



EXPLORING CULTURAL TRANSMISSION IN CHINESE PAPER-CUTTING PRODUCTS: A STUDY AND ANALYSIS UTILIZING BIG DATA FROM SOCIAL MEDIA PLATFORMS

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Abstract

This study aimed to: 1) identify and analyze the main focal points of public opinions regarding paper-cutting products on social media platforms, 2) determine and profile the users actively engaging in discussions about paper-cutting products, and 3) explore and understand the overall attitudes of the public on social media platforms towards paper-cutting products. The research utilized big data analysis techniques with Weibo as the primary data source, comprising 7,042 posts and 104,042 comments spanning a decade (2013-2022).

The study findings revealed: 1) Paper-cutting products were recognized for their profound cultural value as traditional intangible heritage, fostering emotional connections and preferences among the public. The uniqueness, cultural sustainability, creativity, and innovation associated with paper-cutting contribute significantly to its popularity. 2) User activity trended on Weibo demonstrate a significant increase in posting numbers, particularly from official accounts promoting traditional culture, highlighting government support for preserving intangible cultural heritage. and 3) The sentiment analysis of Weibo posts indicated that the majority of people hold a positive attitude towards paper-cutting products, despite some negative sentiments. This also shed light on the current challenges and difficulties faced by Chinese paper-cutting products.

The study validated the applicability of combining the Charm Quality Theory with the Theory of Planned Behavior in the cultural product domain. Ultimately, this provided actionable insights for managers, emphasizing the role of social media in cultural product promotion and understanding public preferences. This contributed to the preservation and promotion of traditional cultural art forms, aligning with UNESCO's cultural promotion advocacy and the United Nations' development goals.



Keywords: Chinese paper-cutting, Social media, Public perception, Big data analysis, Cultural heritage

Introduction

Chinese paper-cutting stands as a human intangible cultural heritage paradigm, representing an ancient traditional handicraft deeply ingrained in Chinese culture (Bortolotto, Demgenski, Karampampas, & Toji, 2020). With roots in various folk activities across China, this art form involves skilled artisans using scissors and paper to create intricate patterns, reflecting a broad spectrum of themes such as natural landscapes, cultural allusions, and religious stories. Despite its cultural significance, Chinese paper-cutting faces challenges like craftsmanship loss and commercialization impacts due to modern lifestyle transformations. In response to these challenges, UNESCO introduced the "intangible cultural heritage" concept in 2003 (UNESCO, 2003), with China actively nominating paper-cutting projects. In 2009, Chinese paper-cutting earned a spot on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity. This traditional art form contributes to various UN Sustainable Development Goals, making it essential to cultural diversity and creativity.

Despite extensive research on the historical origins, transmission, and cultural symbolism of Chinese paper-cutting, there needs to be more research in marketing (Den, 2014). Public engagement is crucial for heritage conservation (Li, Krishnamurthy, Rodgers, & Van Wesemael, 2020), yet the public's perspective on intangible heritage, such as Chinese paper-cutting, needs to be more noticed.

Understanding the preferences and demands of the general public is essential for the paper-cutting industry to adapt to the modern consumer market and ensure sustainable development (Lazaro Ortiz & Jimenez de Madariaga, 2022).

Research Objectives

This study sets out to achieve three main objectives, each contributing to a comprehensive understanding of public opinions on paper-cutting products on social media platforms:

1. Identifying Focal Points of Public Opinions: The first objective is to identify and analyze the main focal points of public opinions regarding paper-cutting products in discussions on social media platforms.



2. Profiling Active Participants: The second objective is to determine and profile the users who actively participate in discussions about paper-cutting products on social media platforms.

3. Exploring Overall Attitudes: The third objective is to explore and understand the overall attitudes of the public on social media platforms towards paper-cutting products.

Literature Review

The Charm Quality Theory, introduced by Norihiko Kano in 1984, offers businesses a framework to comprehend and meet customer expectations, especially in product design and improvement (Kano, 1984). Widely applied in product design and marketing, it sheds light on consumer perceptions (Luor, Lu, Yu, & Lu, 2015). By designing and offering products and services with Charm Quality features, managers can create positive customer experiences, fostering customer satisfaction and loyalty (Han et al., 2019). However, its application in paper-cutting products reveals limitations, such as overlooking factors like consumer individual cognition and attitudes. Integration with the Theory of Planned Behavior (TPB) is proposed to address these gaps.

The TPB, proposed by Icek Ajzen in 1991, is a psychological model explaining human behavior based on individual cognition, subjective attitudes, and perceived behavioral control (Icek Ajzen, 1991). Extensions of TPB have incorporated emotions, moral considerations, and social identity, enhancing its predictive capabilities (Icek Ajzen, 2002). Additionally, (Sniehotta, Priesseu, & Araújo-Soares, 2014) discussed the limitations of TPB and provided suggestions for extensions and improvements to apply it to a broader range of behavior change and behavior intervention fields.

The integrated use of Charm Quality Theory and TPB offers a comprehensive understanding of public preferences for paper-cutting products. While Charm Quality Theory focuses on the relationship between product attributes and satisfaction, TPB considers individual attitudes and behavioral control factors (Sniehotta et al., 2014). These theoretical concepts provide a robust foundation for understanding consumer behavior in the context of paper-cutting art products.

Conceptual Framework

This study proposes a conceptual framework integrating the Charm Quality Theory and the Theory of Planned Behavior to explore public perception of Chinese paper-cutting on social media. Chinese paper-cutting, representing a culturally significant



art form, is examined for its aesthetic, cultural, and historical value (Bortolotto et al., 2020). Cognitive Response involves perceptions of artistic and cultural significance (Anderson, 2009), while Emotional Response includes feelings of appreciation and admiration (Yadollahi, Shahraki, & Zaiane, 2017). Intention reflects inclinations towards actions like purchasing or learning about paper-cutting. Behavior Response encompasses actual engagement actions (Icek Ajzen, 1991). These responses collectively shape engagement with Chinese paper-cutting on social media platforms (Figure 1).

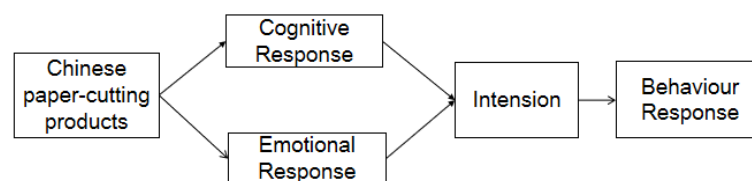


Figure 1 Conceptual Framework

Research Methodology

This study employs a qualitative research approach, utilizing text mining software to collect relevant information about "Chinese paper-cutting products" from social media platforms, followed by big data analysis. We utilized KH Coder to analyze 7,042 posts and 104,042 comments from 2013 to 2022, focusing on word frequency and co-occurrence analysis. Tableau was used to visually represent critical terms and user information. Additionally, sentiment analysis software was utilized to convert unstructured text into numerical data, identifying positive and negative emotions. This methodology facilitates the extraction of valuable insights from large text datasets, aiding in understanding perceptions and attitudes regarding paper-cutting products on Weibo (Saggi & Jain, 2018).

Results

Data analysis shows an upward trend in the number of posts related to paper-cutting products over the past decade. However, there was a slight decrease in the number of posts in 2021 and 2022, which may be attributed to the impact of the COVID-19 pandemic on the global economy and social activities. Lockdowns, restrictive measures, and economic uncertainty for consumers have diminished people's attention to and demand for paper-cutting products, reducing discussions and sharing. This trend



reflects fluctuations in the attention and popularity of paper-cutting products on social media platforms (Figure 2).

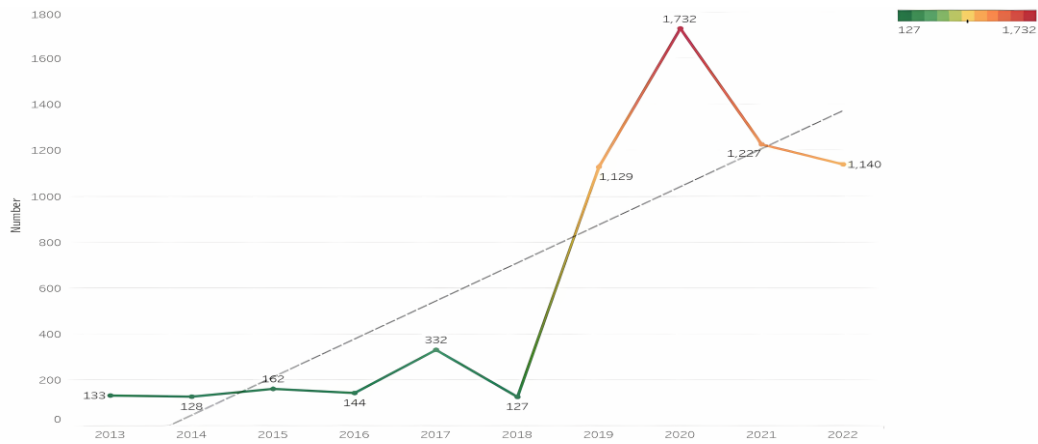


Figure 2 Number of Weibo Posts about Paper-cutting products (by Year)

Objective 1: Identifying Focal Points of Public Opinions

Keyword Analysis Results

To understand the public's focus on paper-cutting products, the dataset underwent processing using KH Coder software. The frequency of each word was tallied, identifying influential keywords (Figure 3).

Action Adore Allergens Appearance Art Assignments Aware Awesome Beautiful Belost Better Brains Celebratethenewyear Childhood Children Chinese Chiping Civil Coffee Collects Comeon Complexity Craftsmanship Craftsmen Culturalheritage Culture Cuteness Daughter Detailed Doublehappiness Dumpling Earnest Easy Eyes Familyreunion Finally Firecracker Fireworks Five-pointedstar Follow Formidable Frequently Friend Fromheadtoail Gift Grandma Great Halfonice Handmade Handy Happiness Wow Happycharacter HappyNewYear Heartache HumanFamily Imgoing(todopapercut) Ican Ingenious Ingots Inheritance Inspiration Intelligent Journal Kindergarten Laughsheartily Learning Like Looksat Looksgood Love Magical Marriage Method Mobile Mom Movies Muda Music Naughty Paperlantern Patient Patterns Period Personal Pretty Primaryschools Professional properly Qiluo Quick Quick-wittedandnimble-fingered RedEnvelope Redpaper Safety Same Scissors Seikatsu Sensory Severaltimes Share Skillfulhands Slower Snowflake Son Special Spider Studies Swift Styles Subjects Succeed Sun Talents Teacher Think Thinking Tigerhead Time Today Together Toughness Traditional Tutorial VeryBeautiful Verygood Video Wife WindowFlower Wish Wither

Figure 3 Keywords with high frequency in Chinese paper-cutting product reviews on Weibo

The top ten keywords are as follows: Love (n=3217), Learning (n=2464), Together (n=1770), Awesome (n=1270), Easy (n=1185), Inheritance (n=1059), Scissors (n=1045), Craftsmanship (n=1039), Ingenious (n=899), Beautiful (n=786).

The most influential keyword, "Love," reflects people's deep emotional connection and admiration for paper-cutting (Chai, Ong, Amini, & Ravindran, 2022). It



captures the affection for its aesthetic value, cultural significance, and role in expressing emotions through unique creations and gifts. The second influential keyword is "Learning," highlighting the benefits of acquiring paper-cutting skills. Paper-cutting enhances manual dexterity, fosters creativity, promotes cultural exploration, and provides a calming activity for mental well-being. The third influential keyword, "Together," emphasizes the communal aspect of paper-cutting. It brings people together for collaborative creation, strengthens relationships, promotes cultural heritage, and fosters a sense of unity and joy through shared experiences and celebrations.

Jaccard Coefficient Co-occurrence Cluster Analysis

The study employed the Jaccard coefficient to measure the strength of co-occurrence, a statistical indicator for assessing the similarity between two sets. It was used here to calculate the strength of co-occurrence relationships between different elements, generating a network graph where the most robust co-occurrence relationships are depicted as edges. This network graph assists researchers in analyzing and visualizing the degree of association between elements. The calculation formula is as follows:

$$JC(M1, M2) = \frac{|M1 \cap M2|}{|M1 \cup M2|} = \frac{|M1 \cap M2|}{|M1| + |M2| - |M1 \cap M2|}$$

Here, M1 and M2 are two sets: $|M1 \cap M2|$ represents the size of the intersection of the two sets, $|M1 \cup M2|$ represents the size of the union of the two sets, and $|M1|$ and $|M2|$ represent the sizes of the two sets.

When specifying the edge type for word clusters, the minimum term frequency (minimum TF) was set to 5, and the selected number of words was 103. Here, 11 clusters were differentiated by different colors (Figure 4).

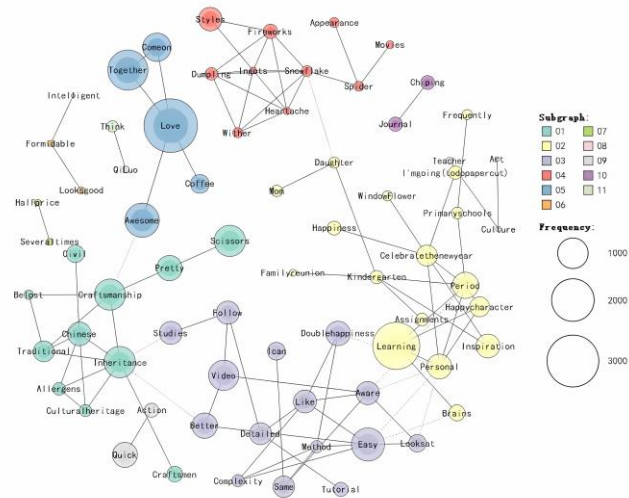


Figure 4 Co-occurring word network of Weibo about Chinese paper cutting product review keywords

The largest cluster, represented in blue, includes keywords such as "Craftsmanship," "Scissors," "Inheritance," "Pretty," "Chinese," "Traditional," "Cultural heritage," and "Craftsmen." These terms collectively reveal paper-cutting's characteristics and cultural background, emphasizing its traditional craft, Chinese heritage, and the importance of skilled artisans in preserving cultural traditions.

The second cluster contains words such as "Learning," "Happy character," "Celebrating the new year," "Personal," "Inspiration," "Happiness," and "Kindergarten," describing various aspects and applications of paper-cutting products. Paper-cutting plays a crucial role in learning, early childhood education, and family activities, conveying emotions of joy and happiness and fostering personal creativity.

In the third cluster, words like "Easy," "Video," "Follow," "Method," "Studies," and "Tutorial" involve the creation process, techniques, and characteristics of paper-cutting products, as well as learning and educational aspects related to paper-cutting. These words highlight the simplicity of paper-cutting, the use of tutorials for learning, and the complexity of paper-cutting works.

Analysis of Popular Paper-cutting Product Content

Through organizing Weibo post data, we compiled the top ten reposted posts, showcasing paper-cutting products' extensive applications and popularity across various domains and activities. These posts underscore paper-cutting's robust cultural allure and artistic value, which is evident in media integration events, public welfare initiatives, exhibitions, and brand collaborations. They highlight paper-cutting's integration with modern culture and commercial activities, revealing its fashionable, innovative, and



versatile aspects. Moreover, these posts reflect people's interest in and pursuit of traditional culture, emphasizing the importance of cultural heritage preservation. As a beloved cultural symbol, paper-cutting products link the past and present, heritage and innovation, fostering a better understanding and appreciation of China's unique handicraft tradition (Table 1).

Table 1 Examples of popular paper-cutting product content on Weibo (Cultural product promotion, Artist participation, Public welfare activities, Traditional festivals)

User	Time	Publishing Content	Number of Forwards
Starlight Charity League	June 12, 2020 16:51	#Starlight Philanthropy Power# On June 11th, the #Agriculture Assistance and Media Integration for Public Welfare# event, sponsored by the People's Government of Yu County and People's Online, was successfully held in Zhangjiakou, Yu County. Dozens of media and self-media personnel visited Yu County, entered the Weizhou Gong Rice and Flaxseed Oil Production Base, visited the Yu County Paper-cutting Museum, experienced the profound intangible cultural heritage of Yu County, conducted in-depth research on the progress of poverty alleviation through industry in Yu County, and explored the "Yu County Experience" in poverty alleviation work. The organizer invited special guest - actor @X NINE Xiaozhan DAYTOY as the experience officer for poverty alleviation products, participating in field investigations in Yu County, and visiting local poverty alleviation industries, supporting the promotion of characteristic agricultural and cultural products in Yu County. This "Agriculture Assistance and Media Integration for Public Welfare" event introduces a new model of "central media + self-media + artists" to support agriculture and poverty alleviation, leveraging the communication advantages of media integration in the Internet era. With the influence and high dissemination power of artists, the effectiveness of poverty alleviation is further enhanced, injecting lasting vitality into the development of local poverty alleviation industries.	10665
Mango Movie Channel	June 11, 2020 21:30	Xiao Zhan Learns Paper-cutting: The Complete Collection of Xiao Zhan's "Agriculture Assistance and Media Integration for Public Welfare"! Xiao Zhan, as the experience officer for poverty alleviation products, actively supports philanthropy with practical actions.	5608
Little bean sprout	January 10, 2020 18:35	To celebrate the Chinese New Year with the kids in a more creative way, we put in a lot of effort and started by preparing the essential New Year goods! New clothes and new shoes were a must-buy, along with the kids' favorite Kinder chocolates and Kinder Surprise Eggs. We came across the new custom-designed Kinder Chinese Zodiac Series for the Year of the Rat at the Kinder flagship store. The bright red packaging not only adds festive joy but also incorporates red envelopes and candy holders into the Kinder products themselves. We also had fun decorating the windows with paper-cut decorations and writing blessings. The New Year atmosphere is truly heightened! We cannot forget the traditional customs passed down through generations, and this year, we have joined @Kinder Official Weibo to make the Spring Festival traditions even more enjoyable!	3495
Geely Holding Company	December 28, 2020 09:40	Inspired by the treasures of the Forbidden City, the "Palace Blessings Box" features lovingly sourced Five-Colored Grains from "Ji Shi Yu," a precise poverty-alleviation area, and specially crafted traditional handicraft "Fu" paper-cutting. Let's start the new year with abundant blessings! Join us and make a wish for 2021! From LUCKINSCREW Holdings Group's Weibo video.	2954
PepsiCo China	October 15, 2020 09:10	Tracing back Chinese intangible cultural heritage, carrying the imprint of traditional culture. Get the same transparent paper-cutting tote bag as @JacksonWang852g7, and instantly unveil the surprise. Follow @PepsiChina, retweet, and comment with the paper-cutting that impresses you the most. On October 22, we will randomly select 3 lucky fans through @Weibo Lottery Platform to receive 1 piece of Jackson Wang's same transparent paper-cutting tote bag. Love is more than just that, with continuous purchases of Huang Gai promotional products.	1282
Where does Bear go to play	December 31, 2022 20:58	I heard that Yunnan's largest Huawei Intelligent Life Pavilion has opened, and I was among the first to visit for a check-in #How Stunning Yunnan's Intangible Cultural Heritage is#. Take the Bai Ethnic Tie-Dye & Paper Cutting DP Art Installation outside the store; it truly showcases the charm of intangible cultural heritage. Here, you can also experience tablet painting, which is perfect for someone like me who loves to draw. For those who love intangible cultural heritage, don't miss this offline experience by Huawei! While experiencing the products, you can also #Unlock the New Year's Play in Kunming#, which will surely satisfy your picky and perfectionist nature~	1181
Beijing headline	September 24, 2021 17:20	#New National Treasure, Reviving the Home# On the 23rd, the national trend-themed paper cutting artwork "New National Treasure, Happy Home" created by intangible cultural heritage	1034



User	Time	Publishing Content	Number of Forwards
		inheritor Chen Xiaoyan, known as @Paper Cutting Gold Swallow, made its debut at the Beijing Yongding River Cultural Museum! The figures from five ancient paintings seem to have "traveled" to the modern era, seamlessly blending the past and present in exquisite artwork, attracting numerous spectators! It is revealed that this is a joint creation by @JD.com Home Appliances in collaboration with Master Chen Xiaoyan, aiming to draw more attention to domestically manufactured home appliances and revitalize the quality of life through home appliance products. This cultural collision is both informative and entertaining.	
Emotional Dan Cell's Photographic Travels	June 25, 2021 00:13	From June 24th to 27th, 2021, the National Convention and Exhibition Center (Tianjin) unveiled a "comprehensive, large-scale, high-level, and high-quality" national-level exhibition hall. The inaugural exhibition was the China Building Science Congress and Green Smart Building Expo. In the future, more exhibitions will be held here. This exhibition also showcased many unique intangible cultural heritage products of Jinnan district. While exploring the exhibition downstairs, visitors can enjoy intangible cultural heritage upstairs. The Ge Gu clay sculpture is incredibly lifelike, the Lin family's paper cutting is vivid and animated, the wheat straw paintings have diverse shapes, and the Yu family's filigree enamel craftsmanship is exquisite. Many interesting objects, whether displayed at home or given as gifts, are fantastic choices.	585
Longnan Publishing	August 18, 2015 09:37	#Chinese Qiqiao Dialogue with the World# [Qiqiao Tourism Products] Xihe cultural has a profound cultural heritage, with a variety of exquisite cultural products such as handmade mulberry paper, Quchi stone processing, straw weaving, willow weaving, embroidered health pillows, embroidered shoe pads, embroidered wall hangings, purses, paper-cutting, and more. Click here to visit Longnan Cultural Museum and explore these rich and exquisite cultural products without even leaving your home.	490
KLEVV	January 24, 2022 10:00	When it comes to customs related to the Spring Festival, paper-cutting and pasting window flowers are definitely essential activities. When I was a child, I often used red paper to create my own window decorations and add a festive atmosphere to the Spring Festival. Now, as adults, our paper-cutting skills may have become rusty, but Xiaoke has prepared a paper-cutting quiz that doesn't require hands-on cutting, only visual observation.	409

Objective 2: Profiling Active Participants

User Analysis

The primary users sharing paper-cutting products on Weibo have shown a steady increase in annual posting numbers from 2013 to 2022, peaking notably in 2022 (Figure 5). This surge can be attributed to the growing popularity and attention garnered by paper-cutting art, coupled with social media's increasing influence and prevalence.



Figure 5 Statistics on the annual number of posts by main users who share Chinese paper-cut products on Weibo



Through an analysis of Weibo posts, 32 highly influential users were identified (those sharing topics related to paper-cutting products more than 10 times) (Figure 6).

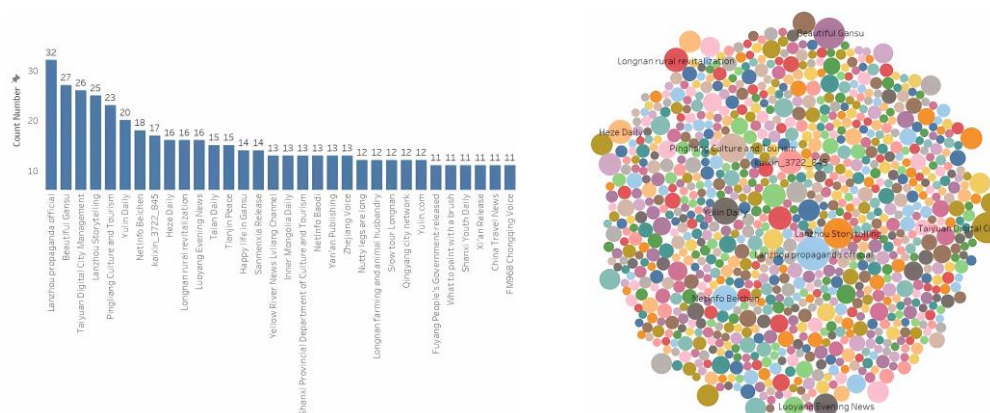


Figure 6 Statistics on the total number of posts by the most influential users on Weibo about paper-cut product content sharing and active users who share Chinese paper-cutting products via Weibo

Among them, 29 were official accounts demonstrating support for and commitment to preserving Chinese intangible cultural heritage. As a representative of traditional culture, paper-cutting aligns with government policies to safeguard and transmit conventional cultural practices. Through these official accounts, the government seeks to promote local cultural products, including paper-cutting, to a broader audience, enhancing public awareness and interest in traditional culture.

Objective 3: Exploring Overall Attitudes

Sentiment Analysis

Sentiment analysis, employing computer techniques and natural language processing, detects emotions or sentiments from text data, which is crucial for real-time social media interactions. It aids in understanding public emotions, facilitating information dissemination and social interaction analysis.

This study employed sentiment analysis technology to calculate sentiment scores for Weibo posts related to paper-cutting products. The scores include +ve (positive), -ve (negative), and neutral. As shown in Figure 8, the +ve score accounts for 95%, the -ve score is only 1.7%, and the neutral score is 3.3%. Among all types of emotions, positive, negative, and neutral sentiments comprise 95%, 1.7%, and 3.3%, respectively (Figure 7, Table 2).

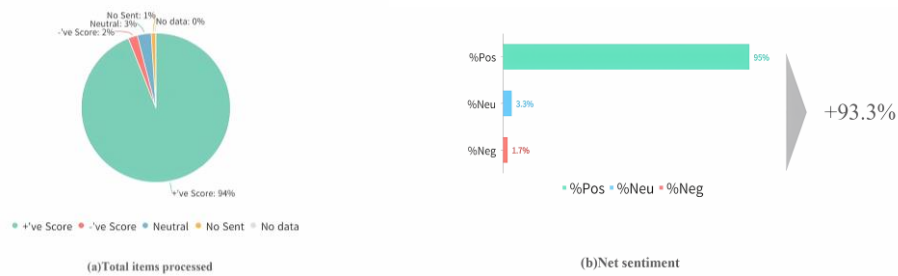


Figure 7 Total number of items processed and net sentiment. Note: Pos indicates positive, Neu indicates neutral, and Neg indicates negative

Table 2 Sentiment analysis source data

	+ve Score	-ve Score	Neutral	No Sent	No Data	Overall	Net Sentiment=93.3%
Total Items Processed	6586	116	228	102	0	7032	%Pos 95.0%
Total Items Processed	94%	2%	3%	1%	0%	100%	%Neu 3.3%
							%neg 1.7%
							Total# 100%

Weibo posts about paper-cutting products generally express positive sentiments, with words like "Feature," "Abundant," and "Creative" indicating positivity. Negative feelings, represented by words like "Sadden" and "Difficulty," are present but relatively low. Despite challenges faced by the paper-cutting industry, public perception of Weibo remains predominantly positive (Figure 8).



Figure 8 Tag clouds: (a) all sentiment, (b) positive sentiment, (c) negative sentiment



Discussion

Findings from Research Objective 1: Firstly, paper-cutting holds significant cultural value as a traditional intangible heritage, resonating emotionally with individuals and reflecting local culture (Ghazali et al., 2023). Secondly, personal reasons influence preferences, such as cultural identity and family traditions. Additionally, the uniqueness and craftsmanship of paper-cutting products capture public interest and appreciation. Moreover, there is a growing concern for cultural sustainability, with paper-cutting embodying values of inheritance and protection (Tu, Liu, & Cui, 2019). Lastly, creativity and innovation in paper-cutting attract the younger generation (Goldenberg & Mazursky, 2002). In summary, the public values paper-cutting for its cultural significance, personal identity, uniqueness, sustainability, and innovation.

Findings from Research Objective 2: On Weibo, primary users sharing paper-cutting products show a consistent increase in annual posting numbers. This rise is fueled by the art's growing popularity on social media, especially among 32 influential official accounts. These accounts support Chinese intangible cultural heritage preservation, aligning with government policies. They promote paper-cutting and traditional culture, fostering public interest.

Findings from Research Objective 3: The sentiment analysis of Weibo posts related to paper-cutting products indicates a predominance of positive sentiments. Positive emotions are prevalent, reflected in terms like "Feature," "Abundant," and "Innovation," highlighting the public's favorable perception and positive attitude towards paper-cutting.

Body of Knowledge

This study employs big data analysis of Chinese paper-cutting products on Weibo to reveal public perceptions and demands regarding this traditional art form. Significant commonalities and patterns for further research are identified by integrating these findings with established theoretical frameworks. Chinese paper-cutting products possess specific characteristics such as cultural value, identity, uniqueness, sustainability, and creativity, which are deeply influenced by individual emotions. Based on these unique features, we have developed a novel conceptual model to comprehensively capture public perceptions of paper-cutting products (Figure 9).

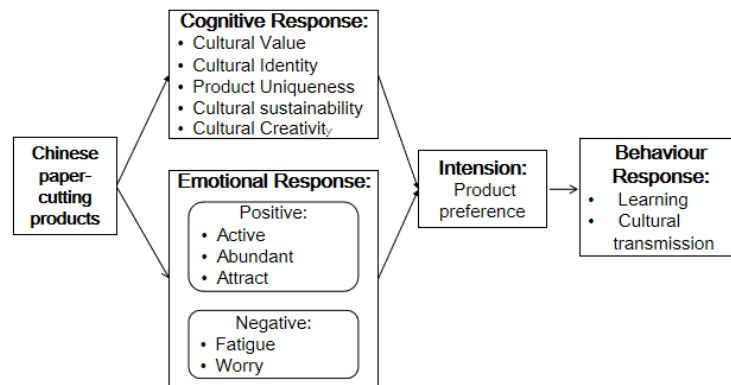


Figure 9 Conceptual Model

Conclusions

Integrating the Charm Quality Theory and the Theory of Planned Behavior provides a holistic understanding of how the Chinese public perceives paper-cutting products. This combination sheds light on the emotional allure these cultural artifacts evoke and the deliberate intentions guiding consumer behaviors. By simultaneously considering the emotional resonance and cognitive processes, this study offers valuable insights into the factors shaping public perceptions of Chinese paper-cutting products.

Suggestion

Managers can utilize social media to boost the visibility of cultural products. Research methods should be employed to gauge public interest in cultural heritage, guiding product design and promotion. Analyzing user engagement on social media can help understand market demands and adjust marketing strategies. Additionally, managers should explore theoretical perspectives to deepen their understanding of consumer behavior.

Researchers should investigate how social media influences cultural product promotion and its impact on different cultural products. They should also emphasize cross-cultural dissemination and reception to foster cultural exchange and preservation. Exploring differences between social media platforms can provide insights into their unique roles. Future research should focus on overcoming data collection limitations using diverse datasets and advanced analytical techniques. Comparative studies between platforms can reveal effectiveness and user preferences.



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