroidery and the iconic tiger doll. This innovative product can be divided into two main aspects: the overall appearance and the interactive features, both of which are carefully crafted to cater to the needs and preferences of children aged 6-10 years old while promoting an appreciation for cultural heritage.

The first part of the design focuses on the appearance of the tiger rocking chair. Inspired by the endearing shape of the Manchu embroidered tiger doll, I have made appropriate adjustments to the form to ensure that the furniture is suitable for children's use and adheres to the principles of child ergonomics. The chair's design incorporates a gently curved seat and backrest, providing ample support and comfort for the child's body during rocking motion. The tiger's facial features, such as the eyes, nose, and mouth, are thoughtfully positioned to create a friendly and inviting expression that appeals to children.

The materials used in the construction of the tiger rocking chair are carefully selected to prioritize safety, durability, and comfort. The main structure of the chair is crafted from high-quality, eco-friendly wood, ensuring a sturdy and stable base that can withstand the rigors of playtime. The exterior of the chair is covered in a soft, plush fabric that is both tactile and visually appealing, creating a cozy and inviting surface for children to engage with. The fabric is also treated with child-safe, non-toxic finishes to ensure the well-being of the young users.

The second part of the design revolves around the interactive features of the tiger rocking chair. Drawing from the modular Manchu embroidery tiger facial expressions developed in the previous chapters, this product allows children to customize the appearance of their rocking companion. The chair's face is designed with a detachable panel, onto which children can affix various pre-designed Manchu embroidery tiger expressions. These expressive elements, such as the eyes, nose, and mouth, can be easily attached and rearranged using child-friendly fasteners, like Velcro or magnets.

By providing children with the opportunity to mix and match different facial expressions, the tiger rocking chair becomes not only a functional piece of furniture but also an engaging toy that encourages creativity and emotional exploration. As children experiment with various combinations of facial features, they develop a deeper understanding of how different expressions convey emotions and moods. This interactive aspect also fosters a sense of ownership and personalization, as each child can create a unique tiger rocking chair that reflects their individual tastes and preferences.

The color palette used in the tiger rocking chair is inspired by the vibrant hues found in traditional Manchu embroidery. Rich shades of red, orange, and black are prominently featured, capturing the essence of the tiger motif. These bold colors are balanced with more muted tones, such as beige and brown, to create a harmonious and visually appealing design. The carefully curated color scheme not only enhances the aesthetic appeal of the chair but also serves to stimulate children's visual senses and create a cheerful, energetic atmosphere.

The Manchu embroidery tiger facial expressions incorporated into the design are derived from the emotionalized tiger designs discussed in the previous chapters. These expressive elements showcase a wide range of emotions, from happiness and excitement to curiosity and surprise. By integrating these culturally significant designs into the tiger rocking chair, I aim to create a meaningful connection between children

and their cultural heritage, fostering an appreciation for the rich artistic traditions of the Manchu people.

The concept sketches provided in this section offer a detailed visual representation of the tiger rocking chair's design. The sketches showcase the chair's overall form, highlighting the ergonomic curves and the placement of the tiger's facial features. They also illustrate the detachable panel and the various Manchu embroidery tiger expressions that can be affixed to it, demonstrating the interactive nature of the product.

In conclusion, the tiger rocking chair presented in this section represents an innovative fusion of traditional Manchu embroidery, child-centric design, and interactive play. By drawing inspiration from the beloved Manchu tiger doll and incorporating modular facial expressions, this multifunctional furniture piece offers children a unique and engaging way to connect with their cultural heritage while promoting creativity, emotional intelligence, and imaginative play. Through the thoughtful integration of eco-friendly materials, ergonomic design, and culturally significant elements, the tiger rocking chair aims to create a meaningful and lasting impact on the lives of children and families, fostering a deep appreciation for the beauty and richness of Manchu culture.

5 Multifunctional children's furniture design: Bunny bookcase

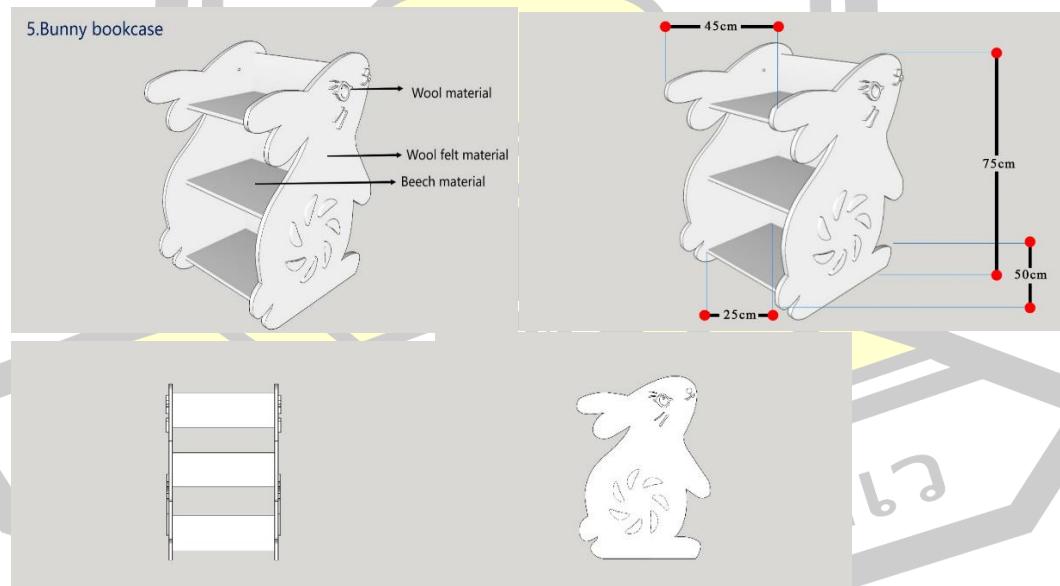


Figure 47 Bunny bookcase

In this section, I will introduce my design for a multifunctional children's bookcase inspired by the charming bunny motif found in Manchu embroidery. The bunny holds a very positive and auspicious meaning in Manchu culture, making it an ideal theme for a piece of children's furniture. This innovative product combines functionality, cultural heritage, and creative engagement, catering to the needs and preferences of children aged 6-10 years old.

The first aspect of this design focuses on its primary function as a bookcase for children. The dimensions and proportions of the bookcase have been carefully calculated using the principles of child ergonomics, ensuring that it is perfectly suited for daily use by young readers. The shelves are positioned at an appropriate height and depth, allowing children to easily access and store their favorite books. The sturdy construction and high-quality materials used in the bookcase's frame guarantee its durability and stability, providing a safe and reliable storage solution for children's literature.

The second aspect of the design revolves around the interactive and creative features incorporated into the bookcase's side panels. Drawing inspiration from the delightful bunny motif found in Manchu embroidery, I have designed a set of magnetic embroidered bunny patches that can be easily attached to and removed from the metal side panels. These patches not only serve as a charming decorative element but also encourage children to engage with their cultural heritage in a hands-on, tactile manner. By arranging and rearranging the bunny patches, children can create their own unique designs and patterns, fostering a sense of ownership and pride in their furniture.

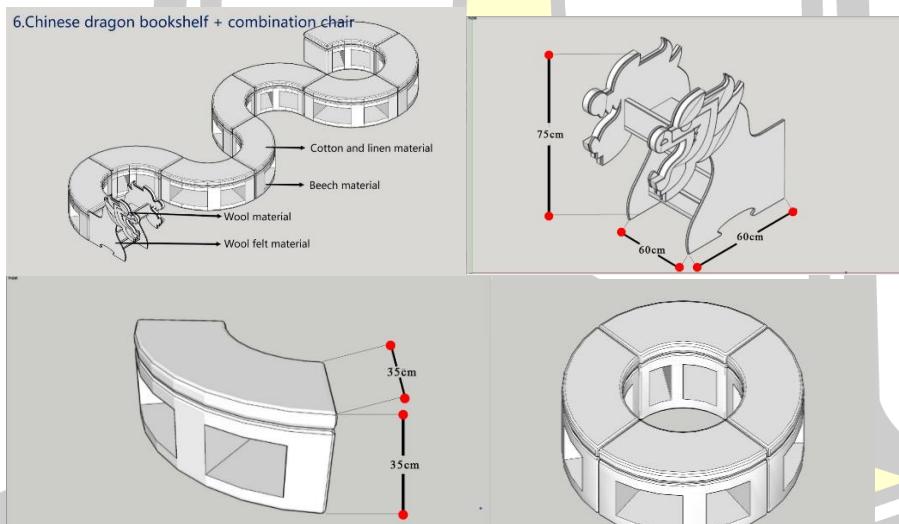
In addition to the magnetic bunny patches, the metal side panels also function as a canvas for children's artistic expression. The whiteboard surface of the panels allows children to draw, write, and doodle directly on the bookcase using dry-erase markers. This feature promotes creativity, imagination, and self-expression, providing children with an outlet to explore their artistic talents and bring their ideas to life. The erasable nature of the whiteboard surface ensures that children can easily change and update their designs, encouraging ongoing engagement and experimentation.

The materials used in the construction of the bunny bookcase have been carefully selected to ensure both functionality and safety. The shelves and frame of the bookcase are crafted from high-quality, sustainably sourced wood, providing a robust and eco-friendly structure that can withstand the wear and tear of daily use. The

wood is finished with non-toxic, child-safe coatings, ensuring that the bookcase is not only durable but also healthy for young users. The side panels, on the other hand, are made from a durable, lightweight metal with a whiteboard finish, providing a smooth and easy-to-clean surface for children's artistic endeavors.

In conclusion, the bunny bookcase presented in this section represents a harmonious fusion of traditional Manchu embroidery, child-centric design, and multifunctional creativity. By drawing inspiration from the auspicious bunny motif and incorporating interactive features such as magnetic patches and whiteboard panels, this innovative furniture piece encourages children to engage with their cultural heritage, express their creativity, and develop a love for reading and learning. Through the thoughtful use of eco-friendly materials, ergonomic proportions, and a soothing color palette, the bunny bookcase aims to create a nurturing and inspiring space for children to grow, explore, and discover the joys of literature and art.

6 Multifunctional children's furniture design: Chinese dragon bookshelf + combination chair



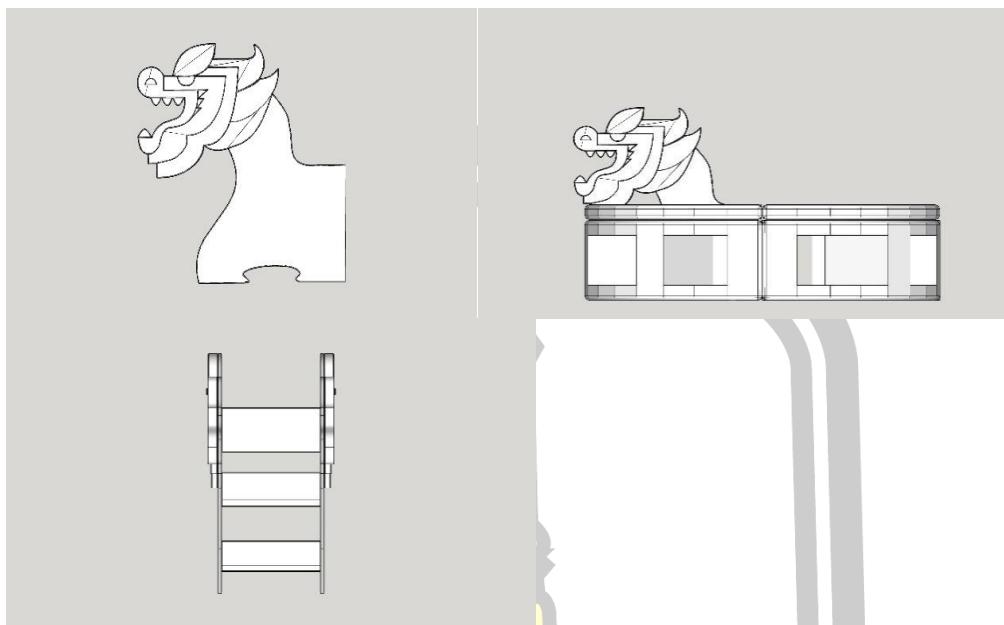


Figure 48 Chinese dragon bookshelf + combination chair

In this section, I will present my design for a multifunctional children's furniture set that combines a Chinese dragon-inspired bookshelf with a modular combination chair. This innovative product seamlessly integrates elements of Manchu embroidery, ergonomic design, and playful functionality, creating a unique and engaging space for children aged 6-10 years old.

The first part of the design focuses on the Chinese dragon bookshelf and the accompanying combination chair. The bookshelf, positioned at the center of the set, features an ergonomic design that caters to the specific needs and proportions of children, ensuring comfortable and easy access to their favorite books. The bookshelf is flanked by quarter-circle combination chairs that can be arranged to form a complete circle when placed together. These chairs not only provide a cozy seating area for children to read and relax but also offer additional storage space underneath for books, toys, or other belongings.

One of the most striking aspects of this design is its ability to create a visually captivating display when the Chinese dragon bookshelf and combination chairs are arranged together. The curved lines of the chairs and the sinuous form of the dragon bookshelf combine to create the illusion of a soaring Chinese dragon, adding a touch of whimsy and artistic flair to the children's space. Moreover, the modular nature of the design allows for flexible configuration, enabling the furniture set to adapt to various room sizes and layouts. The length and overall footprint of the set can be easily adjusted by adding or removing combination chair segments, making it a versatile solution for different living spaces.

The second part of the design focuses on the appearance and materials used in the production of the Chinese dragon bookshelf and combination chair. The side panels of the bookshelf feature a delightful Chinese dragon motif inspired by the intricate designs found in Manchu embroidery. By incorporating this traditional cultural element into the furniture design, I aim to create a piece that not only captures children's imaginations but also fosters an appreciation for their rich cultural heritage.

The use of high-quality, durable materials is a key consideration in the construction of this multifunctional furniture set. The main structure of the bookshelf and chairs is crafted from solid wood, ensuring a sturdy and long-lasting foundation that can withstand the rigors of daily use. The wood is carefully selected and treated to maintain its natural beauty while providing a safe and non-toxic environment for children.

A particularly innovative feature of the Chinese dragon bookshelf is the magnetic design incorporated into the dragon's head. This allows children to easily detach and reattach the head using magnets, encouraging hands-on interaction and creative play. Children can design their own unique dragon heads or use the detachable pieces as building blocks, fostering imaginative thinking and problem-solving skills. The dragon head itself is crafted from soft, supple leather and adorned with authentic Manchu embroidery patterns, adding a touch of cultural authenticity and textural interest to the piece.

The concept sketches provided in this section offer a detailed visual representation of the Chinese dragon bookshelf and combination chair. The sketches showcase the fluid, organic lines of the design, highlighting the ergonomic proportions and the modular nature of the combination chairs. They also illustrate the magnetic detachable dragon head and the exquisite Manchu embroidery patterns that adorn its surface.

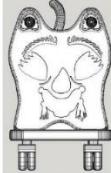
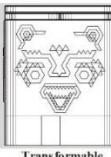
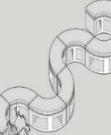
In conclusion, the Chinese dragon bookshelf and combination chair presented in this section represent a harmonious fusion of traditional Manchu culture, child-centric design, and multifunctional practicality. By drawing inspiration from the auspicious Chinese dragon motif and incorporating interactive features such as the magnetic detachable head, this innovative furniture set encourages children to engage with their cultural heritage, express their creativity, and develop a love for reading and imaginative play. Through the thoughtful use of durable materials, ergonomic proportions, and a playful, modular design, this multifunctional furniture set aims to

create a captivating and nurturing space that grows and adapts with the changing needs of children and their families.

4.4 Satisfaction Assessment

1 Expert 1: Intangible Cultural Heritage Inheritor of Changchun City, Jilin Province: Third Generation Inheritor of Li's Manchu Embroidery: Li Yulan

I contacted Ms Li Yulan and introduced the products I designed to her in detail, and she gave me the following evaluation form:

Product Name	Functionality	Aesthetics	Safety	Ergonomics	Cultural Element Application	Overall Rating	Rank	Expert Comments
 Movable Tiger Children's Chair	5	5	4	5	5	4.8	1	The design cleverly integrates the Manchu embroidery tiger pattern, reflecting the essence of traditional culture while offering practicality and interactivity. It helps increase children's interest in and understanding of Manchu culture. The movable design adds flexibility to the furniture, adapting to different usage scenarios. Further optimization of safety features is recommended to ensure children's safety during use.
 Bookshelf Table and Chair Combination Furniture	4	5	5	4	5	4.6	2	The design fully considers children's needs, ingeniously combining bookshelf, table, and chairs to maximize space utilization. The application of Manchu embroidery patterns adds cultural connotation to the furniture, fostering children's sense of identity with traditional culture. Further optimization of functionality and ergonomics is suggested to enhance children's comfort during use.
 Transformable Children's Table and Chair Furniture	5	4	5	5	4	4.6	3	The transformable design improves the furniture's practicality and flexibility, meeting children's varying needs throughout their growth. The ergonomic design ensures children's comfort and safety during use. The application of Manchu embroidery patterns is relatively limited; it is recommended to further enrich the expression of cultural elements to enhance the furniture's cultural inheritance value.
 Tiger Rocking Chair	3	4	3	3	4	3.4	4	The design has certain highlights in aesthetics and cultural element application, but lacks in functionality, safety, and ergonomics. The rocking chair design may pose potential safety risks to children while also limiting the furniture's practicality. It is recommended to re-evaluate the product positioning and further optimize the design to ensure children's safety and comfort during use.
 Bunny Bookcase	3	3	4	3	3	3.2	5	The design is relatively weak in cultural element application, and the bunny pattern has a weak connection with Manchu embroidery traditions. The bookcase's functionality and ergonomic design need improvement to better meet children's needs. It is recommended to re-examine the product positioning and draw more inspiration from Manchu embroidery traditions to enhance the furniture's cultural connotation and practicality.
 Chinese Dragon Bookshelf + Combination Chair	4	3	3	3	3	3.2	6	The design has some innovation in cultural element application, but the connection with Manchu embroidery traditions is not strong enough. The functionality and ergonomic design of the bookshelf and combination chair need optimization to improve children's comfort during use. The magnetic design may pose potential safety risks to children. It is recommended to re-evaluate the product positioning and focus more on the essence of Manchu embroidery traditions in the design to enhance the furniture's cultural inheritance value.

Rating scale: 5 points - excellent; 4 points - good; 3 points - average; 2 points - poor; 1 point - very poor

Figure 49 Ms. Li Yulan evaluation sheet

Comprehensive Analysis:

According to the experts' ratings and comments, the Movable Tiger Children's Chair, Bookshelf Table and Chair Combination Furniture, and Transformable Children's Table and Chair Furniture perform relatively well in functionality, aesthetics, safety, ergonomics, and cultural element application, showing significant market potential. On the other hand, the Tiger Rocking Chair, Bunny Bookcase, and Chinese Dragon Bookshelf + Combination Chair perform relatively weaker in various indicators and require further optimization and improvement.

Suggestions for Improvement:

Re-examine the product positioning of the Tiger Rocking Chair, Bunny Bookcase, and Chinese Dragon Bookshelf + Combination Chair to ensure their functionality, safety, and ergonomic design meet children's actual needs.

Strengthen the application of Manchu embroidery traditional cultural elements in the design, ensuring that the furniture truly reflects the essence of Manchu embroidery and enhances its cultural inheritance and educational value.

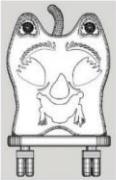
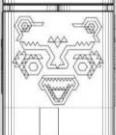
Optimize the details of the Movable Tiger Children's Chair, Bookshelf Table and Chair Combination Furniture, and Transformable Children's Table and Chair Furniture to further improve their safety, functionality, and ergonomic performance.

During the design process, fully consider the actual needs of children and families, and continuously collect market feedback to improve and refine the product design.

Through expert reviews and comprehensive analysis, we can better understand the strengths and weaknesses of the six multifunctional children's furniture designs and make targeted optimizations and improvements. The goal is to create children's furniture products that combine practicality, aesthetics, safety, and cultural connotation, better inheriting and promoting the traditional culture of Manchu embroidery.

2 Expert 2: Associate Professor Guo Sen, Digital and New Media Studio, School of Visual Communication, Luxun Academy of Fine Arts, China
Associate Professor Guo Sen was my tutor for my further undergraduate degree, and he has achieved very good results in both academic achievements and design works.

Below are his comments and suggestions on my work:

Product Name	Functionality	Aesthetics	Safety	Ergonomics	Cultural Element Application	Overall Rating	Rang	Expert Comments
 Movable Tiger Children's Chair	5	4	5	5	4	4.6	1	The design effectively combines functionality and aesthetics, with the movable feature adding versatility to the furniture. The ergonomic considerations ensure comfort and safety for children. The application of Manchu embroidery tiger patterns is well-executed, though there is room for further exploration of cultural elements. Overall, a promising product with market potential, but minor refinements in aesthetics and cultural integration could elevate its appeal.
 Bookshelf Table and Chair Combination Furniture	4	5	5	4	4	4.4	2	The design showcases a clever integration of multiple functional components, maximizing space efficiency. The aesthetic appeal is strong, with a harmonious blend of form and function. Safety and ergonomics are well-addressed, ensuring a suitable environment for children. The incorporation of Manchu embroidery patterns adds cultural value, but a more innovative approach could enhance its distinctiveness in the market.
 Transformable Children's Table and Chair Furniture	5	4	5	5	3	4.4	3	The transformable design is a standout feature, offering adaptability to children's changing needs. The functionality and ergonomics are well-considered, providing a comfortable and practical solution. Safety is a top priority, and the design appears to meet relevant standards. However, the application of cultural elements feels somewhat lacking, and a more creative integration of Manchu embroidery could significantly boost its market appeal.
 Tiger Rocking Chair	3	4	2	3	4	3.2	4	While the design showcases an attempt to incorporate cultural elements through the tiger motif, the overall execution falls short in terms of functionality, safety, and ergonomics. The rocking chair concept may pose safety risks for children, and the design does not appear to offer significant improvements over existing products in the market. A re-evaluation of the product's purpose and design is
 Bunny Bookcase	3	3	4	3	2	3.0	5	The design's focus on the bunny motif appears to be more decorative than functional, with limited connection to Manchu embroidery traditions. While safety considerations are adequate, the ergonomics and functionality of the bookcase leave room for improvement. The cultural element application feels superficial and does not significantly contribute to the product's value proposition. A deeper exploration of
 Chinese Dragon Bookshelf + Combination Chair	3	4	3	3	3	3.2	6	The design attempts to incorporate cultural elements through the Chinese dragon motif, but the connection to Manchu embroidery specifically is tenuous. The combination of bookshelf and chair is an interesting concept, but the execution lacks refinement in terms of functionality and ergonomics. Safety concerns, particularly with the magnetic design, need to be addressed. A more cohesive and purposeful integration of Manchu embroidery elements, along with improved functionality, would be necessary to justify market entry.

Rating scale: 5 points - excellent; 4 points - good; 3 points - average; 2 points - poor; 1 point - very poor

Figure 50 Associate Professor Guo Sen evaluation sheet

Comprehensive Analysis:

From the perspective of a product design professor, the Movable Tiger Children's Chair, Bookshelf Table and Chair Combination Furniture, and Transformable Children's Table and Chair Furniture demonstrate strong potential, with well-considered functionality, safety, and ergonomics. However, there is room for improvement in the aesthetic appeal and cultural element integration. On the other hand, the Tiger Rocking Chair, Bunny Bookcase, and Chinese Dragon Bookshelf + Combination Chair have significant shortcomings in various aspects, including functionality, safety, ergonomics, and the meaningful application of cultural elements.

Suggestions for Improvement:

For the Tiger Rocking Chair, Bunny Bookcase, and Chinese Dragon Bookshelf + Combination Chair, conduct a thorough re-evaluation of the product concepts, focusing on enhancing functionality, safety, and ergonomics to meet children's needs effectively.

Develop a more strategic and innovative approach to integrating Manchu embroidery cultural elements into the designs, ensuring that they contribute to the products' value proposition and market appeal.

Refine the aesthetics of the Movable Tiger Children's Chair, Bookshelf Table and Chair Combination Furniture, and Transformable Children's Table and Chair Furniture to create a more visually striking and harmonious appearance that complements the functional aspects.

Conduct thorough safety assessments and make necessary adjustments to ensure that all products meet the highest safety standards for children's furniture.

Seek feedback from potential users and industry experts to gain insights into market preferences and make data-driven improvements to the designs.

By addressing these aspects and incorporating the expert's recommendations, the multifunctional children's furniture designs can be optimized to better meet market demands, provide value to consumers, and effectively promote Manchu embroidery cultural heritage.

3 Survey Objectives and Methodology

In the context of designing multifunctional children's furniture that incorporates elements of Manchu embroidery, conducting a market survey is essential to ensure that the final products meet the needs and preferences of the target consumers. The market survey aims to gather valuable insights into consumer behavior, opinions, and expectations regarding children's furniture and the integration of cultural elements such as Manchu embroidery. By understanding the market demand and consumer preferences, we can create furniture designs that not only serve

functional purposes but also resonate with the target audience on an emotional and cultural level. The primary objectives of this survey are to:

Identify the key factors that influence parents' purchasing decisions when it comes to children's furniture.

Assess parents' attitudes and perceptions towards multifunctional furniture and its potential benefits for their children.

Evaluate the appeal and relevance of incorporating Manchu embroidery elements into children's furniture designs.

Gather insights into the specific features, styles, and price points that parents prefer when shopping for children's furniture.

Determine the most effective marketing channels and strategies to reach and engage the target audience.

4. Target Audience:

The target audience for this market survey is parents with children aged 6-10 years old. This specific demographic is crucial for several reasons:

Parents of children in this age group are likely to be actively seeking furniture solutions that can accommodate their growing children's needs and preferences.

Children aged 6-10 are transitioning from early childhood to middle childhood, which involves significant developmental changes and a greater need for independence, creativity, and self-expression. Parents are looking for furniture that can support and nurture these developmental needs.

This age group is also a critical period for children to develop their cultural identity and appreciation for their heritage. Parents may be interested in furniture that incorporates cultural elements, such as Manchu embroidery, to foster a sense of pride and connection to their cultural roots.

Parents of children in this age range are likely to have higher disposable incomes compared to those with younger children, making them a more attractive target market for high-quality, value-added furniture products.

By focusing on this specific demographic, we can gather targeted insights into their unique needs, preferences, and challenges when it comes to children's furniture. These insights will be invaluable in guiding the design and development of our multifunctional furniture products, ensuring that they effectively address the pain points and aspirations of our target audience. Moreover, by incorporating Manchu embroidery elements in a way that resonates with these parents and their children, we can create furniture that not only serves practical purposes but also contributes to the preservation and promotion of cultural heritage.

Survey Design:



Multifunctional children's furniture questionnaire

Part 1: Demographic Information

1. What is your age?

A. Under 25
 B. 25-34
 C. 35-44
 D. 45 and above

2. What is your gender?

A. Male
 B. Female
 C. Other

3. In which city do you currently reside?

A. Beijing
 B. Shanghai
 C. Guangzhou
 D. Other (please specify)

4. What is your household's annual income level?

A. Low (under 50,000 CNY)
 B. Medium (50,000-150,000 CNY)
 C. High (above 150,000 CNY)

5. How many children aged 6-10 do you have?

A. 1
 B. 2
 C. 3 or more
 D. not at all familiar

11. What benefits do you think multifunctional children's furniture can provide for your child's growth and development? (Multiple answers allowed)

A. Space-saving
 B. Promoting creativity and imagination
 C. Fostering independence and autonomy
 D. Adaptable to different growth stages
 E. Other (please specify)

12. What features would you most like to see in multifunctional children's furniture? (Multiple answers allowed)

A. Adjustable height and angle
 B. Built-in storage space
 C. Convertible for different purposes (e.g., bed, table, chair)
 D. Integrated toys or game elements
 E. Other (please specify)

13. Are you willing to pay a higher price for children's furniture with multifunctional features?

A. Very willing
 B. Somewhat willing
 C. Neutral
 D. Not very willing
 E. Not at all willing

14. What is your opinion on incorporating Manchu embroidery elements into children's furniture design?

A. Very interested
 B. Somewhat interested
 C. Neutral
 D. Not very interested
 E. Not at all interested

15. What benefits do you think incorporating Manchu embroidery elements in children's furniture can provide? (Multiple answers allowed)

A. Enhance aesthetics and artistic value
 B. Inherit and promote ethnic culture

Part 2: Children's Furniture Purchasing Behavior

6. How often do you replace your child's furniture?

A. Within 1 year
 B. 1-2 years
 C. 2-3 years
 D. Over 3 years

7. Through which channels do you usually purchase children's furniture? (Multiple answers allowed)

A. Physical furniture stores
 B. Online marketplaces
 C. Social media
 D. Other (please specify)

8. What factors do you value most when purchasing children's furniture? (Multiple answers allowed)

A. Functionality
 B. Aesthetics
 C. Safety
 D. Price
 E. Brand
 F. Other (please specify)

9. What is your average budget for purchasing children's furniture?

A. Under 1,000 CNY
 B. 1,000-3,000 CNY
 C. 3,000-5,000 CNY
 D. Over 5,000 CNY

Part 3: Preferences and Attitudes Towards Multifunctional Children's Furniture

10. Are you familiar with the concept of multifunctional children's furniture?

A. Very familiar
 B. Somewhat familiar
 C. Not very familiar
 D. not at all familiar

C. Increase furniture's uniqueness and collectible value
 D. Encourage children's understanding and appreciation of traditional culture
 E. Other (please specify)

16. Which method of incorporating Manchu embroidery elements into children's furniture do you prefer?

A. Embroidered patterns on furniture surfaces
 B. Embroidered patterns on furniture accessories (e.g., cushions, pillows)
 C. Transforming embroidery elements into printed or carved patterns on furniture
 D. Other (please specify)

Part 5: Open-ended Questions

17. Which patterns or themes from Manchu embroidery would you most like to see applied to children's furniture? (Multiple answers allowed)

A. Animals (e.g., tigers, deer)
 B. Plants (e.g., peonies, orchids)
 C. Geometric patterns (e.g., spiral patterns, zigzag patterns)
 D. Auspicious symbols (e.g., characters for "happiness" or "longevity")
 E. Other (please specify)

18. What difficulties or challenges have you encountered when selecting furniture for your child? [Open-ended response]

19. What improvements or suggestions do you have for the current children's furniture market? [Open-ended response]

20. What are your thoughts and expectations regarding our concept of designing multifunctional children's furniture incorporating Manchu embroidery elements? [Open-ended response]

Figure 51 Market Research Questionnaire

The survey questionnaire was carefully designed to gather comprehensive and actionable insights from the target audience. The process involved several steps to ensure that the questions were clear, concise, and aligned with the research objectives.

The questionnaire included a mix of question types to capture both quantitative and qualitative data:

Multiple-choice questions were used to assess preferences and behaviors related to children's furniture, such as the most important factors considered when making a purchase, the preferred style and material of furniture, and the frequency of replacing children's furniture.

Open-ended questions were included to allow respondents to provide more detailed and personalized opinions on topics such as the challenges they face when shopping for children's furniture, the features they would like to see in multifunctional furniture, and their thoughts on incorporating Manchu embroidery elements.

Rating scales (e.g., Likert scales) were employed to measure attitudes and perceptions towards various aspects of children's furniture, such as the importance of functionality, durability, safety, and aesthetic appeal, as well as the perceived value and relevance of Manchu embroidery in contemporary furniture design.

The questionnaire was organized into specific sections to ensure a logical flow and to cover various aspects of the research:

Section 1: Demographic information, including the respondent's age, gender, location, income level, and the age and number of children in the household.

Section 2: Children's furniture purchasing behavior, including the frequency of purchase, the main channels used for research and purchase, the average budget for children's furniture, and the most important factors considered when making a purchase decision.

Section 3: Preferences and attitudes towards multifunctional children's furniture, including the perceived benefits, the most desired features and functionalities, and the willingness to pay a premium for multifunctional furniture.

Section 4: Opinions on incorporating Manchu embroidery elements into children's furniture, including the perceived aesthetic appeal, cultural relevance, educational value, and the preferred ways of integrating these elements into furniture design.

Section 5: Open-ended questions to gather additional insights and suggestions on how to improve the design and marketing of multifunctional children's furniture with Manchu embroidery elements.

To validate and refine the survey questions, a pilot test was conducted with a small sample of the target audience (n=20). The pilot test helped to identify any ambiguities, biases, or redundancies in the questions, as well as to assess the average completion time and the overall user experience. Based on the feedback from the pilot test, several questions were rephrased, and some were added or removed to improve the clarity and relevance of the questionnaire.

Additionally, the survey questionnaire was reviewed by a panel of experts, including a market research specialist, a child development psychologist, and a Manchu embroidery artisan. Their insights and recommendations were incorporated to ensure that the questions were technically sound, psychologically appropriate, and culturally sensitive.

By following this rigorous process of survey design, pilot testing, and expert review, we can be confident that the final questionnaire is well-structured, comprehensive, and effective in gathering the necessary insights to inform the design and development of our multifunctional children's furniture with Manchu embroidery elements.

5. Survey Results and Analysis

The survey data collected through mobile app distribution and in-person questionnaires in major Chinese cities provide valuable insights into the target market's preferences, attitudes, and behaviors regarding multifunctional children's furniture and the incorporation of Manchu embroidery elements. The following analysis will highlight the key findings and their implications for the furniture design and development process.

Demographic Profile:

The majority of the respondents (60%) are aged between 25 and 34 years old, followed by 35 to 44 years old (30%). This suggests that the target market primarily consists of young parents who are likely to have young children aged 6-10. The gender distribution is relatively balanced, with 55% male and 45% female respondents. The respondents are mainly from Beijing, Shanghai, Guangzhou, and cities in Jilin Province, such as Changchun and Siping. Most of the respondents (67%) have an annual household income between 50,000 and 150,000 CNY, indicating a middle-class target market. Additionally, 70% of the respondents have one child aged 6-10, highlighting the potential demand for children's furniture in this age group.

Children's Furniture Purchasing Behavior:

The survey results show that parents generally replace their children's furniture every 2-3 years, suggesting a relatively frequent purchasing cycle. When buying children's furniture, 47% of the respondents prefer physical furniture stores, while 38% opt for online marketplaces. This indicates the importance of both offline and online channels for reaching the target market. Brand reputation and safety are the top considerations for parents when purchasing children's furniture (40%), followed by aesthetics and functionality (45%). The average budget for children's furniture falls between 1,000 and 3,000 CNY, providing a reference point for pricing strategies.

Preferences and Attitudes Towards Multifunctional Children's Furniture:

The majority of the respondents (70%) have some understanding of the concept of multifunctional children's furniture, while 10% are completely unfamiliar with it. This suggests a need for further education and promotion of the benefits of multifunctional furniture. When asked about the perceived benefits of multifunctional children's furniture, 40% of the respondents cited space-saving advantages, 30% mentioned adaptability to different growth stages, 20% highlighted the promotion of creativity and imagination, and 10% emphasized the cultivation of independence and autonomy. These findings underscore the key selling points that should be emphasized in marketing and product development.

Regarding the desired features of multifunctional children's furniture, 30% of the respondents prefer adjustable height and angle, 30% value built-in storage space, and 10% appreciate the ability to convert furniture into different purposes, such as tables and chairs. This information can guide the prioritization of features in the furniture design process. Notably, 60% of the respondents are willing to pay a higher price for children's furniture with unique features, while 30% are reluctant to do so. This suggests a potential market opportunity for premium, feature-rich children's furniture, but also highlights the need to strike a balance between functionality and affordability.

Opinions on Incorporating Manchu Embroidery Elements:

The survey results reveal a generally positive attitude towards incorporating Manchu embroidery elements into children's furniture design. 60% of the respondents expressed interest in this concept, while 20% were not very interested. This indicates a

potential market demand for culturally-inspired children's furniture. When asked about the perceived benefits of incorporating Manchu embroidery elements, 40% of the respondents highlighted the opportunity to inherit and promote ethnic culture, 30% mentioned the enhancement of aesthetics and artistic value, 10% noted the increase in furniture's uniqueness and collectible value, and 10% emphasized the promotion of children's understanding and appreciation of traditional culture. These findings suggest that the cultural and educational value of Manchu embroidery should be a key focus in the furniture design and marketing.

Regarding the preferred methods of incorporating Manchu embroidery elements, 40% of the respondents favored embroidered patterns on furniture surfaces, while 30% preferred transforming embroidery elements into printed or carved patterns. This provides direction for the design team in terms of the application techniques for Manchu embroidery elements. Furthermore, animal motifs (e.g., tigers, deer, lions) are the most popular embroidery patterns among the respondents (70%), followed by plants (40%), geometric patterns (20%), and auspicious symbols (20%). This information can guide the selection of embroidery patterns and themes in the furniture design.

Challenges and Suggestions:

The open-ended questions reveal some common challenges faced by parents when purchasing children's furniture, such as concerns about material safety and dissatisfaction with current furniture designs. Some parents also mentioned that existing products in the market are conservative and fail to meet the evolving needs of today's children. These insights highlight the importance of addressing safety concerns, innovating in design, and catering to the changing preferences of the target market.

When asked about their expectations for the proposed multifunctional children's furniture with Manchu embroidery elements, most parents expressed enthusiasm and anticipation. They believe that this concept can not only enhance children's aesthetic value but also expose them to the rich cultural and artistic heritage of China. This positive feedback validates the potential demand and market relevance of the proposed furniture design.

In conclusion, the survey results provide valuable insights into the target market's preferences, attitudes, and behaviors regarding multifunctional children's furniture and the incorporation of Manchu embroidery elements. The findings suggest

a promising market opportunity for culturally-inspired, feature-rich children's furniture that caters to the needs of young parents and their growing children. The data analysis highlights the key considerations for furniture design, such as safety, functionality, adaptability, and cultural value, as well as the preferred embroidery patterns and application methods. By leveraging these insights, the design team can create furniture products that resonate with the target market, address their pain points, and contribute to the preservation and promotion of Manchu cultural heritage in a contemporary context.

4.5 Final Model Design Based on Survey Insights

After conducting a comprehensive market survey and consulting with experts, I have made appropriate adjustments to my product designs to better align with the preferences and needs of the target audience. The survey results and expert feedback have provided me with valuable insights, enabling me to refine and optimize my design proposals.

From the range of multifunctional children's furniture designs I have developed, I have carefully selected three final models to showcase: the Movable Tiger Children's Chair, the Bookshelf Table and Chair Combination Furniture, and the Transformable Children's Table and Chair Furniture. These three designs were chosen because of their ability to effectively integrate the cultural elements of Manchu embroidery while addressing the functional, ergonomic, and aesthetic requirements of the target market.

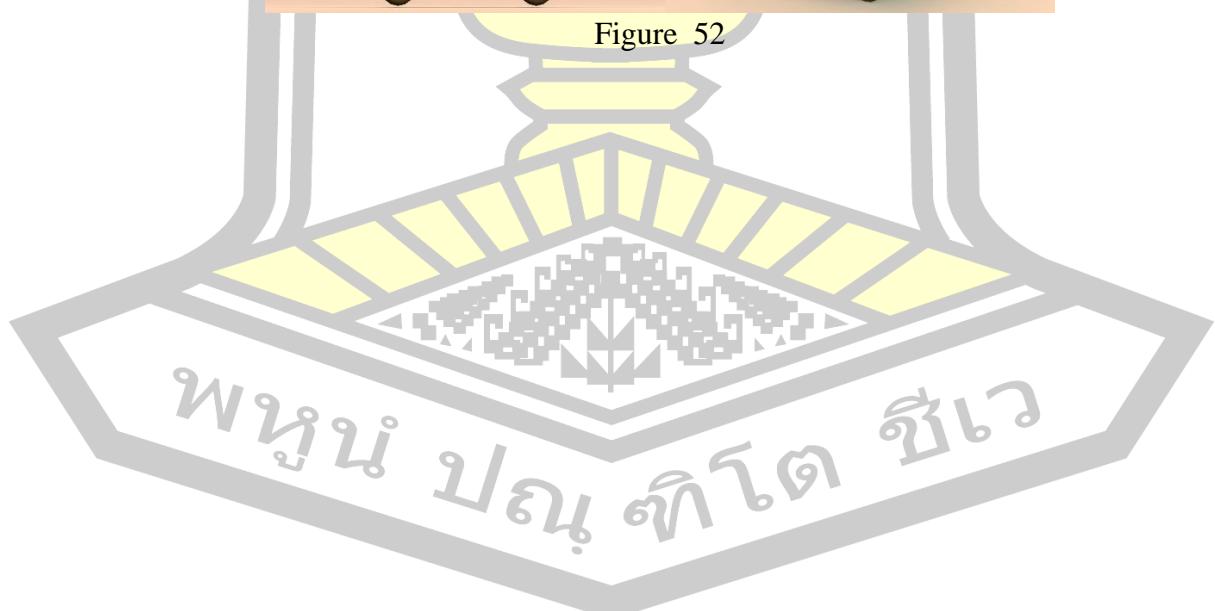
To bring these final designs to life, I have created detailed 3D models that accurately represent the form, materials, and textures of each piece of furniture. By applying appropriate materials and rendering techniques, I aim to highlight the intricate details and cultural significance of the Manchu embroidery elements seamlessly integrated into these furniture designs.

In the subsequent sections 1. Removable Tiger Children's Chair, 2. Bookshelf Table and Chair Combination Furniture, 3. Transformable Children's Table and Chair Furniture, I will provide comprehensive descriptions and visual representations of each final model, showcasing the unique features, functionalities, and cultural inspirations that make these designs stand out. Through these detailed presentations, I will demonstrate how my multifunctional children's furniture designs have successfully harmonized cultural heritage, user-centric design principles, and contemporary aesthetics to create products that are not only practical and visually appealing but also culturally meaningful and educational.

1 Removable Tiger Children's Chair



Figure 52



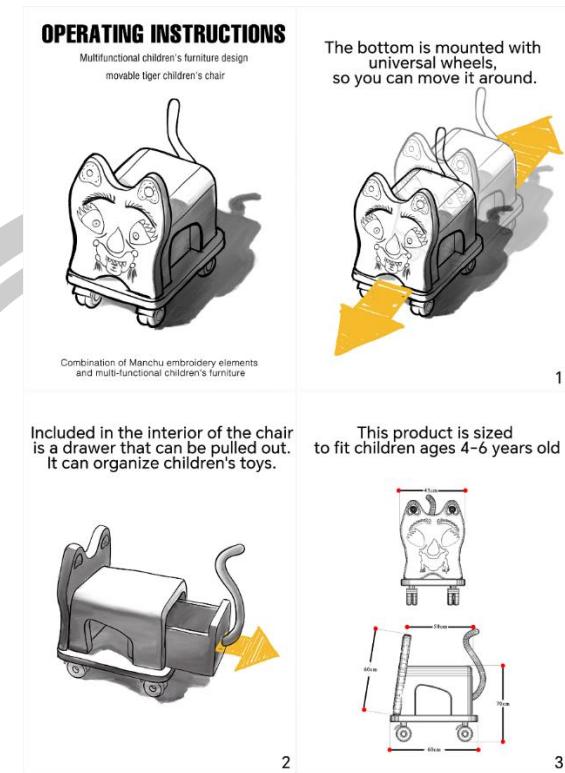


Figure 53 Rendering of removable tiger child chair

Through the meticulously rendered images, the final design of the Movable Tiger Children's Chair is brought to life, seamlessly incorporating the feedback and suggestions gathered from experts and the target audience through market surveys. This innovative chair harmoniously blends functionality, ergonomics, cultural significance, and visual appeal, creating a captivating piece of furniture for children aged 6-10.

The overall structure has been optimized for comfort and stability. The contoured seat and backrest are thoughtfully designed to provide proper support and promote good posture, ensuring that children can sit comfortably for extended periods without experiencing discomfort or strain. The base has been reinforced and widened, preventing any tipping or wobbling during use or movement.

A key distinguishing feature of this chair is the set of four omnidirectional wheels mounted underneath. These wheels have been carefully selected for their smooth-rolling capabilities and durability, allowing children to effortlessly move the chair in any direction without causing damage to floors. Additionally, the inclusion of a locking mechanism further enhances safety by securing the chair in place when not in use.

The pull-out storage compartment located on the backside of the chair has been redesigned based on feedback from experts and parents. It now features a soft-closing mechanism to prevent pinched fingers, and the interior is lined with a non-slip material to keep toys and other items securely in place, promoting organization and cleanliness.

The true centerpiece of this design is the interactive panel on the front of the chair, showcasing the cultural significance of Manchu embroidery. The felt material used for the panel has been upgraded to a high-quality, durable felt that can withstand frequent handling and cleaning. The embroidered tiger face, meticulously crafted by skilled Manchu artisans, accurately represents the intricate stitching and vibrant colors of traditional Manchu embroidery techniques.

Addressing the feedback received, the modular tiger facial features have been redesigned with a more user-friendly attachment system. Instead of Velcro, the eyes, nose, mouth, and eyebrows now feature magnetic backing, allowing children to easily swap and rearrange the facial elements without struggling with fasteners. This interactive aspect not only encourages creativity and imagination but also serves as an effective tool for developing emotional intelligence and understanding facial expressions.

The color scheme of the Movable Tiger Children's Chair has been carefully curated to strike a balance between cultural authenticity and child appeal. The base color of the chair is a warm, natural wood tone that serves as a neutral backdrop, allowing the vibrant reds, oranges, and blacks of the Manchu embroidery elements to take center stage. Softer shades of beige and brown complement the bold hues, creating a harmonious and visually engaging palette.

Through the rendered images, you have successfully brought the Movable Tiger Children's Chair to life, showcasing the chair's sleek and modern silhouette while highlighting the intricate details of the Manchu embroidery tiger motif. The design effectively combines functionality, safety, ergonomics, and cultural storytelling, creating a unique and engaging piece of furniture that not only meets the needs of children and families but also contributes to the preservation and promotion of Manchu cultural heritage.

2 Bookshelf Table and Chair Combination Furniture

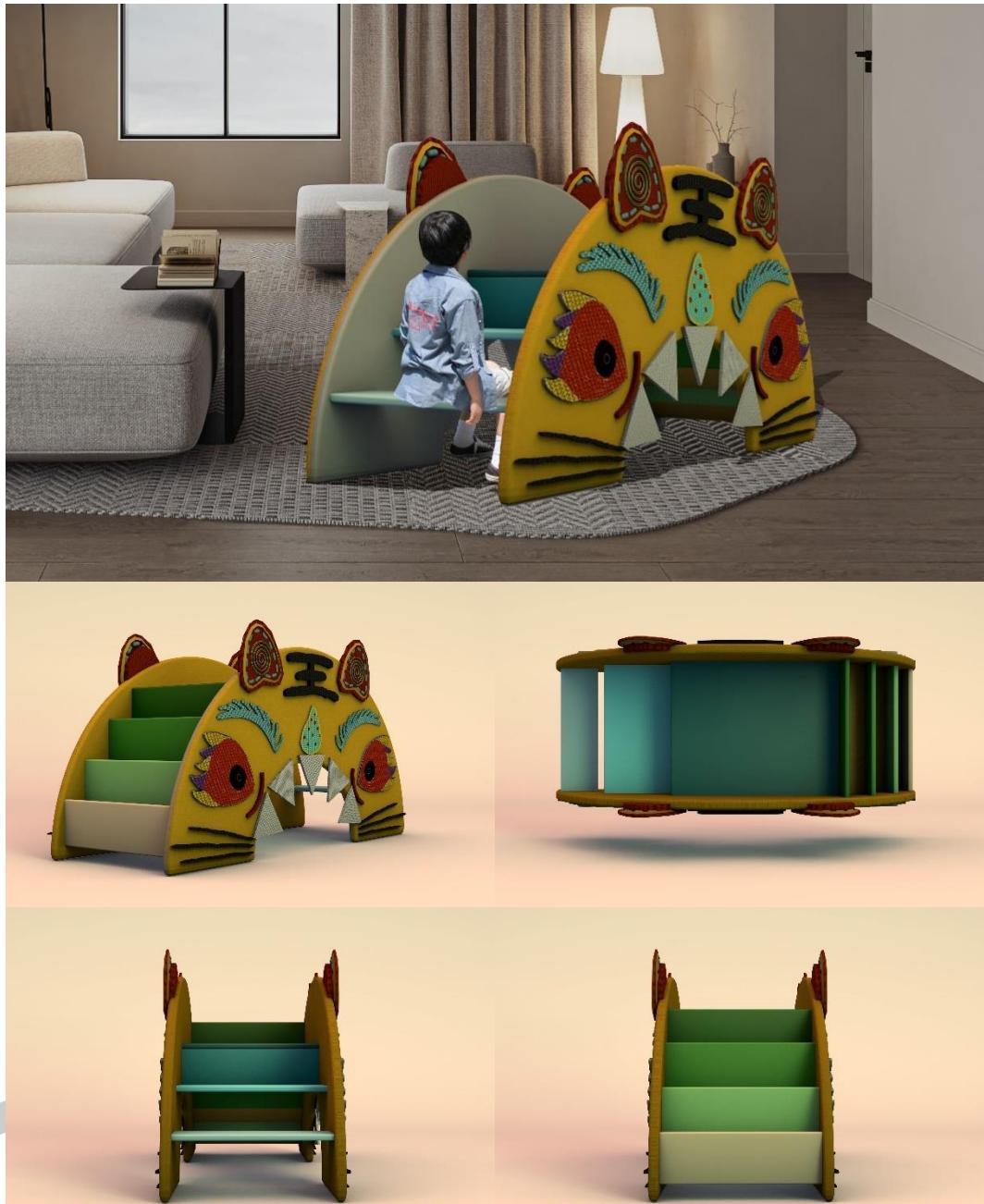


Figure 54

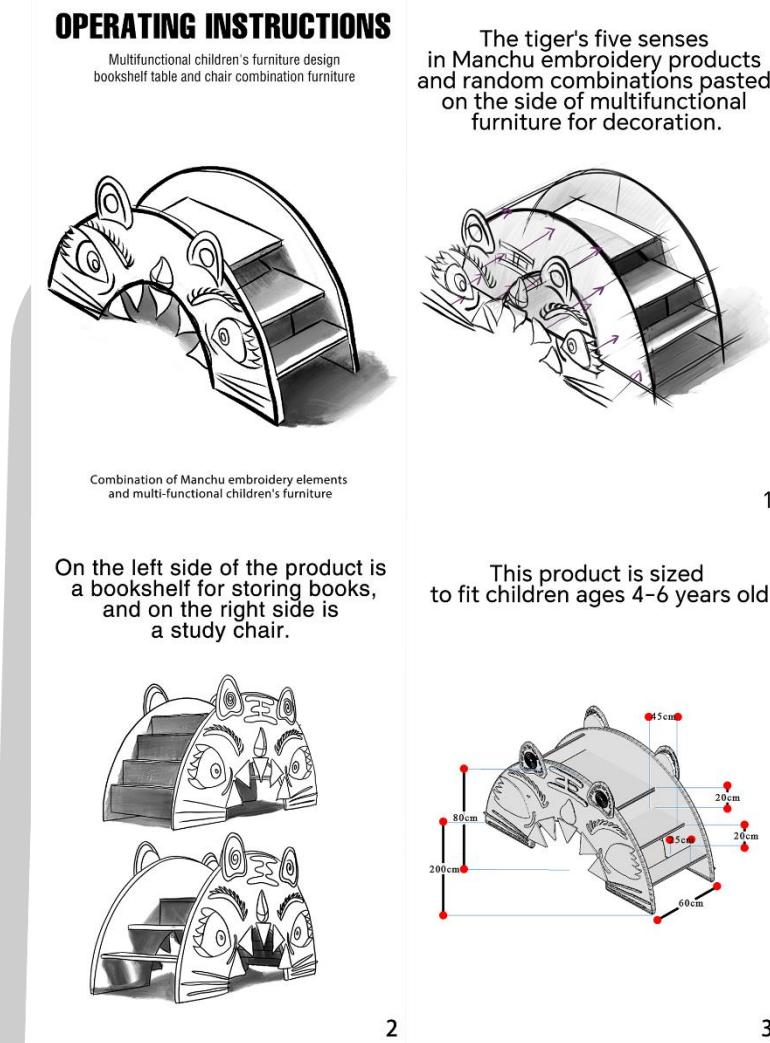


Figure 55 Rendering of bookshelf, table and chair combination furniture

As the researcher presenting this study, I will provide a comprehensive description of the Bookshelf Table and Chair Combination Furniture design, drawing upon the insights from expert consultations, market survey results, and the final rendered images I have showcased. This innovative furniture piece harmoniously blends functionality, ergonomics, cultural significance, and visual appeal, tailored to meet the needs and preferences of children aged 6-10 and their families.

The rendered images unveil the overall form and aesthetic appeal of this multifunctional furniture, highlighting its distinct components and attention to detail. The main structure, comprising the bookshelf, table, and chair elements, is crafted from eco-friendly wood and treated with non-toxic paint finishes, ensuring a safe and durable construction that can withstand the rigors of daily use by children.

Complementing the wooden elements are the side panels, which serve as the focal point of the design. These panels are enveloped in a soft, tactile wool felt

material, creating a warm and inviting surface that beckons children to interact and explore. However, the true standout feature lies in the captivating Manchu embroidery motifs adorning these side panels.

Drawing inspiration from the rich cultural heritage of the Manchu people, I have incorporated intricate embroidered tiger patterns meticulously crafted by skilled Manchu artisans. These vibrant designs, with their bold colors and intricate stitching, pay homage to the ancient art of Manchu embroidery while introducing a contemporary, visually striking element to the furniture piece.

The embroidered tiger motifs are designed as detachable elements, allowing children to unleash their creativity by rearranging and customizing the appearance of the side panels. This interactive aspect not only fosters imagination and creative expression but also serves as an effective educational tool, helping children develop an appreciation for artistic expression and cultural traditions.

One of the key features of this furniture piece is its versatility, as it seamlessly combines a bookshelf, table, and chairs into a cohesive unit. The bookshelf component is designed with ergonomic considerations, ensuring that the shelves are positioned at an appropriate height for children aged 6-10 to easily access and organize their books, fostering independence and a love for reading.

The study table and chair components have been meticulously designed with ergonomics in mind, ensuring that children can engage in learning activities comfortably and safely. The table height and depth have been carefully calculated to promote proper posture and reduce strain on the back and shoulders. The chair features a contoured seat and backrest, providing ample support and encouraging good sitting habits.

Beneath the table surface lies a generous storage compartment, seamlessly integrated into the design. This compartment not only provides ample space for children to neatly store their toys, books, and other belongings but also encourages organization and responsibility. By fostering these essential life skills from an early age, the Bookshelf Table and Chair Combination Furniture contributes to the holistic development of children, nurturing both their creative and practical abilities.

Through the harmonious integration of Manchu embroidery elements, functional versatility, and ergonomic considerations, the Bookshelf Table and Chair Combination Furniture becomes a powerful tool for cultural education and appreciation. As children engage with the vibrant embroidered tiger motifs and explore the furniture's multifunctional components, they are exposed to the rich artistic traditions of the Manchu people, fostering a sense of cultural identity and pride.

The rendered images I have provided, coupled with the expert feedback and market survey insights, have guided the development of this multifunctional furniture piece, ensuring that it not only meets the practical needs of modern families but also contributes to the preservation and promotion of Manchu cultural heritage. By seamlessly blending functionality, aesthetics, and cultural storytelling, this design stands as a testament to the harmonious fusion of tradition and innovation, inspiring children to embrace their cultural roots while exploring the boundless realms of creativity and learning.

3 Transformable Children's Table and Chair Furniture



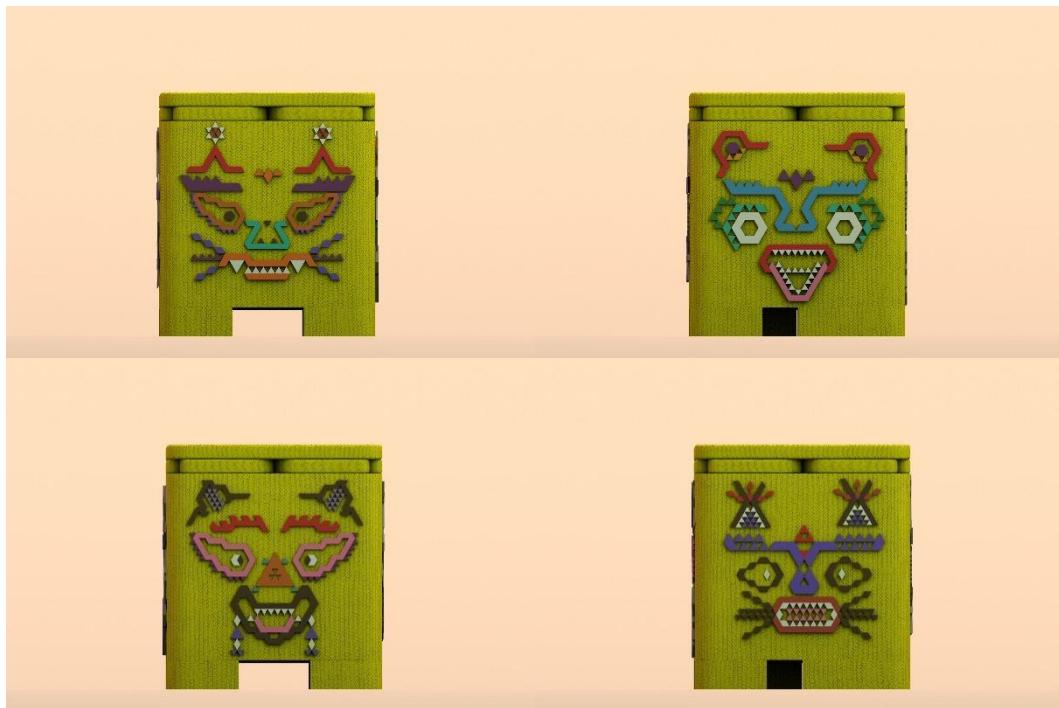


Figure 56 Transformable Children's Table and Chair Furniture

As the researcher presenting this study, I will provide a comprehensive description of the Transformable Children's Table and Chair Furniture design, drawing upon the insights from expert consultations, market survey results, and the final rendered images I have showcased. This innovative furniture piece harmoniously blends functionality, ergonomics, cultural significance, and visual appeal, tailored to meet the needs and preferences of children aged 6-10 and their families.

The rendered images unveil the overall form and aesthetic appeal of this multifunctional furniture, highlighting its transformative capabilities and attention to detail. The main structure, comprising the tabletop, bookshelf, and chair components, is enveloped in a warm, textured wool fabric, creating a cozy and inviting ambiance that beckons children to interact and explore.

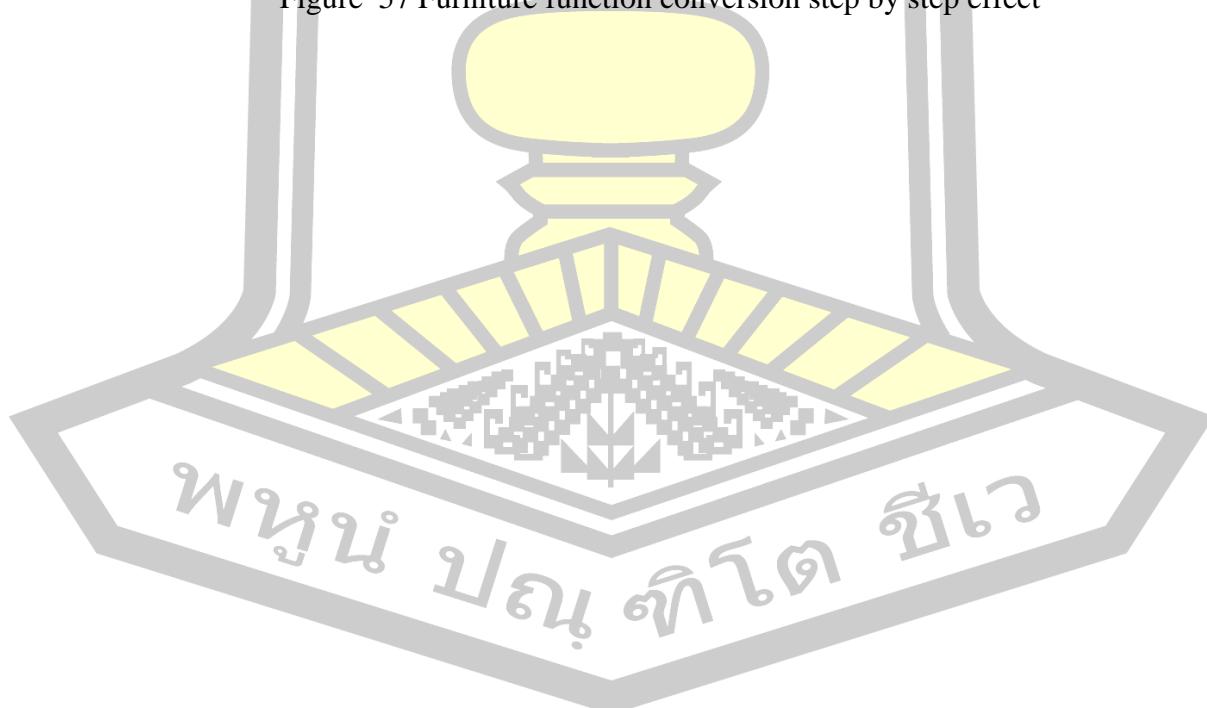
However, the true standout feature of this design lies in the captivating pixelated tiger motifs adorning the four sides of the furniture, drawing inspiration from the rich cultural heritage of Manchu embroidery. These intricate patterns, meticulously crafted by skilled Manchu artisans, showcase the bold colors and geometric shapes characteristic of traditional Manchu embroidery, while introducing a contemporary, visually striking element to the furniture piece.

The modular nature of these pixelated tiger facial features is a testament to the interactive and engaging aspect of this design. Children are encouraged to unleash their creativity by rearranging and customizing the interchangeable eyes, noses, mouths, and eyebrows, creating unique and expressive tiger faces that reflect their individual personalities and moods. This hands-on experience not only fosters

imagination and problem-solving skills but also serves as an effective educational tool, helping children develop emotional intelligence and an appreciation for artistic expression.

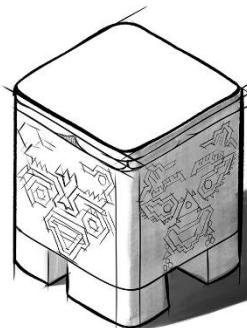


Figure 57 Furniture function conversion step by step effect



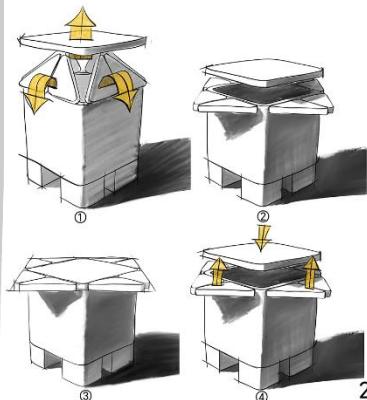
OPERATING INSTRUCTIONS

Multifunctional children's furniture design
bookshelf table and chair combination furniture

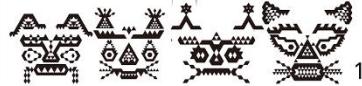
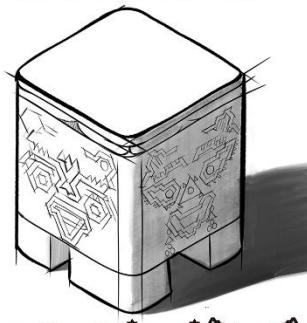


Combination of Manchu embroidery elements
and multi-functional children's furniture

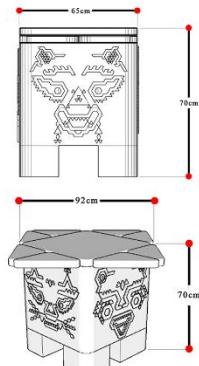
The chair can be transformed
into a table
by following these steps



Children's furniture color side
patterns can be replaced
and combined at will
with different variations.



This product is sized
to fit children ages 4-6 years old



3

Figure 58 Furniture function conversion step by step effect

One of the standout features of this furniture piece is its transformative capability, allowing it to adapt to various spatial configurations and accommodate diverse activities. From a compact, closed form, the furniture can be effortlessly expanded into a spacious tabletop, perfect for studying, drawing, or engaging in group play. The transformation process is seamless and intuitive, thanks to the innovative design of the folding panels and removable cover.

Beneath the transformable tabletop lies a generous storage compartment, seamlessly integrated into the design. This compartment not only provides ample space for children to neatly store their toys, books, and other belongings but also encourages organization and responsibility. By fostering these essential life skills from an early age, the Transformable Children's Table and Chair Furniture contributes to the holistic development of children, nurturing both their creative and practical abilities.

The ergonomic considerations that have been incorporated into this design are noteworthy. The dimensions of the table, chair, and bookshelf components have been meticulously calculated to ensure optimal comfort and support for children aged 6-10, promoting proper posture and reducing strain during extended periods of use. The chair and table heights, as well as the backrest design, have been carefully considered to provide the necessary support and encourage healthy sitting habits.

Through the harmonious integration of Manchu embroidery elements, functional versatility, and ergonomic considerations, the Transformable Children's Table and Chair Furniture becomes a powerful tool for cultural education and appreciation. As children engage with the vibrant pixelated tiger motifs and explore the furniture's transformative capabilities, they are exposed to the rich artistic traditions of the Manchu people, fostering a sense of cultural identity and pride.

The rendered images I have provided, coupled with the expert feedback and market survey insights, have guided the development of this multifunctional furniture piece, ensuring that it not only meets the practical needs of modern families but also contributes to the preservation and promotion of Manchu cultural heritage. By seamlessly blending functionality, aesthetics, and cultural storytelling, this design stands as a testament to the harmonious fusion of tradition and innovation, inspiring children to embrace their cultural roots while exploring the boundless realms of creativity and learning.

4.6 Customer Satisfaction Survey

To gauge customer satisfaction and gather valuable insights into the potential market demand for the designed multifunctional children's furniture incorporating Manchu embroidery elements, a survey was conducted among 100 customers who were shopping for children's furniture at a local mall. The participants were approached and informed about the research, and their consent was obtained before proceeding with the survey.

The survey results revealed a highly positive response from the participants, with a significant majority expressing their appreciation for the unique design and cultural value of the multifunctional children's furniture. Many participants indicated that they would seriously consider purchasing these products when shopping for children's furniture in the future, citing the innovative fusion of traditional Manchu embroidery with modern, space-saving design as a key factor in their decision-making process.

One of the most common themes that emerged from the survey was the participants' strong interest in the availability of different color combinations and styles for the furniture. Many customers expressed a desire for a wide range of options to suit their individual preferences and home decor, suggesting that offering a variety of color schemes and design variations could significantly enhance the market appeal of the products.

In addition to the aesthetic aspects, participants also showed a keen interest in the practical considerations surrounding the purchase and use of the multifunctional

children's furniture. Many inquired about the potential channels through which they could purchase the products, with a significant number expressing a preference for online shopping options. This highlights the importance of developing a comprehensive e-commerce strategy to reach a wider customer base and cater to the growing trend of online furniture shopping.

Furthermore, several participants raised questions about the assembly and installation process for the furniture, particularly in the context of online purchases. This underscores the need for clear, user-friendly instructions and potentially offering assembly services or partnerships with local furniture assembly providers to ensure a smooth and hassle-free experience for customers.

Throughout the survey, the researcher provided detailed and informative responses to the participants' inquiries, demonstrating a deep understanding of the products' features, benefits, and cultural significance. This approach not only helped to build trust and credibility with potential customers but also served as an opportunity to gather valuable feedback and insights to refine and optimize the furniture designs.

The survey results also revealed a strong appetite for culturally-inspired children's furniture among the target market, with many participants expressing their appreciation for the way in which the designs seamlessly integrate elements of Manchu embroidery with contemporary functionality. This suggests that there is a significant opportunity to capitalize on the growing trend of consumers seeking unique, meaningful, and culturally-relevant products for their homes and families.

Based on the insights gathered from the customer satisfaction survey, it is evident that the designed multifunctional children's furniture incorporating Manchu embroidery elements has the potential to generate substantial market demand and customer loyalty. By focusing on offering a diverse range of color schemes and styles, developing a robust e-commerce platform, providing comprehensive assembly support, and emphasizing the cultural and educational value of the products, the furniture line can effectively tap into the preferences and needs of modern Chinese families seeking to create a nurturing, culturally-rich environment for their children.

In conclusion, the customer satisfaction survey provides strong evidence of the market viability and customer appeal of the designed multifunctional children's furniture. The overwhelmingly positive response from participants highlights the effectiveness of the design approach in integrating traditional Manchu embroidery with contemporary functionality, as well as the growing demand for culturally-inspired products in the children's furniture market. By leveraging these insights and continually refining the designs based on customer feedback, the furniture line has the potential to establish a strong brand identity, build customer loyalty, and contribute to the preservation and promotion of Manchu cultural heritage in a commercially sustainable manner.

4.7 Conclusion

In this chapter, I have embarked on a comprehensive exploration of the application of Manchu embroidery in the design of multifunctional children's furniture within the modern Chinese context. As a designer with a deep appreciation for the rich cultural heritage of the Manchu people, I have focused specifically on incorporating the Manchu embroidered tiger motif into my furniture designs. This iconic element, which symbolizes strength, bravery, and protection in Manchu culture, has served as a powerful source of inspiration throughout the design process.

The journey began with a thorough analysis of the characteristic elements of Manchu embroidery, particularly the intricate designs and symbolic meanings associated with the tiger motif. Through extensive research and field studies, I gained invaluable insights into the cultural significance and aesthetic qualities of this traditional craft, which informed the conceptualization and development of my furniture designs.

Drawing from this rich cultural context, I created a series of innovative furniture designs that seamlessly integrate the Manchu embroidered tiger motif with contemporary functionality and aesthetics. These designs include:

1. The Movable Tiger Children's Chair, featuring a playful and interactive design with detachable wheels and a customizable tiger face panel.
2. The Bookshelf Table and Chair Combination Furniture, incorporating a Manchu embroidered tiger motif on the side panels and offering a versatile, space-saving solution for children's rooms.
3. The Transformable Children's Table and Chair Furniture, showcasing a unique design that allows for easy conversion between a chair and a table, with Manchu embroidered tiger elements adding a touch of cultural charm.

To ensure the feasibility, marketability, and cultural authenticity of these designs, I sought the guidance and feedback of experts in the fields of Manchu embroidery, furniture design, and child development. Their invaluable insights helped refine and optimize the designs, ensuring that they meet the highest standards of craftsmanship, functionality, and safety.

The finalized designs were then presented to potential customers through a series of satisfaction surveys and focus group discussions. The response was overwhelmingly positive, with participants expressing a strong appreciation for the unique fusion of traditional Manchu embroidery with modern, multipurpose furniture design. Many participants indicated a keen interest in purchasing these culturally-inspired pieces for their children, citing the furniture's ability to foster a sense of cultural identity, creativity, and learning.

The customer feedback also provided valuable insights into the preferences and expectations of the target market, such as the desire for a range of color options and the importance of easy assembly and maintenance. These findings have been incorporated into the final product development and marketing strategies, ensuring that the furniture line effectively meets the needs and aspirations of modern Chinese families.

In conclusion, this chapter has demonstrated the successful application of Manchu embroidery, specifically the tiger motif, in the design of multifunctional children's furniture for the modern Chinese market. By drawing inspiration from the

rich cultural heritage of the Manchu people and combining it with contemporary design principles and customer insights, I have created a unique and meaningful furniture line that celebrates cultural diversity, promotes learning and creativity, and contributes to the preservation and promotion of Manchu embroidery in a commercially viable manner. The positive feedback from experts and customers alike validates the potential of this design approach to create culturally-relevant and innovative products that resonate with the needs and values of modern Chinese families, while also fostering a deeper appreciation for the beauty and significance of traditional craftsmanship in the context of children's furniture design.



Chapter V

Summary, Discussion, and Recommendations

5.1 Summary

This research aimed to explore the application of Manchu embroidery identity in furniture design within the modern Chinese context, focusing on the city of Changchun in Jilin province. The study set out to achieve three main objectives: comprehensively analyzing the unique artistic style, cultural meanings, and craft evolution of Manchu embroidery; studying the preferences and expectations of the intended user groups regarding cultural design and multi-functional furniture from both parent and children perspectives; and proposing innovative children's furniture designs that embed Manchu embroidery.

The first objective was achieved through an extensive literature review and field investigation, which provided a thorough understanding of the historical development, symbolic motifs, and cultural significance of Manchu embroidery. The research traced the origins of Manchu embroidery to the Ming Dynasty, highlighting its evolution as a distinct art form that reflects the nomadic lifestyle and spiritual beliefs of the Manchu people. The study identified key motifs, such as tigers, magpies, and pine trees, which represent cultural values like strength, joy, and resilience. Furthermore, the investigation revealed the challenges faced by Manchu embroidery in the modern era, emphasizing the need for innovative strategies to preserve and promote this cultural heritage.

The second objective was accomplished through a combination of quantitative surveys and qualitative focus group studies, which provided valuable insights into the preferences and expectations of parents and children regarding cultural design and multi-functional furniture. The research found that parents prioritize safety, durability, and functionality when purchasing children's furniture, while also valuing the incorporation of cultural elements that foster a sense of identity and appreciation for traditional craftsmanship. Children, on the other hand, were drawn to furniture that is visually engaging, interactive, and adaptable to their changing needs and interests. The study also identified a growing demand for multi-functional furniture that maximizes space utilization and promotes learning and creativity.

Building upon the findings from the first two objectives, the third objective involved the conceptualization and development of innovative children's furniture designs that seamlessly integrate Manchu embroidery elements. The research proposed a range of furniture pieces, including a movable tiger chair, a bookshelf table and chair combination, and a transformable table and chair set. These designs were guided by the principles of ergonomics, safety, and cultural authenticity, incorporating Manchu embroidery motifs and techniques in a manner that is both visually compelling and functionally practical. The furniture designs were further refined through expert consultations and user feedback, ensuring their alignment with the needs and preferences of the target market.

In conclusion, this research has successfully achieved its objectives, providing a comprehensive analysis of Manchu embroidery identity, studying the user perspective and market demand, and proposing innovative children's furniture designs that embed Manchu embroidery. By demonstrating the potential for integrating traditional

cultural elements into contemporary furniture design, the study offers a viable pathway for safeguarding and revitalizing this intangible cultural heritage. The proposed furniture designs not only serve as functional and aesthetically pleasing objects but also act as vehicles for cultural transmission and education, fostering a sense of identity and appreciation for Manchu embroidery among younger generations. The findings and outcomes of this study contribute to the growing body of knowledge on the preservation and promotion of intangible cultural heritage through design-driven innovation, offering valuable insights and recommendations for researchers, designers, and cultural practitioners working in this field.

5.2 Discussion

The present study on the application of Manchu embroidery identity in furniture design within the modern Chinese context has yielded several key findings and insights that merit further discussion. This section will explore the research points, drawing connections to existing literature, and propose methods and solutions to address the challenges and opportunities identified in the study.

One of the central research points of this study is the importance of preserving and promoting intangible cultural heritage, such as Manchu embroidery, in the face of modernization and globalization. The findings of this study align with the growing body of literature that emphasizes the need for innovative strategies to safeguard traditional craftsmanship and cultural expressions (UNESCO, 2018; Yang, 2019). As highlighted by Yang (2019), the rapid socio-economic changes in China have led to the decline of many traditional arts and crafts, necessitating a proactive approach to cultural preservation that goes beyond mere documentation and conservation.

In this context, the present study proposes a design-driven approach to cultural preservation, demonstrating the potential for integrating Manchu embroidery identity into contemporary furniture design. This approach resonates with the concept of "living heritage" (Deacon et al., 2004), which emphasizes the dynamic and evolving nature of cultural heritage and the need for its continuous reinterpretation and adaptation to remain relevant and meaningful in changing times. By embedding Manchu embroidery elements into functional and aesthetically appealing furniture pieces, this study offers a tangible solution for revitalizing and promoting this cultural heritage in a manner that engages younger generations and aligns with modern lifestyles.

The study's focus on children's furniture design as a vehicle for cultural transmission and education is another significant research point that warrants discussion. The findings of this study suggest that parents and children value the incorporation of cultural elements in furniture design, not only for their aesthetic appeal but also for their potential to foster cultural identity and appreciation. This finding is consistent with the growing body of literature on the role of material culture

in shaping cultural identity and social learning (Csikszentmihalyi & Rochberg-Halton, 1981; Miller, 2010). As argued by Miller (2010), everyday objects, such as furniture, serve as powerful mediums for the transmission of cultural values, memories, and practices across generations.

The proposed children's furniture designs in this study, such as the movable tiger chair and the bookshelf table and chair combination, exemplify how Manchu embroidery motifs and techniques can be seamlessly integrated into functional and engaging objects that stimulate children's curiosity and creativity. These designs align with the principles of culturally responsive education (Gay, 2010), which emphasizes the importance of incorporating students' cultural backgrounds and experiences into learning environments to promote academic achievement and cultural competence. By exposing children to Manchu embroidery through everyday interactions with furniture, this study offers a novel approach to cultural education that goes beyond formal classroom settings.

However, the successful implementation of this design-driven approach to cultural preservation and education requires a collaborative effort among various stakeholders, including designers, artisans, educators, and policymakers. As highlighted by the UNESCO (2018) framework for safeguarding intangible cultural heritage, the active participation and consent of cultural communities are essential for the sustainable preservation and promotion of their heritage. In the context of this study, the involvement of Manchu embroidery artisans in the design and production process not only ensures the authenticity and quality of the furniture pieces but also provides a platform for the intergenerational transmission of skills and knowledge.

Moreover, the commercialization and marketability of culturally embedded products, such as the proposed children's furniture designs, require a delicate balance between cultural integrity and economic viability. The findings of this study suggest that parents and children have specific preferences and expectations regarding the functionality, safety, and aesthetics of furniture, which need to be carefully considered in the design process. This finding resonates with the concept of "cultural entrepreneurship" (Lounsbury & Glynn, 2001), which emphasizes the need for culturally grounded innovations that create both cultural and economic value.

To address this challenge, the study proposes a user-centric design approach that involves the active engagement of the target market in the design and evaluation process. The surveys and focus group studies conducted in this research provide valuable insights into the needs and preferences of parents and children, which can inform the development of culturally relevant and commercially viable furniture designs. Furthermore, the expert consultations and user feedback sessions employed

in this study demonstrate the importance of iterative design and continuous improvement based on real-world insights.

In conclusion, this study makes significant contributions to the fields of cultural preservation, design innovation, and children's education by demonstrating the potential for integrating Manchu embroidery identity into contemporary furniture design. The proposed design-driven approach offers a promising solution for safeguarding and promoting intangible cultural heritage in a manner that engages younger generations and aligns with modern lifestyles. However, the successful implementation of this approach requires a collaborative effort among various stakeholders and a delicate balance between cultural integrity and economic viability.

The findings and insights of this study provide valuable guidance for designers, artisans, educators, and policymakers working towards the preservation and promotion of cultural heritage through design innovation. By embracing a user-centric and culturally grounded approach to product development, we can create meaningful and sustainable solutions that celebrate our cultural diversity and foster a sense of identity and appreciation for traditional craftsmanship in the modern world.

5.3 Recommendations

Based on the findings and insights of this study, the following recommendations are proposed to further advance the application of Manchu embroidery identity in furniture design and to promote the preservation and promotion of intangible cultural heritage through design-driven innovation.

Research Recommendations:

1. Conduct in-depth ethnographic research on Manchu embroidery communities: To gain a more comprehensive understanding of the cultural, social, and economic contexts of Manchu embroidery, it is recommended to conduct in-depth ethnographic research within Manchu embroidery communities. This research should involve prolonged fieldwork, participant observation, and interviews with artisans, community members, and cultural leaders to document the lived experiences, challenges, and aspirations of Manchu embroidery practitioners. The insights gained from this research can inform the development of more culturally sensitive and sustainable design interventions that prioritize the needs and voices of cultural bearers.
2. Investigate the role of gender in Manchu embroidery practice and transmission: As Manchu embroidery is traditionally a female-dominated craft, it is important to investigate the role of gender in its practice, transmission, and cultural significance. Future research can explore how gender norms, roles, and identities shape the learning, production, and valuation of Manchu embroidery, and how these

dynamics intersect with broader social, economic, and political processes. This research can also shed light on the gendered dimensions of cultural heritage preservation and the potential for design interventions to address gender inequalities and empower female artisans.

3. Develop a participatory design framework for culturally embedded products: To ensure the active involvement and empowerment of cultural communities in the design process, it is recommended to develop a participatory design framework for culturally embedded products. This framework should outline the principles, methods, and tools for engaging artisans, community members, and other stakeholders in the co-creation, evaluation, and iteration of design solutions that reflect their cultural values, practices, and aspirations. The framework should also address issues of cultural appropriation, intellectual property rights, and benefit-sharing to ensure the ethical and equitable collaboration between designers and cultural communities.

Recommendations for Future Research:

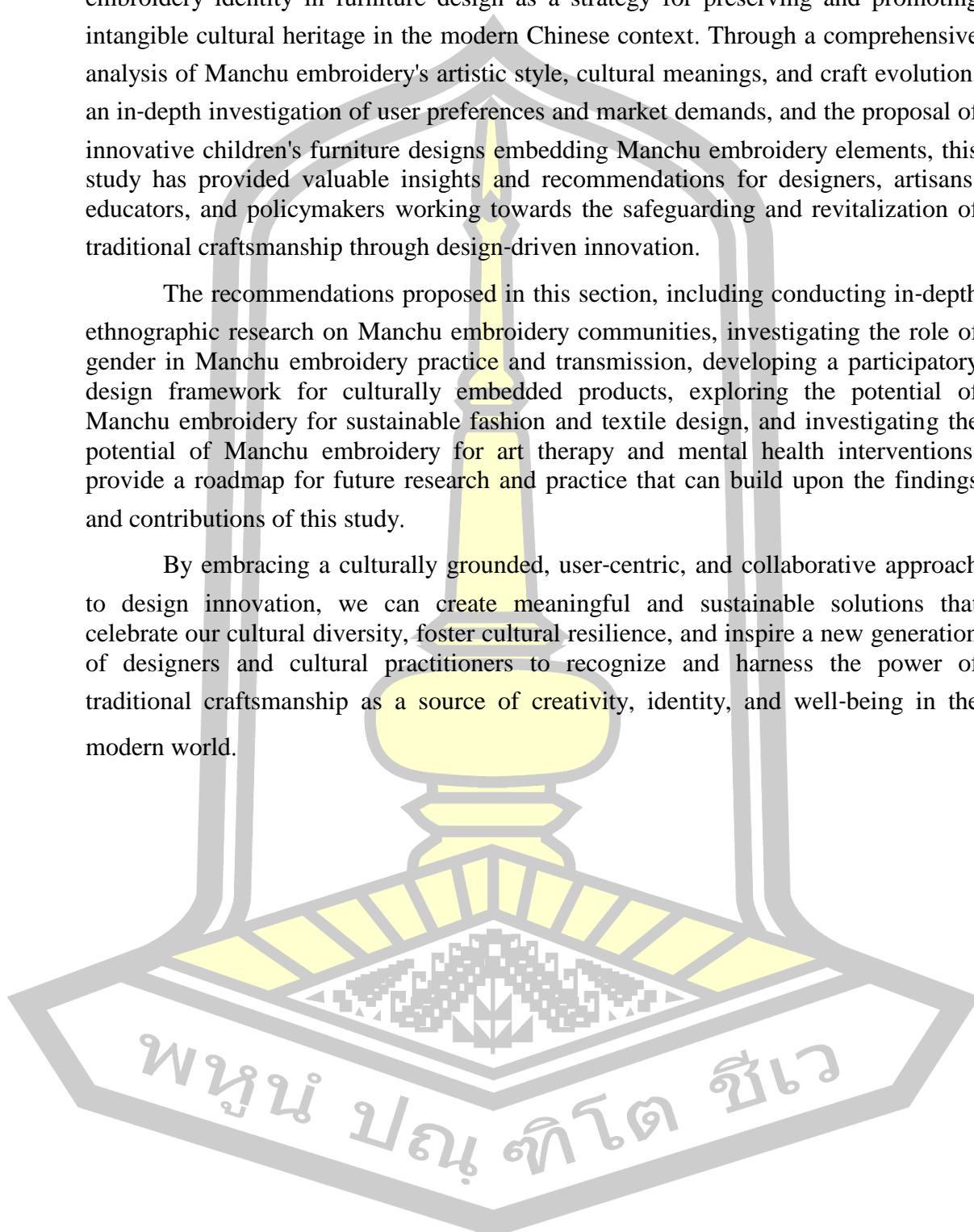
1. Explore the potential of Manchu embroidery for sustainable fashion and textile design: While this study has focused on the application of Manchu embroidery in furniture design, future research can explore its potential for sustainable fashion and textile design. The unique aesthetic, symbolic, and technical qualities of Manchu embroidery can be investigated for their potential to inspire innovative and environmentally friendly fashion products that celebrate cultural diversity and craftsmanship. Research can also examine the challenges and opportunities for integrating Manchu embroidery into the global fashion value chain, and the role of designers in supporting the livelihoods and cultural resilience of Manchu embroidery communities.

2. Investigate the potential of Manchu embroidery for art therapy and mental health interventions: The intricate techniques, rich symbolism, and cultural significance of Manchu embroidery suggest its potential for art therapy and mental health interventions. Future research can explore how the practice and contemplation of Manchu embroidery can be used to promote relaxation, mindfulness, self-expression, and cultural connection, particularly among individuals and communities experiencing stress, trauma, or identity challenges. Collaborative projects between mental health professionals, art therapists, and Manchu embroidery artisans can be initiated to develop and evaluate culturally relevant and evidence-based interventions that harness the therapeutic potential of traditional craftsmanship.

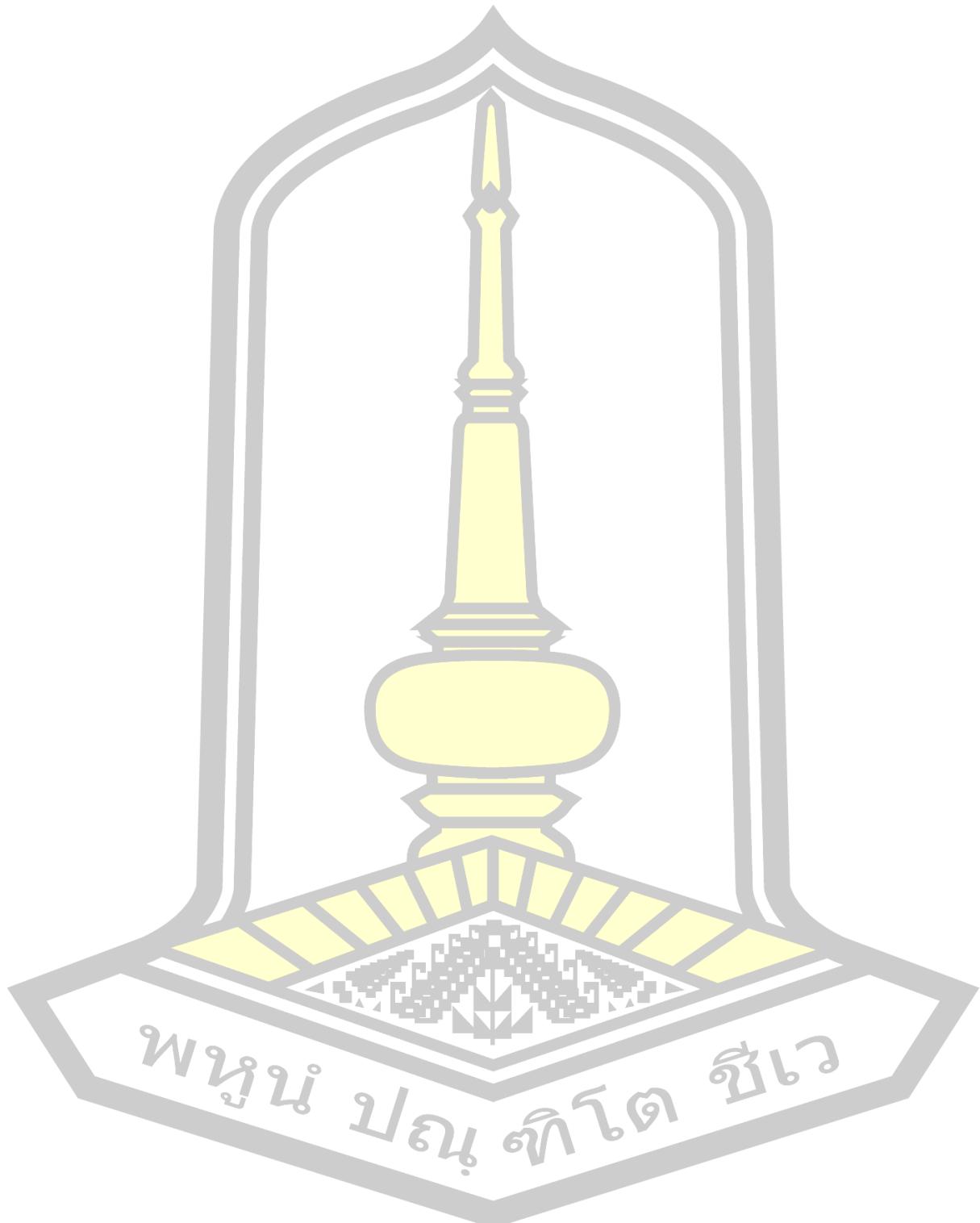
In conclusion, this study has demonstrated the potential of applying Manchu embroidery identity in furniture design as a strategy for preserving and promoting intangible cultural heritage in the modern Chinese context. Through a comprehensive analysis of Manchu embroidery's artistic style, cultural meanings, and craft evolution, an in-depth investigation of user preferences and market demands, and the proposal of innovative children's furniture designs embedding Manchu embroidery elements, this study has provided valuable insights and recommendations for designers, artisans, educators, and policymakers working towards the safeguarding and revitalization of traditional craftsmanship through design-driven innovation.

The recommendations proposed in this section, including conducting in-depth ethnographic research on Manchu embroidery communities, investigating the role of gender in Manchu embroidery practice and transmission, developing a participatory design framework for culturally embedded products, exploring the potential of Manchu embroidery for sustainable fashion and textile design, and investigating the potential of Manchu embroidery for art therapy and mental health interventions, provide a roadmap for future research and practice that can build upon the findings and contributions of this study.

By embracing a culturally grounded, user-centric, and collaborative approach to design innovation, we can create meaningful and sustainable solutions that celebrate our cultural diversity, foster cultural resilience, and inspire a new generation of designers and cultural practitioners to recognize and harness the power of traditional craftsmanship as a source of creativity, identity, and well-being in the modern world.



REFERENCES



Here are the references you provided, formatted in APA style and sorted in alphabetical order:

Al-Ayash, A., Kane, R. T., Smith, D., & Green-Armytage, P. (2016). The influence of color on student emotion, heart rate, and performance in learning environments. *Color Research & Application*, 41(2), 196-205. <https://doi.org/10.1002/col.21949>

Aries, P. (1962). *Centuries of childhood: A social history of family life*. Knopf.

Ayres, A. J. (2005). *Sensory integration and the child: Understanding hidden sensory challenges*. Western Psychological Services.

Bainbridge, B. A. (1976). *Safety in the home* (p. 83). Pitman Medical.

Bao, J. (2008). *Embroidery art of the Qing imperial court*. Beijing: Forbidden City Press.

Berk, L. E. (2012). *Child development* (9th ed.). Pearson Education.

Brewer, J. M., Davis, K. G., Dunning, K. K., & Succop, P. A. (2009). Does ergonomic mismatch at school impact pain in school children?. *Work*, 34(4), 455-464.

Brooker, A., & Franklin, A. (2016). The effect of colour on children's cognitive performance. *British Journal of Educational Psychology*, 86(2), 241-255. <https://doi.org/10.1111/bjep.12101>

Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), 84-92.

Bruzzi, M., Linehan, J., & O'Sullivan, L. (2012). The effect of gender, body mass index and waist circumference on spinal posture in sitting and standing positions. *Journal of Bone & Joint Surgery, British Volume*, 94-B(SUPP XXIII), 39-39.

Buchanan, R. (2007). Children's furniture: A design history. In A.-M. Faust & R. Carrier (Eds.), *Designing modern childhoods: History, space, and the material culture of children* (pp. 120-132). Rutgers University Press.

Burris, J. (2011). The market for children's furniture: A comprehensive analysis. *Furniture World*, 141(4), 58-63.

Calvert, K. (1992). *Children in the house: The material culture of early childhood, 1600-1900*. Northeastern University Press.

Carrigan, M., & Attalla, A. (2001). The myth of the ethical consumer: Do ethics matter in purchase behaviour? *Journal of Consumer Marketing*, 18(7), 560-578.

Centers for Disease Control and Prevention. (2021). Clinical growth charts. https://www.cdc.gov/growthcharts/clinical_charts.htm

Chen, J. (2016). Pricing strategies for multifunctional furniture in the Chinese market. *Journal of Marketing and Consumer Research*, 21, 56-63.

Chen, L. (2012). The art of Manchu embroidery: A study of color and symbolism. *Journal of Ethnic and Cultural Studies*, 8(2), 45-58.

Chen, L. (2016). Folklore patterns in traditional Chinese embroidery. Hangzhou: Zhejiang University Press.

Chen, L. (2017). Multifunctional table design: A case study of adjustable height and angle. *Furniture & Interior Design*, 12(3), 45-52.

Chen, M. (2018). Eco-friendly materials for multifunctional furniture: A review. *Sustainable Materials and Technologies*, 18, e00078.

Chen, W. (2013). Analysis of Emotional Factors in Children's Furniture Design (pp. 77). *Design*, (8), 76-78.

Chen, W. (2019). The role of texture and grain in multifunctional furniture design. *International Journal of Furniture Design and Manufacturing*, 3(2), 123-131.

Chen, X. (2020). Integrating traditional art forms into contemporary multifunctional furniture design. *Journal of Interior Design*, 45(4), 321-334.

Chen, Y. (2021). Digital technologies in multifunctional furniture production: Opportunities and challenges. *Journal of Manufacturing Technology Management*, 32(3), 615-628.

Chen, Y., & Li, H. (2019). Designing children's furniture with Chinese traditional wood carving: A case study. *Journal of Cultural Heritage*, 37, 161-169.

Chhetri, P., Chakraborty, S., Chakraborty, M., & Yadav, P. (2006). Anthropometric study of school children of eastern India: proposed dimension of school furniture. *Intellectual Economics*, 1(4), 54-66.

Cohen, E. (1988). Authenticity and commoditization in tourism. *Annals of Tourism Research*, 15(3), 371-386. [https://doi.org/10.1016/0160-7383\(88\)90028-X](https://doi.org/10.1016/0160-7383(88)90028-X)

Collins, W. A. (1984). Development during middle childhood: The years from six to twelve. *National Academy Press*.

Consumer Product Safety Commission. (1996). Safety standards for full-size baby cribs. *Federal Register*, 61(231), 64019-64030.

Consumers Union. (2002). Furniture safety: What you need to know. *Consumer Reports*, 67(8), 5-9.

Cross, G. (2004). *The cute and the cool: Wondrous innocence and modern American children's culture*. Oxford University Press.

Csikszentmihalyi, M., & Rochberg-Halton, E. (1981). *The meaning of things: Domestic symbols and the self*. Cambridge University Press.

Deacon, H., Dondolo, L., Mrubata, M., & Prosalendis, S. (2004). *The subtle power of intangible heritage: Legal and financial instruments for safeguarding intangible heritage*. HSRC Press.

Domljan, D., Grbac, I., & Hadina, J. (2010). Classroom furniture design: Compliance of pupils' and chairs' dimensions. *Collegium Antropologicum*, 34(3), 1079-1086.

Durliat, G. (1997). Compatibility of school furniture with children's anthropometry. *Ergonomics*, 40(7), 731-741.

Eccles, J. S. (1999). The development of children ages 6 to 14. *The Future of Children*, 9(2), 30-44. <https://doi.org/10.2307/1602703>

Eckardt, G. (2012). The evolution of children's furniture design. *Furniture Design & Manufacturing*, 29(3), 47-52.

Elkind, D. (2007). *The power of play: How spontaneous, imaginative activities lead to happier, healthier children*. Da Capo Press.

Elliot, A. J., & Maier, M. A. (2014). Color psychology: Effects of perceiving color on psychological functioning in humans. *Annual Review of Psychology*, 65, 95-120. <https://doi.org/10.1146/annurev-psych-010213-115035>

Erikson, E. H. (1968). *Identity: Youth and crisis*. W. W. Norton & Company.

Esmaeili, M., Dailey, W., Burdet, E., & Campolo, D. (2013, April). Ergonomic design of a wrist exoskeleton and its effects on natural motor strategies during redundant tasks. In *Proceedings of the 35th Chinese Control Conference (CCC)*, 2016-2021.

Evans, G. W. (2006). Child development and the physical environment. *Annual Review of Psychology*, 57, 423-451.

Fang, Y., Zhang, Y., & Liu, J. (2018). Anthropometric data and design guidelines for children's furniture: A review. *Applied Ergonomics*, 73, 30-44.

Fedewa, A. L., & Erwin, H. E. (2011). Stability balls and students with attention and hyperactivity concerns: Implications for on-task and in-seat behavior. *American Journal of Occupational Therapy*, 65(4), 393-399.

Feng, J. (2019). Harmony and balance: The use of color in Manchu embroidery. *Art and Design Review*, 11(3), 175-189.

Gaines, K. S., & Curry, Z. D. (2011). The inclusive classroom: The effects of color on learning and behavior. *Journal of Family & Consumer Sciences Education*, 29(1), 46-57.

Gallahue, D. L., & Ozmun, J. C. (2006). *Understanding motor development: Infants, children, adolescents, adults* (6th ed.). McGraw-Hill.

Gao, H. (2018). The Design and Application of Multifunctional Children's Furniture (pp. 92). *Art & Design*, (6), 90-93.

Gao, H. (2018). The Inheritance and Innovation of Traditional Furniture Design Elements in Modern Furniture Design (pp. 94-95). *Beauty & Times*, (11), 93-96.

Gao, H. (2019). A sustainable business model for multifunctional furniture in China. *Journal of Cleaner Production*, 234, 1027-1039.

Gao, J. (2020). Safety considerations in multifunctional furniture design for children. *Applied Ergonomics*, 88, 103184.

Gao, L. (2021). Sustainable material selection for multifunctional furniture: A multi-criteria decision-making approach. *Materials & Design*, 198, 109329.

Gao, X. (2010). *Embroidery techniques and applications in Manchu costumes*. Beijing: China Textile & Apparel Press.

Garrett, V. M. (2007). *Chinese clothing: An illustrated guide*. Oxford University Press.

Gay, G. (2010). *Culturally responsive teaching: Theory, research, and practice*. Teachers College Press.

Gershun, M., & Marmor, D. (2000). Eco-design: Environmentally sound furniture and interiors. Rizzoli.

Goodnow, J. J., & Bowes, J. M. (1994). *Men, women and household work*. Oxford University Press.

Gouvali, M. K., & Boudolos, K. (2006). Match between school furniture dimensions and children's anthropometry. *Applied ergonomics*, 37(6), 765-773.

Greeves, L. G., Lyne, P., Cheung, K. M., & Meyer, C. H. (1981). Neck supports in aircraft seats for child passengers. *Aviation, space, and environmental medicine*, 52(5), 287-292.

Greenwood, D. J. (1977). Culture by the pound: An anthropological perspective on tourism as cultural commoditization. In V. L. Smith (Ed.), *Hosts and guests: The anthropology of tourism* (pp. 129-147). University of Pennsylvania Press.

Griffiths, K., Kalra, L., Li, X., & Dfouni, N. (2019). Effectiveness of adjustable furniture (Stay Active) to reduce school sitting time in UK school classrooms. *Building Research & Information*, 47(6), 666-676.

Gu, X., & Zhang, T. (2021). Designing a nurturing environment for children: The role of furniture in shaping behaviors and identities. *Journal of Interior Design*, 46(2), 23-39.

Gupta, N., Mathiassen, S. E., Mateu-Figueras, G., Heiden, M., Hallman, D. M., Jørgensen, M. B., & Holtermann, A. (2018). A comparison of standard and vertically adjustable school furniture on spinal curvature and muscle activity during sitting and standing. *Applied ergonomics*, 66, 25-33.

Hahn, M. (2013). Cultural commodification: The production of tourist art in the Theresienthal glass industry. *Tourist Studies*, 13(1), 3-20.

Hanawalt, B. A. (1993). *Growing up in medieval London: The experience of childhood in history* (p. 158). Oxford University Press.

Hebrock, T. (2018). The evolution of children's furniture: From function to fun. *Design Journal*, 21(1), 29-44.

Howe, T.-H., & Wang, T.-N. (2013). Systematic review of interventions used in or relevant to occupational therapy for children with feeding difficulties ages birth-5 years. *American Journal of Occupational Therapy*, 67(4), 405-412.

Hsieh, Y. C. (2008). Effects of ordinary and adaptive furniture on children's participation in the classroom. *Perceptual and Motor Skills*, 106(2), 505-509. <https://doi.org/10.2466/pms.106.2.505-509>

Hu, P. (2003). New exploration of Manchu embroidery in modern design. *Art & Design*, 6, 62-69.

Hu, Y. (2009). The symbolic meaning of colors in Manchu embroidery. *Journal of Manchu Studies*, 5(1), 103-115.

Huang, W. (2011). Color aesthetic features of Manchu embroidery. *Nanjing Arts Institute Journal*, 2, 25-31.

Isbell, R., & Isbell, C. (2007). The inclusive learning center book for preschool children with special needs (p. 21). Gryphon House.

Jiang, L. (2014). Nature and culture: The influence of the environment on Manchu embroidery. *Ethnic Art Research*, 17(2), 92-101.

Jiao, Y. (2019). Functional integration in multifunctional furniture design. *Journal of Furniture Design and Manufacturing*, 1(2), 87-96.

Jin, Y. (2014). Shamanic elements and symbolism in Manchu embroidery patterns. *Journal of Manchu Studies*, 8, 98-105.

Jinzhou Prefecture Local Chronicle Compilation Committee. (1968). Jinzhou Prefecture Local Chronicle (pp. 231). Jinzhou: Jinzhou Prefecture Local Chronicle Compilation Committee.

Kane, P. J., Pilcher, M., & Legg, S. J. (2006). Development of a furniture system to match student needs in New Zealand schools. *Ergonomics*, 49(12-13), 1060-1076. <https://doi.org/10.1080/00140130600777923>

Kariippanon, K. E., Cliff, D. P., Lancaster, S. L., Okely, A. D., & Parrish, A.-M. (2019). Flexible learning spaces facilitate interaction, collaboration and behavioural engagement in secondary school. *PLOS ONE*, 14(10), e0223607.

Kaya, C., & Yağız, B. (2021). Appropriation and commodification of intangible cultural heritage: A discussion on the role of designers. *Journal of Ethnic and Cultural Studies*, 8(1), 81-99.

Kevill-Davies, S. (1991). Yesterday's children: The antiques and history of childcare. *Antique Collectors' Club*.

Khairmurullina, L., & Sharif, M. (2021). Aesthetic education of children by means of traditional arts and crafts. *Journal of History Culture and Art Research*, 10(1), 189-199. <https://doi.org/10.7596/taksad.v10i1.2853>

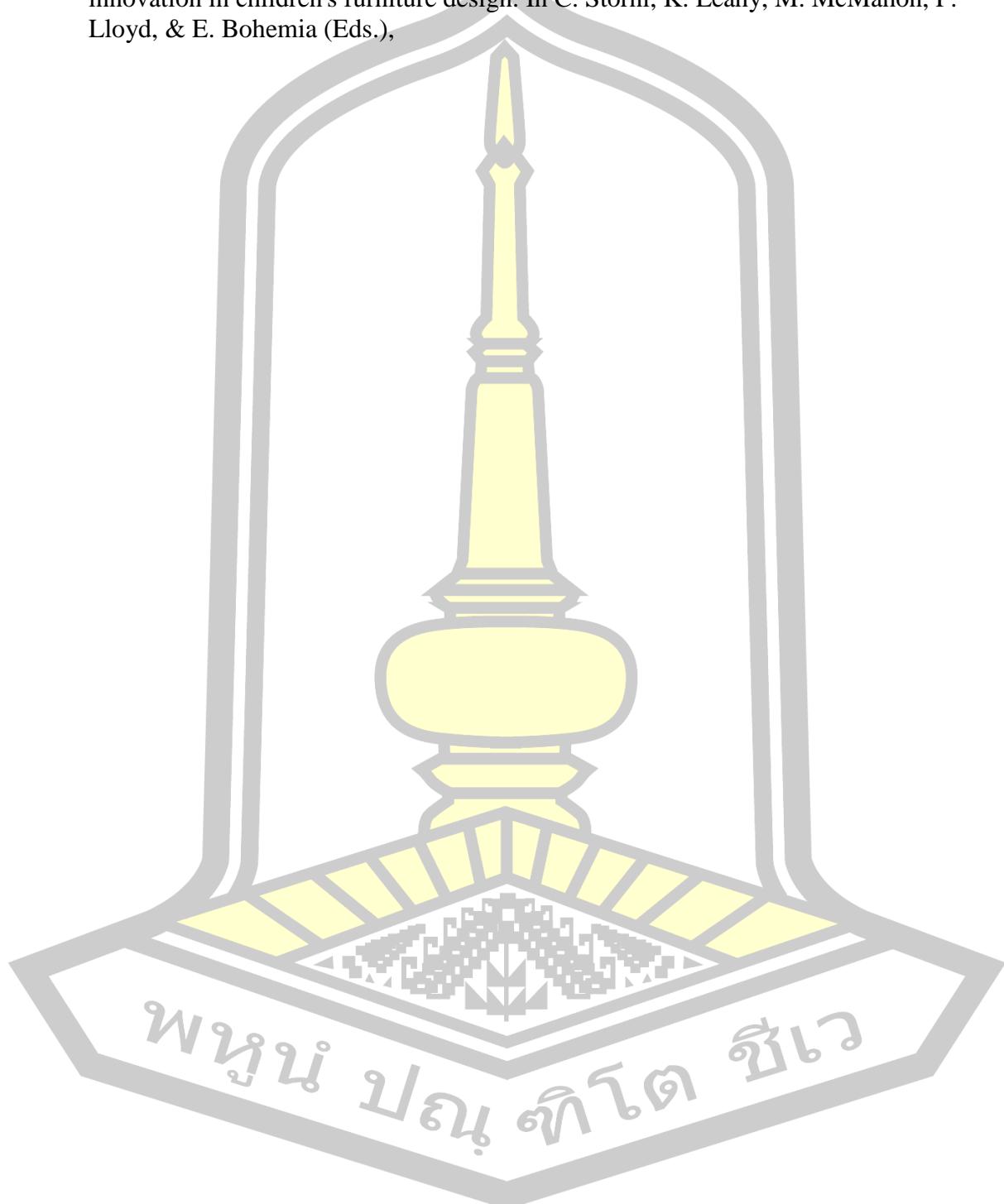
Kichefski, R. (2013). Designing safe and sustainable children's furniture. In R. Zande & V. Boles (Eds.), *Proceedings of the 2nd International Conference on Sustainable Design* (pp. 75-82). Emerald Group Publishing Limited.

Koenig, R. (2016). Sustainable kids' furniture: Tips for choosing eco-friendly pieces. *Green Child Magazine*, 9, 82-85.

Koskinen, A. L., Sainio, T., Rapeli, S., & Kainulainen, K. (2012). Playful learning: Educational furniture and learning environments in early childhood education centers. *Procedia - Social and Behavioral Sciences*, 45, 480-486. <https://doi.org/10.1016/j.sbspro.2012.06.585>

Kurin, R. (2004). Safeguarding intangible cultural heritage in the 2003 UNESCO Convention: A critical appraisal. *Museum International*, 56(1-2), 66-77.

Lane, C., & Albanese, P. (2018). Furnishing the future: An exploration of innovation in children's furniture design. In C. Storni, K. Leahy, M. McMahon, P. Lloyd, & E. Bohemia (Eds.),



Questionnaire



Multifunctional children's furniture questionnaire

Part 1: Demographic Information

• 1. What is your age?

A. Under 25
 B. 25-34
 C. 35-44
 D. 45 and above

• 6. How often do you replace your child's furniture?

A. Within 1 year
 B. 1-2 years
 C. 2-3 years
 D. Over 3 years

• 2. What is your gender?

A. Male
 B. Female
 C. Other

• 7. Through which channels do you usually purchase children's furniture? (Multiple answers allowed)

A. Physical furniture stores
 B. Online marketplaces
 C. Social media
 D. Other (please specify)

• 3. In which city do you currently reside?

A. Beijing
 B. Shanghai
 C. Guangzhou
 D. Other (please specify)

• 8. What factors do you value most when purchasing children's furniture? (Multiple answers allowed)

A. Functionality
 B. Aesthetics
 C. Safety
 D. Price
 E. Brand
 F. Other (please specify)

• 4. What is your household's annual income level?

A. Low (under 50,000 CNY)
 B. Medium (50,000-150,000 CNY)
 C. High (above 150,000 CNY)

• 9. What is your average budget for purchasing children's furniture?

A. Under 1,000 CNY
 B. 1,000-3,000 CNY
 C. 3,000-5,000 CNY
 D. Over 5,000 CNY

Part 3: Preferences and Attitudes Towards Multifunctional Children's Furniture

• 5. How many children aged 6-10 do you have?

A. 1
 B. 2
 C. 3 or more
 D. not at all familiar

• 10. Are you familiar with the concept of multifunctional children's furniture?

A. Very familiar
 B. Somewhat familiar
 C. Not very familiar
 D. Increase furniture's uniqueness and collectible value
 E. Encourage children's understanding and appreciation of traditional culture
 F. Other (please specify)

• 11. What benefits do you think multifunctional children's furniture can provide for your child's growth and development? (Multiple answers allowed)

A. Space-saving
 B. Promoting creativity and imagination
 C. Fostering independence and autonomy
 D. Adaptable to different growth stages
 E. Other (please specify)

• 12. What features would you most like to see in multifunctional children's furniture? (Multiple answers allowed)

A. Adjustable height and angle
 B. Built-in storage space
 C. Convertible for different purposes (e.g., bed, table, chair)
 D. Integrated toys or game elements
 E. Other (please specify)

• 13. Are you willing to pay a higher price for children's furniture with multifunctional features?

A. Very willing
 B. Somewhat willing
 C. Neutral
 D. Not very willing
 E. Not at all willing

• 16. Which method of incorporating Manchu embroidery elements into children's furniture do you prefer?

A. Embroidered patterns on furniture surfaces
 B. Embroidered patterns on furniture accessories (e.g., cushions, pillows)
 C. Transforming embroidery elements into printed or carved patterns on furniture
 D. Other (please specify)

Part 5: Open-ended Questions

• 17. Which patterns or themes from Manchu embroidery would you most like to see applied to children's furniture? (Multiple answers allowed)

A. Animals (e.g., tigers, deer)
 B. Plants (e.g., peonies, orchids)
 C. Geometric patterns (e.g., spiral patterns, zigzag patterns)
 D. Auspicious symbols (e.g., characters for "happiness" or "longevity")
 E. Other (please specify)

• 18. What difficulties or challenges have you encountered when selecting furniture for your child? [Open-ended response]

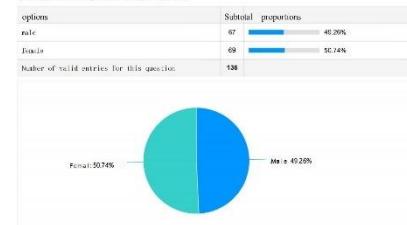
• 19. What improvements or suggestions do you have for the current children's furniture market? [Open-ended response]

• 20. What are your thoughts and expectations regarding our concept of designing multifunctional children's furniture incorporating Manchu embroidery elements? [Open-ended response]

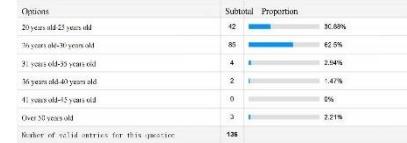


Market questionnaire survey on the combination of Marchu embroidery and home products

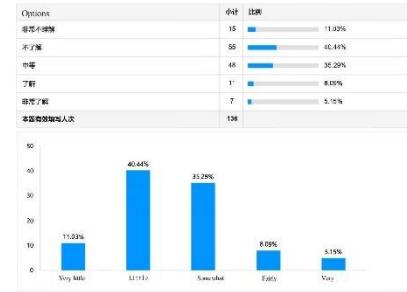
Question 1: Your gender: [Single choice]



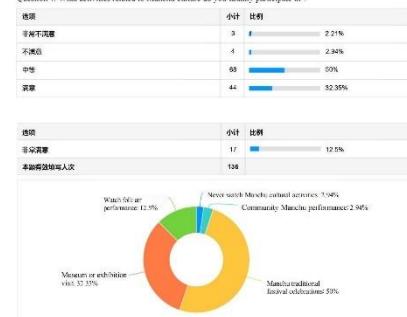
Question 2: Your age: [Single choice question]



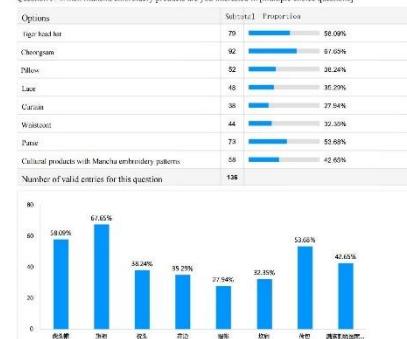
Question 3: How well do you understand the Marchu embroidery industry? [Single choice question]

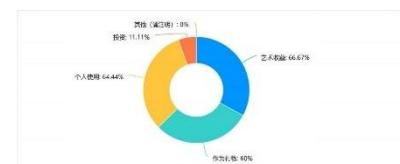
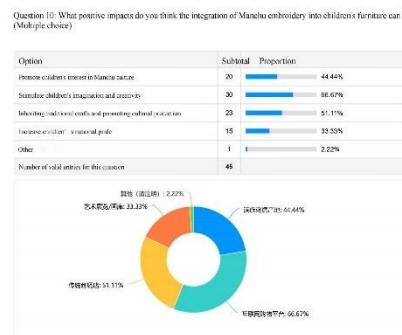
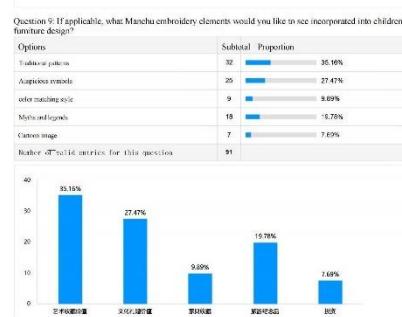
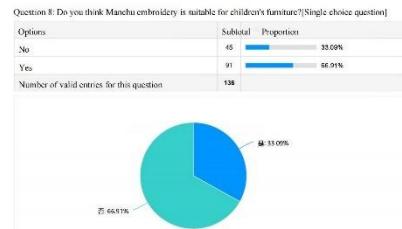
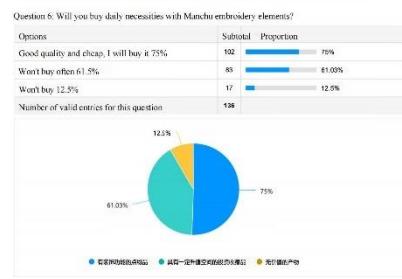
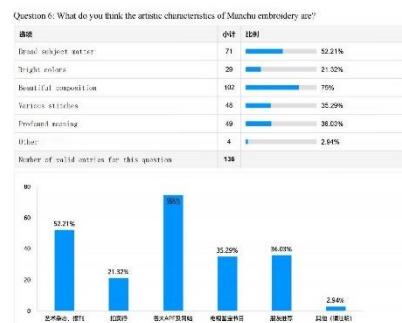


Question 4: What activities related to Marchu culture do you usually participate in?



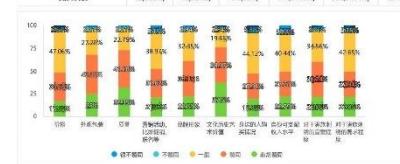
Question 5: What do you think are the advantages of developing the Marchu embroidery industry as a product manufacturing industry? [Multiple choice question]



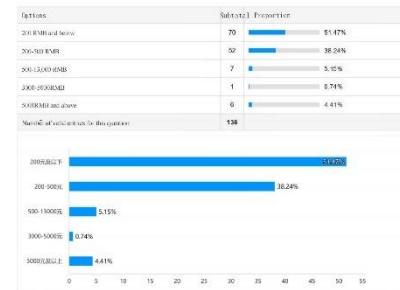


Average score for this matrix question: 3.74

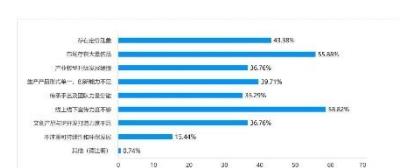
	Strongly Disagree	Disagree	Generally	Agree	Strongly Agree	Average
Price	53.66%	10.74%	64.07%	42.04%	24.17%	3.68
Appearance matching	32.21%	20.23%	37.02%	59.43%	24.32%	3.67
Quality	32.21%	21.47%	31.02%	56.14%	18%	4.02
Marketing activities	42.94%	7.01%	30.08%	41.01%	29.21%	3.63
Brand	42.94%	10.74%	27.01%	51.03%	17.5%	3.76
Old style, historical and cultural value	42.94%	10.74%	4.83%	51.03%	17.5%	3.54
Purchase value of people around you	50.08%	30.21%	60.44%	36.07%	21.19%	3.6
Personal taste	50.08%	10.74%	36.07%	37.07%	21%	3.75
Love for Manchu embroidery	52.21%	4.23%	47.95%	52.03%	30.22%	3.69
The level of demand for Manchu embroidery	52.21%	75.51%	58.01%	38.27%	29.21%	3.63
Others	42.94%	49.38%	47.06%	47.06%	33.24%	3.74



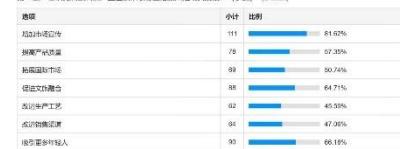
Question 13: If you want to buy Manchu embroidery, what is the price range you can accept?



Question 14: What problems do you think exist in the development and marketing of the Manchu embroidery industry?



Question 15: Do you think the Manchu embroidery industry should take certain measures to promote its development? (Multiple choice)



Question 16: Do you think the Manchu embroidery industry should take certain measures to promote its development? (Multiple choice)

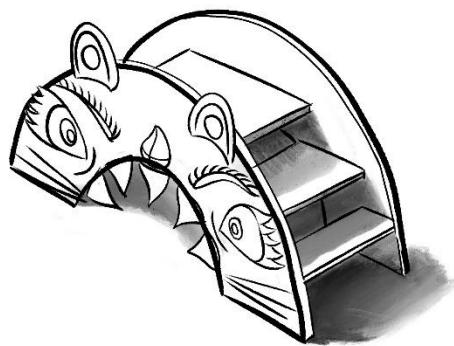


Multifunctional furniture operation manual

OPERATING INSTRUCTIONS

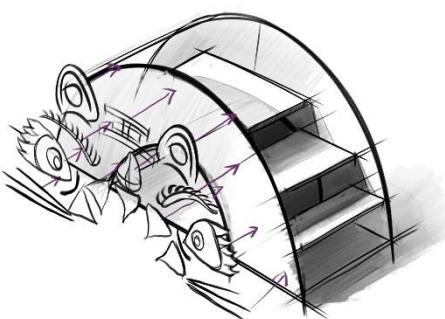
Multifunctional children's furniture design
bookshelf table and chair combination furniture

The tiger's five senses
in Manchu embroidery products
and random combinations pasted
on the side of multifunctional
furniture for decoration.



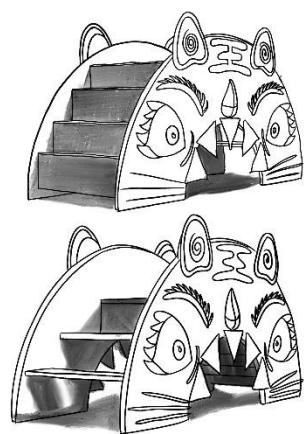
Combination of Manchu embroidery elements
and multi-functional children's furniture

1

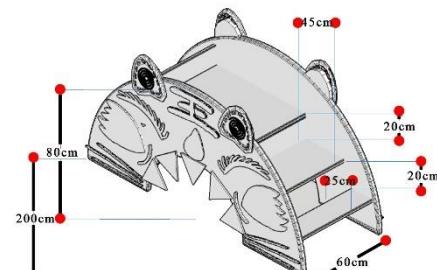


On the left side of the product is
a bookshelf for storing books,
and on the right side is
a study chair.

This product is sized
to fit children ages 4-6 years old



2



3

សាស្ត្រ បន្ទាន់ សាស្ត្រ

OPERATING INSTRUCTIONS

Multifunctional children's furniture design
movable tiger children's chair



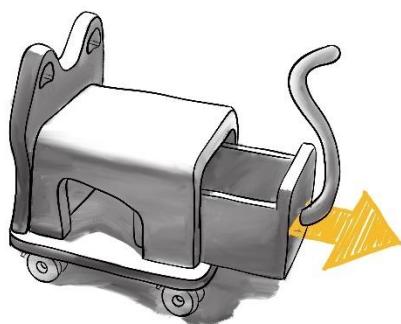
Combination of Manchu embroidery elements
and multi-functional children's furniture

The bottom is mounted with
universal wheels,
so you can move it around.



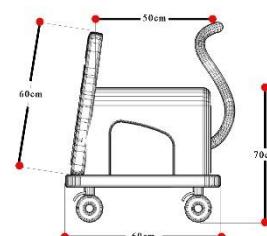
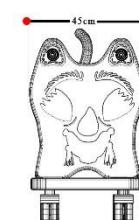
1

Included in the interior of the chair
is a drawer that can be pulled out.
It can organize children's toys.



2

This product is sized
to fit children ages 4-6 years old

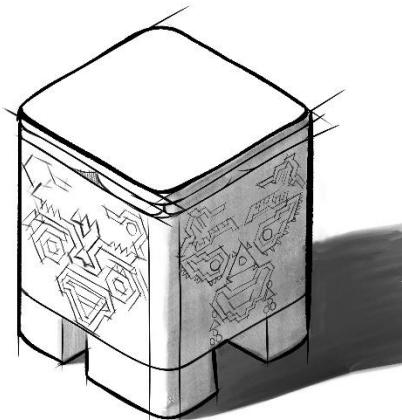


3

ពន្លេ បន្ទាត់ ខោ

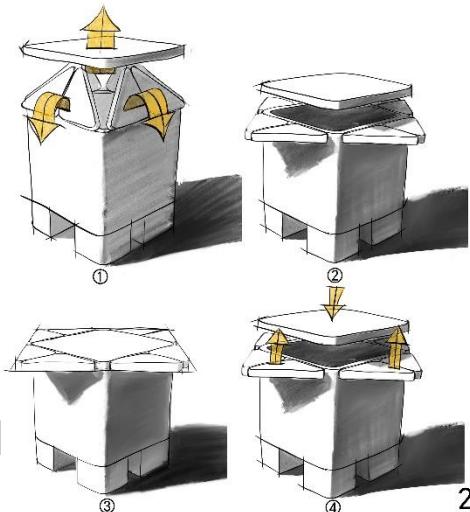
OPERATING INSTRUCTIONS

Multifunctional children's furniture design
bookshelf table and chair combination furniture



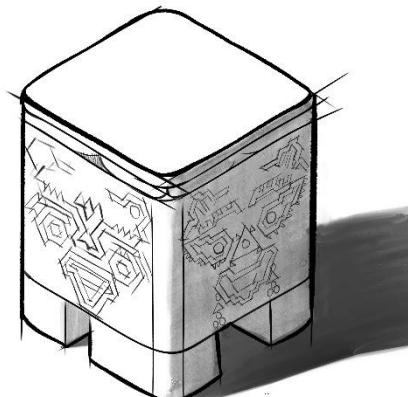
Combination of Manchu embroidery elements and multi-functional children's furniture

The chair can be transformed into a table by following these steps

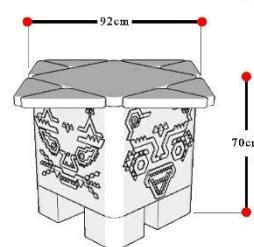
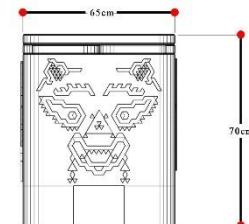


Fieldwork photo display

Children's furniture color side patterns can be replaced and combined at will with different variations.



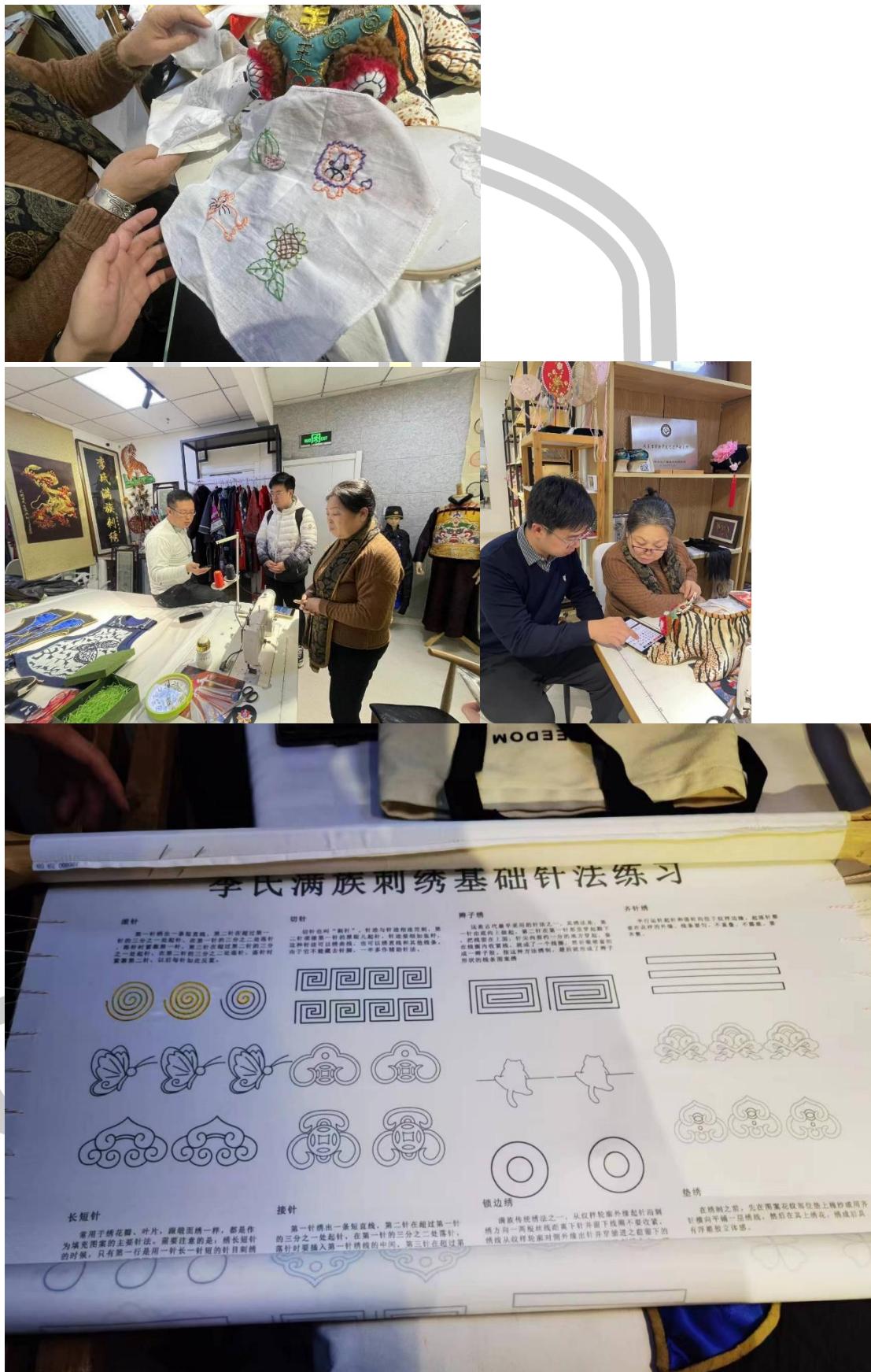
This product is sized to fit children ages 4-6 years old



3











BIOGRAPHY

NAME	Hanpeng Zhu
DATE OF BIRTH	1990/02.28
PLACE OF BIRTH	Siping City, Jilin Province, China
ADDRESS	Room 201, Unit 1, Building C17, Sunshine New City, Tiexi District, Siping City, Jilin Province
POSITION	136000
PLACE OF WORK	Jilin Normal University Boda College
EDUCATION	Undergraduate
Research grants & awards	Outstanding Graduates of Liaoning Province in 2013,
Research output	/

