

Brand Image Perception and Enhancement Strategies of Zhaoqing Duan Inkstones: An Online Text Analysis Based on Weibo

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Abstract: The Duan inkstone is a form of intangible cultural heritage and a cultural symbol. Improving its brand image has a positive effect on the sustainable development of the industry and its place of origin. Through online text analysis, this study found that consumers' understanding of Duan inkstones mainly revolves around two core concepts "Duan inkstone" and "Zhaoqing", and the content mostly involves the object itself, geography, culture, experience, and emotion. On the whole, consumers' sentiment is mostly positive and their evaluations are relatively high, but there are still problems such as aesthetic disconnect, weak social media dissemination, and price anxiety. This article puts forward five strategies of exhibition optimization, design improvement, communication deepening, traceability reconstruction, and public communication strengthening to provide data support and improvement suggestions for Duan inkstone brand upgrading and place-of-origin brand promotion.

Keywords: Online Text Analysis; Zhaoqing Duan Inkstone; Brand Image Perception; Enhancement Strategy

1. Introduction

Duan inkstone is the foremost of the Four Famous Inkstones of China and an important representative of Lingnan culture, carrying the profound spirit of literati and artisan spirit [1,2]. The modern way of writing has changed, and the inkstone market has shrunk significantly. The Duan inkstone industry is looking for a path of revitalization and transformation, and expands the consumer market with the help of marketing methods such as the development of tourism cultural and creative products made from leftover inkstone materials and the incorporation of cultural symbols [3,4]. The intangible cultural

heritage transmission of Duan inkstone-making craftsmanship still faces many difficulties, and the traditional protection method also needs to be integrated with the needs of modern consumption [5].

The early study of Duan inkstones paid more attention to historical and cultural origins, the schools of carving craftsmanship and the path of intangible cultural heritage protection. With the continuous development of digital preservation, Duan inkstone's three-dimensional virtual images and database metadata design standards [6,7] provide reference for Duan inkstone's digital archiving and virtual display. Mobile games are becoming more and more popular, and the production process of Duan inkstones is also used for mobile game development to promote the public to understand Duan inkstone culture [8]. These studies are mostly carried out from the perspective of cultural preservation and educational provision, and pay less attention to the true views of ordinary consumers on Duan inkstone products.

With the continuous development of digital media, online text analysis can overcome the lag and limitations of traditional feedback collection methods [9] and process a large amount of unstructured data, which has become a new way to study public preferences. This method has been used in many fields such as cultural heritage and cultural space perception, and can present the real evaluation and inner needs of the public [10]. This method has obvious advantages, but it has not been used much in the study of Duan inkstones.

This article collects the text data of Duan inkstones on the new media platform, uses natural language processing and machine learning algorithms to analyze the public's overall image perception, emotional attitudes and place-of-origin cognition of Duan inkstones, and puts forward corresponding countermeasures and suggestions to provide data

support and new references for the sustainable development of the Duan inkstone industry.

2. Research Objects and Methods

2.1 Case Selection

Zhaoqing City, Guangdong Province, has a history of inkstone material mining for more than 1,300 years and also has a deep accumulation of inkstone culture. It is known as "China's Inkstone Capital". Zhaoqing Duan inkstone has unique artistic value and practical value, and also carries the core content of Lingnan culture and intangible cultural heritage craftsmanship. At present, Duan inkstone is facing the real needs of mass cultural and creative transformation and brand image reshaping. Choosing Zhaoqing Duan inkstone as a research case can further analyze the influence between online users' image perception and place-of-origin cognition of Duan inkstone, and provide an empirical basis for improving the brand competitiveness and cultural communication effect of Duan inkstone.

2.2 Data Source and Processing

According to the user portrait analysis report of the five mainstream social platforms released by QuestMobile in October 2025, the proportion of young users aged 18-35 on Weibo platforms is 77.7%, ranking first among the five major platforms, with average daily active users of 232 million. Weibo is an important platform for young people to discuss traditional culture and consumption trends. The target audience of the youthful dissemination of the Duan inkstone brand has a high degree of overlap with the Weibo user group. This article uses Weibo as the source of online text collection.

With the help of the Houyi Collector software, this study crawled 448 Weibo posts published from January 7, 2025 to May 1, 2026 on the Weibo platform with the keyword "Duan inkstone". In the data cleaning stage, novels, ancient poems and advertisements that are not related to the research topic were deleted, and duplicate content was eliminated. Finally, 255 valid Weibo posts with a cumulative number of text characters of more than 60,000 were obtained, which were used for subsequent text mining and content analysis.

3. Research Results of Zhaoqing Duan Inkstone Brand Image Perception

3.1 High-Frequency Word Analysis

This study filters and processes the words in the original text, screens out the top 100 high-frequency words, and arranges them in order of frequency, as shown in Table 1.

It can be seen from Table 1 that high-frequency words are mainly nouns, including proper nouns, cultural abstract nouns and object nouns. This shows that the public's cognition of Duan inkstone is mostly limited to the shallow level of conceptualization and labeling. There are also a certain number of verbs or gerunds, including craft, experience and cultural inheritance. This shows that consumers pay attention to the process of Duan inkstone carving, also attach importance to the experience of cultural tourism, and recognize the important role of Duan inkstone cultural inheritance and development. Adjectives account for a relatively small proportion, mainly used to describe texture or make evaluations, and lack refined and personalized aesthetic appreciation and value judgment expressions.

After inductive analysis of high-frequency words, this study classifies words with similar themes and meanings into the same category, and finally summarizes them into 14 subcategories and 5 main categories. The relevant categories correspond to consumers' overall perception of Duan inkstone's object itself, geographical space, history and culture, experience perception and emotional attitude, which clearly shows consumers' concerns and cognition of Duan inkstone. (As shown in Table 2).

1) The body of Duan inkstone. Duan inkstone is the core carrier of consumers' cognition and emotion, including four subcategories of Duan inkstone entity, material and pit source, craftsmanship and characteristics, and similar and supporting utensils, mainly pointing to the physical object of Duan inkstone itself and its characteristics. "Duan inkstone" and "inkstone" refer to the utensils themselves, which are the basis for the formation of consumers' cognition and emotions; words such as "stone texture" and "Laokeng pit" reflect consumers' attention to the pit source, stone texture and appearance of Duan inkstone; words such as "carving" and "craft skills" show consumers' recognition of deep characteristics such as Duan inkstone craftsmanship and texture; words such as "Xuan paper" and "Hu brush" reflect the attributes of

Duan inkstone as one of the scholar's stationery objects, and also reflect the relationship and contrast between similar categories. Consumers'

perception of Duan inkstone is not only a simple practical value, but also involves a deeper understanding of aesthetic value.

Table 1. Top 100 High-Frequency Words

Rank	Feature Word	Frequency	Rank	Feature Word	Frequency	Rank	Feature Word	Frequency	Rank	Feature Word	Frequency
1	Duan inkstone	338	26	Xijiang River	27	51	time	18	76	time	14
2	Zhaoqing	270	27	Guangzhou	27	52	scenic area	18	77	famous inkstone	14
3	culture	78	28	Dinghu Mountain	29	53	Xuan paper	18	78	years	14
4	inkstone	75	29	inkstone material	26	54	value	18	79	ink-grinding performance	13
5	Lingnan	64	30	fine-grained	26	55	as if	18	80	texture	13
6	museum	64	31	one piece	26	56	core	18	81	stone eye	13
7	millennium	58	32	cultural relics	26	57	Duan Inkstone Museum	18	82	texture	13
8	history	56	33	She inkstone	26	58	Hu brush	17	83	wood carving	13
9	Guangdong Province	51	34	unique	25	59	stone	17	84	exquisite	13
10	Duanzhou	50	35	literati	25	60	tea tray	17	85	craftsmanship	13
11	China	47	36	Star Lake	25	61	tradition	17	86	distinctive feature	13
12	intangible cultural heritage	45	37	Song Dynasty	25	62	Duanxi	16	87	stroll	13
13	feeling	39	38	craft skills	24	63	humanistic culture	16	88	Zhaoqing Museum	13
14	natural landscape	38	39	architecture	24	64	exhibition	15	89	carry	13
15	carving	38	40	practical	22	65	cultural context	15	90	stone material	13
16	stone texture	36	41	Laokeng pit	22	66	natural	15	91	walk into	12
17	Seven Star Crag	33	42	story	22	67	profound	15	92	Guangdong goods	12
18	art	32	43	guozheng zongzi	21	68	Chengni inkstone	15	93	integration	12
19	the Four Treasures of the Study	32	44	transmission	21	69	period	15	94	form	12
20	one piece	32	45	shop owner	20	70	scholar's study	15	95	Tang Dynasty	12
21	Qing Dynasty	31	46	nature	20	71	cultural depth	14	96	Ming and Qing dynasties	12
22	Guangdong Museum	31	47	smooth and lustrous	19	72	master	14	97	Tao inkstone	12
23	making	30	48	collection	19	73	Gu Erniang	14	98	be known as	12
24	experience	27	49	social media check-in	19	74	modern	14	99	memory	12
25	craftsmanship	27	50	Song Dynasty City Wall	19	75	blue-and-white porcelain pattern	14	100	this piece	12

2) Geographical space. As a geographical indication product, Duan inkstone has strong geographical attributes. The frequent appearance of Duan inkstone origin words such as "Zhaoqing" and "Duanzhou" shows that consumers are likely to associate the cultural symbol of Duan inkstone with the image of its city of origin; the local landscape, landmarks and distinctive local products and customs words related to Duan inkstone, such as "Seven Star Crag" and "Dinghu Mountain", reflect that consumers' image cognition will extend to the local space of the place of origin, and form an integrated perception of cultural tourism of the place of origin; "museum", "exhibition hall" and other venues are important places to appreciate Duan inkstone, and also display and promote the dissemination of Duan inkstone culture, which is

an important attraction for consumers when traveling. The cognition of Duan inkstone extends to the origin of Duan inkstone, reflecting the reverse place-of-origin effect. Duan inkstone's cultural capital can reversely empower the place of origin and enhance the tourism attractiveness of the place of origin.

3) History and culture. Consumers' historical and cultural cognition of Duan inkstone can be divided into three subcategories: cultural attribute perception, time concept perception and historical carrier perception. Words such as "culture" and "intangible cultural heritage" show consumers' identification with the intangible cultural heritage attributes of Duan inkstone; words such as "millennium" and "history" show consumers' concern for the development context of inkstone culture; words such as "cultural

relics" and "memory" show that Duan inkstone carries the memory of the times and the changes of the years. Duan inkstone is not only a practical tool, but also a concrete embodiment of cultural spirit and historical inheritance.

4) Experience perception. Experience perception reflects the perceptual state and behavior of consumers when they come into contact with Duan inkstone. Words such as "profound" and "natural" are consumers' subjective feelings about Duan inkstone's temperament and style; "social media check-in" and "experience" show consumers' active participation in Duan inkstone. Consumers complete immersive and interactive contact as

tourists, and form an understanding of Duan inkstone in the process.

5) Emotional attitude. Consumers' value judgment and aesthetic evaluation are mainly based on positive evaluation. Words such as "exquisite" reflect consumers' affirmation and appreciation of the craftsmanship level, cultural status and artistic value of Duan inkstone; the neutral evaluation of "practical" reflects consumers' rational understanding of the function and value of Duan inkstone. The public has formed a tendency to evaluate Duan inkstone with an emphasis on aesthetics and practicality.

Table 2. Classification Table of High-Frequency Words

Main Category	Subcategory	Words
Object Itself of Duan Inkstone	Duan inkstone entity	Duan inkstone, inkstone, one piece, this piece, one piece
Object Itself of Duan Inkstone	Material and pit source	inkstone material, stone, stone texture, stone material, Laokeng pit, Duanxi, stone eye, texture, ink-grinding performance, fine-grained, smooth and lustrous
Object Itself of Duan Inkstone	Craftsmanship and characteristics	carving, making, craftsmanship, craft skills, natural, wood carving, unique, carry, Gu Ermiang, nature, value
Object Itself of Duan Inkstone	Similar and supporting objects	Xuan paper, Hu brush, tea tray, the Four Treasures of the Study, scholar's study, She inkstone, Chengni inkstone, Tao inkstone
Geographical Space	Core place of origin	Zhaoqing, Duanzhou, Lingnan, Guangdong Province, Xijiang River, Guangzhou, Guangdong goods, China
Geographical Space	Related objects	Seven Star Crag, Dinghu Mountain, Star Lake, Song Dynasty City Wall, scenic area, natural landscape, guozheng zongzi
Geographical Space	Cultural venues	Guangdong Museum, Duan Inkstone Museum, Zhaoqing Museum, museum, exhibition
History and Culture	Cultural attributes	culture, intangible cultural heritage, cultural context, humanistic culture, cultural depth, tradition, integration, art, literati, transmission
History and Culture	Time concepts	millennium, history, modern, period, Song Dynasty, Qing Dynasty, Tang Dynasty, Ming and Qing dynasties, time
History and Culture	Historical carriers	cultural relics, memory, years, time, architecture
Experience Perception	Subjective feelings	feeling, profound, distinctive feature, nature
Experience Perception	Interactive behaviors	social media check-in, experience, story, collection, walk into, stroll, shop owner, master
Emotional Attitude	Positive evaluation	be known as, exquisite, craftsmanship, core, famous inkstone
Emotional Attitude	Neutral evaluation	practical

3.2 Semantic Network Analysis

It can be seen from the semantic network diagram (As shown in Figure 1) of the Duan inkstone online text that "Duan inkstone" and "Zhaoqing" are the core nodes in the semantic network. Duan inkstone has the dual attributes of both tangible and intangible cultural heritage. "Duan inkstone" has the most connections and is the central word of the whole semantic network. It is directly related to the craft attributes of Duan inkstone, such as "carving", "craft skills", etc.; it is also related to cultural attributes, such as "culture", "intangible cultural heritage", etc.; it is also related to space-time attributes, such as "Song Dynasty", "millennium", etc.; and functional attributes, such as "practical",

"collection", etc. It is also connected with similar or related objects in the Four Treasures of the Study, such as "Chengni inkstone" and "Xuan paper", etc. The different contents related to Duan inkstone have jointly formed a diffusion network of "craft object itself - cultural significance - social function".

Zhaoqing is the place of origin of Duan inkstone, an important carrier of regional cultural space, and the core node second only to "Duan inkstone". It is related to geographical words such as "Duanzhou" and "Duanxi"; natural landscape words such as "Seven Star Crag" and "Dinghu Mountain"; urban cultural symbol words such as "Song Dynasty City Wall" and "guozheng zongzi"; cultural words such as

difficult to "calm down to appreciate", and it is also easy to be confused and disappointed because they "cannot understand".

Second, the experience of taking photos is poor, and the value of social media dissemination is insufficient. Affected by factors such as museum lighting, booth settings or the material of Duan inkstone itself, it is difficult for Duan inkstone to be "beautifully photographed". In the new media era, it is difficult for consumers to get the expected feedback on social platforms such as WeChat Moments and Xiaohongshu. This lack of "gratification" affects the dissemination of Duan inkstone to a certain extent.

Third, the market price is not clear enough, and consumers are prone to anxiety about value for money. The price difference of Duan inkstone is large, and the gap between cost and perceived gains is easy to trigger consumers' negative emotions. There is an obvious contrast between the "joy of finding a bargain" and "pain of spending" brought by the price. When the subsequent experience does not meet the value expectations, negative emotions will be amplified. Consumers who are more obsessed with Duan inkstone may also enter the state of "the more they buy, the more they want". There is an imbalance between the desire to collect and rational consumption, resulting in psychological pressure, anxiety and entanglement.

Fourth, there are concerns about cultural inheritance. Consumers expressed strong concern and anger that "resource monopoly leads to a rupture in craft transmission". They are worried that traditional craft skills will be lost, and they are also worried that Chinese inkstones will become an accessory of Western writing tools. Such concerns will make consumers have a negative perception of the Duan inkstone industry.

4. Strategies for Improving the Brand Image of Zhaoqing Duan Inkstone

In recent years, Duan inkstone has made some progress in craft transmission and innovation, and has become a material symbol of Lingnan culture. The negative emotions shown by young consumers in the online text also reflect that Duan inkstone still has some problems in terms of exhibition experience, product form, communication mode, trust mechanism and cultural inheritance. The following is to put forward optimization suggestions from five aspects to help Duan inkstone's brand image be

improved as a whole.

4.1 How to Present: Optimization of Exhibition Space

The Duan Inkstone Museum and high-end exhibition halls have been improving the display method, and have also introduced special display cabinets to improve the ambient lighting. From the feedback of consumers watching the exhibition, we can still see problems such as "cannot see clearly" and "cannot understand". These problems will obviously affect consumers' aesthetic interests and cultural perception.

In response to this situation, the exhibition space can be optimized from three aspects. First, set up an independent booth of "macro lens + dynamic spotlighting" for top-grade Duan inkstones, so that the audience can clearly see the stone patterns. At the same time, it is equipped with a high-definition electronic screen, and cooperates with colleges and universities and inkstone-making masters to dynamically display various processes, textures and three-dimensional scanning images. Second, optimize the lighting of ordinary booths, replace anti-glare glass and directional wall-washing lights, improve the shooting effect, and set up the "best shooting point" to improve the viewing experience of the exhibition. Third, add a detail observation area of Duan inkstones with magnifying equipment and a protected touch experience area, so that the audience can observe and feel the beauty of the shape and texture of Duan inkstones at close range, and complete the process of understanding from embodied perception to aesthetic understanding. By continuously optimizing the exhibition space, we can lower the threshold for consumers to appreciate Duan inkstone and shape a more positive brand perception image.

4.2 How to Innovate: The Youth-Oriented Improvement of Product Design

Most consumers regard Duan inkstone as an "old antique" and "study decoration", thinking that it lacks aesthetic appeal. The demand of modern young consumers for cultural products is not only at the level of practical use or collection, but also attaches more importance to the multiple experience of "usable, appreciable and shareable".

The product design of Duan inkstone needs to break the fixed idea of the traditional form and launch the "practical aesthetic light cultural and

creative products" series. On the basis of retaining the quality of Duan inkstone, the product can be decorated with metal, natural wood, acrylic, polymer clay, resin, soft rubber, jade and other materials to meet the aesthetic needs of consumers to be "amazed at a glance" and transform Duan inkstone from an "old antique" to desktop "trendy scholar's stationery". In addition, the packaging and peripheral design of Duan inkstone should also be upgraded to create portable products with the value of "photo sharing", improve consumers' willingness to buy, expand the use scenarios, and shape the image of Duan inkstone that conforms to the aesthetics of modern life.

4.3 How to Touch: The Deepening of Social Media Dissemination and User Content Ecology

Duan inkstone consumers are not enthusiastic about content dissemination and interaction in new media. Duan inkstone appreciation itself also has a high professional threshold, and the active participation and spontaneous dissemination of users are subject to certain restrictions.

In the era of digital media, providing professional shooting auxiliary services can effectively enhance the public's willingness to interact and disseminate. High-end sales stores can open a "scholar's-stationery photo corner", equipped with high color-rendering fill lights, themed background boards and other equipment to meet the public's "Versailles" sharing needs on the platform. The new media platform can also help Duan inkstone carry out popular-science interaction. The short-video platform can launch the AR filter function, superimpose the classic special effects of Duan inkstone such as "blue-and-white porcelain pattern" and "fish-brain jelly pattern" to make the popular-science content more interesting and expand the scope of dissemination.

4.4 How to Trust: the Reconstruction of the Standard System and Traceability Mechanism

Information asymmetry will affect consumer trust and limit market expansion. Industry associations and consumer associations can jointly issue "pitfall avoidance guidelines" to form external supervision. For high-value Duan inkstones, the "one inkstone and one certificate" system can be implemented. Professional

institutions can generate tamper-proof traceability QR codes for each Duan inkstone, and record complete files such as place of origin, author, stone quality and pattern, craftsmanship, etc. For low-value Duan inkstones, a batch-based certificate of conformity system can be implemented to achieve information transparency at a lower cost. Works by renowned masters and awards should also be recorded, and a traceable intangible cultural heritage record system should be established.

4.5 How to Continue: Strengthening Cultural Ecology and Public Communication

Duan inkstone culture is still weak in public communication and living transmission, and cultural continuity needs to be further strengthened. Existing factories, studios and other venues can be used to open research and study handicraft courses and set up a carving visit area. With the help of AR technology and digital human explanation, the public can see the birth process of Duan inkstone with their own eyes. Practitioners in the whole process of the Duan inkstone industry, especially intangible cultural heritage inheritors, should be encouraged to use all-media platforms to show real craftsmanship and contemporary inheritance practice, alleviate the public's anxiety about the "loss of craft skills", let the public feel the difference between "fine hand carving" and "machine-carved mass production", and establish more reasonable consumption expectations.

5. Conclusion

This study conducts high-frequency word analysis, semantic network analysis and sentiment analysis of the online text about Duan inkstone on the Weibo platform. The study found that "Duan inkstone" is the core carrier, and consumers mainly pay attention to its object characteristics and cultural values; "Zhaoqing" is the core place of origin, bringing consumers spatial identity and cultural tourism experience. Positive emotions dominate consumer perception, but they also show the characteristics of "high cultural identification and low aesthetic engagement". Problems such as "cannot understand, cannot be photographed, and cannot be trusted" reflect the misalignment between traditional craftsmanship and modern consumer demand. The Duan inkstone brand needs to reduce the aesthetic threshold by optimizing the

exhibition space, reshape the aesthetics of life with youth-oriented design, strengthen communication and interaction with the help of social media, rebuild the trust system through the traceability mechanism, and finally realize the coordinated development of "culture-industry-city". The data of this study only comes from a single platform, and there may be a certain perception bias. Future research can be expanded to multiple platforms and combined with multiple methods to continue to explore the deep mechanism of brand image perception of Duan inkstone.

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