

# Innovative Research and Application of Rizhao Marathon Souvenir Modeling Design Based on Black Pottery Culture

Yanqun Yin, Na Liu

Shandong Vocational and Technical University of International Studies, Rizhao 276826, China

## Abstract

**This study focuses on the black pottery culture and explores the innovative path of Rizhao marathon souvenir styling design in depth. Nowadays, marathon events are booming worldwide, and souvenirs have become an important carrier to convey the spirit of the event and local culture. Rizhao's unique natural resources and deep cultural heritage provide rich materials for souvenir design. Among them, black pottery, as a local craft with deep historical accumulation, becomes the core element of the design. This study adopts a combination of literature analysis, case study and program design to analyze the artistic characteristics of black pottery culture and the spirit of the marathon, and then integrates the two organically through innovative design to create souvenirs with cultural connotations and market attraction. The results of the study show that the integration of the simple shape of black pottery and the dynamic elements of the marathon not only conveys the spirit of the race, but also highlights the local characteristics and cultural values. Combining local traditional crafts with modern design concepts not only enhances the artistic value of souvenirs, but also strengthens the cultural identity and market competitiveness of the event brand.**

## Keywords

**Black pottery culture; Rizhao Marathon; souvenir design; innovation; local characteristics.**

## 1. Background of the Study

As a local traditional craft in Rizhao City, Shandong Province, Rizhao black pottery has been highly praised by historians as "the treasure of primitive culture". Its unique craftsmanship and profound historical and cultural heritage have become the most important traditional cultural symbols in Rizhao. The black pottery craft not only carries the ancient wisdom and skills, but also is the key industry to promote the local economic development of Rizhao.

Rizhao Marathon has gone through eight years since its launch in 2017. In these eight years, the event has developed well and attracted many domestic and foreign runners to actively participate. With the progress of the event, the design of souvenirs is also being optimized and innovated. As an important part of the event, the souvenirs highly condense the elements of the event as well as the humanities, natural landscape and historical and cultural elements of the city, which is a bridge and carrier for the city's cultural publicity, information exchange and image display, and its economic value and cultural value are becoming more and more prominent.

It is of great significance to incorporate the elements of black pottery culture into the design of marathon souvenirs. For one thing, it is a powerful inheritance and promotion of traditional culture. As a treasure of Rizhao traditional culture, black pottery, combined with modern marathon souvenirs, can let more people understand the black pottery culture, and then promote the inheritance and development of traditional culture. Secondly, it injects new inspiration and creativity into modern design. The unique craftsmanship and artistic style of

black pottery can bring new ideas and methods for marathon souvenir design, making the souvenirs more artistic value and collection value. At the same time, it also helps to promote the inheritance and development of Rizhao's outstanding traditional culture, enhance the visibility and reputation of the city's cultural brand, and promote the development of souvenir design in the direction of diversification and personalization.

## 2. Literature Review

### 2.1. Research related to black pottery culture

Rizhao black pottery has a long history, the Longshan culture pottery unearthed in the site has a history of more than 5000 years, the two towns, Donghaiyu, Yaowangcheng and other sites witnessed its development, providing archaeological basis for the study<sup>[1]</sup>. 1955, Rizhao county government set up the handicrafts management section, before 1959, the Rizhao local history of the pottery industry is called "Rizhao pottery industry", this period of government support for the development of the craft laid the foundation. Before 1959, Rizhao local history called the pottery industry "Rizhao clay pottery industry", the government support for the development of the black pottery craft laid the foundation<sup>[2]</sup>. 1985 July, Nanjing Museum published "Rizhao two towns pottery", a systematic study on the introduction of the relevant pottery, for the understanding of the history and culture of the black pottery provides an important reference<sup>[3]</sup>. In the 80s of last century, Rizhao culture department set up "Rizhao Longshan Culture Black Pottery Craft Research Institute", gathered many forces to discover, research and develop the utilization of Longshan culture black pottery technology, and opened the prelude of modern black pottery craft production. Nowadays, Rizhao black pottery pursues the fusion of practicality and aesthetics, and the products are rich and diversified to meet different consumption demands. At the same time, practitioners of black pottery art continue to innovate the design direction, so that the black pottery closer to the public life. However, studies at home and abroad show that the dissemination of black pottery culture is insufficient and the innovation needs to be improved, and it is necessary to strengthen the brand building and marketing, and develop special black pottery souvenirs.

### 2.2. Marathon Souvenir Design Study

In the study of marathon souvenir design, scholars such as Ma Dongming, Sun Shan and Qian Hao have analyzed marathon souvenirs from the perspective of perceptual engineering. They carefully sorted out all kinds of marathon souvenirs, and extracted the main elements affecting the design of souvenirs, including color scheme, material, craftsmanship, size and regional elements, etc. These elements together construct the design of marathon souvenirs. These elements together construct the emotional cornerstone of souvenir design and bring important inspiration for souvenir design<sup>[4]</sup>.

In terms of the conveyed image carried by marathon souvenirs, Liu Chunyang and Wang Na's research is quite insightful. They believe that marathon souvenirs, as the core image projection platform of the city hosting the race, can reveal the core projected image characteristics of different marathon races through the stories behind the design of the souvenirs. As a symbol of participants' honor and experience, souvenirs carry the important mission of city image promotion and urban culture<sup>[5]</sup>.

In terms of the impact of marathon on city development, well-known tourist cities, as the main body of current marathon host cities, have greatly enhanced the core competitiveness and popularity of the city by combining city tourism and cultural resources with marathon events. Taking Lanzhou Marathon as an example, Zhang Yiwen believes that Lanzhou International Marathon has developed rapidly as a latecomer of marathon sports events, and has played an important role in influencing the city image of Lanzhou<sup>[6]</sup>.

The cultural value of the marathon souvenirs, is carrying a tournament or race will be the concentrated manifestation of culture. Take the Olympic movement as an example, Wang Yilin, Li Yiyang that, as one of the carriers of Olympic culture, Olympic souvenirs, engraved with the development of the Olympic movement, but also reflects the cultural characteristics of the host country cohesion of the creativity of the designers, and has become an indispensable part of the Olympic Games and a valuable asset<sup>[7]</sup>. Dong Yu and Li Xiaolan took the souvenirs of the previous Winter Olympics as the comparative objects, and took the main elements of the souvenirs, such as specifications, shapes, patterns and national characteristics rendered, as the research entry point to interpret the design ideas of the souvenirs of the 21st Winter Olympics<sup>[8]</sup>. Through the analysis, it is believed that the souvenirs of the 21st Winter Olympic Games not only fill people's actual aesthetic needs, enrich the aesthetic perception and experience, and expand the aesthetic value, but also carry the transmission of information, which is a perfect inheritance of intangible cultural heritage.

### 3. Case Study

Rizhao Marathon since 2017 "start", so far there have been seven years, each year souvenirs designed in a different style, the elements contained can reflect the characteristics of Rizhao, the specific elements and symbolism are as follows; see Table 1.

In summary, the design of Rizhao Marathon souvenirs every year is skillfully integrated into the city characteristics and cultural heritage of Rizhao, especially the iconic lighthouse element, which has become the core symbol throughout. It symbolizes the unique charm of Rizhao as a seaside city and the power to guide the direction. At the same time, the addition of waves, conch, rudder and other marine elements further strengthens Rizhao's seaside characteristics and shows the city's vitality and charm. In addition, the integration of running crowds, cityscape, blue sky and blue sea, golden beach and other elements not only enriches the visual effect of the souvenir, but also deeply expresses the health, vitality and hard work spirit advocated by the marathon.

## 4. Rizhao Marathon Souvenir Styling Design Based on Black Pottery Culture

### 4.1. Analysis of Design Options

Rizhao enjoys the reputation of "Sunshine Coast", and its unique natural landscape provides a source of inspiration for souvenir design. The design is skillfully integrated into the iconic elements of Rizhao: the towering lighthouse, bright lights, the strong word "Rizhao" on the stone carvings of the river and mountains, sailing sailboats, soaring seagulls, surging waves, the official LOGO of the Rizhao Marathon, and the image of the people who are running hard. These elements vividly display Rizhao's natural scenery and city charms, and convey the philosophy of living close to nature and positivity, which is inherited and promoted through souvenirs.

The design of the souvenir is closely linked to the Rizhao Lighthouse, an iconic symbol of the city, which is reproduced in relief, with its top shining brightly, symbolizing hope and guidance and illuminating the road ahead. At the same time, it is skillfully embedded in the stone carving of "Rizhao" in the Heshan Scenic Area, which does not directly depict the mountains and rivers, but contains far-reaching symbolism and triggers people's yearning. The scene of the sailboat breaking waves and seagulls soaring freely vividly presents the style of Rizhao seaside city and conveys infinite vitality and vigor.

**Table 1.** Souvenir elements and symbols of Rizhao Marathon in previous years

particular year	elemental	lesson be learned
2017	Lighthouses, compasses, seagulls, sailboats, starry skies.	The lighthouse symbolizes the characteristics of Rizhao's coastal city and its light guiding runners in the night sky; the combination of elements such as starry sky, compass, sailboat and people show the image of Rizhao as "the city of sports, vitality, health and sports".
2018	Lighthouses, waves, conchs, sailboats.	Lighthouse in the stars and the sea under the backdrop of the sea and stand, guiding the way forward, illuminating the dawn of victory; and waves, conch elements reflect each other, showing the charm and vitality of Rizhao, reflecting the runners because of the marathon and the love, the sea and the harmony of coexistence.
2019	Lighthouses, waves, cities and people running.	The lighthouse integrates with the new landscape of Rizhao city and leads the runners to victory in the change of time. The combination of the lighthouse, the waves, the city and the running crowds, the rising sun on the front of the souvenir and the nightfall on the back are connected, presenting a virtuous cycle of harmonious symbiosis.
2020	Lighthouses, rudders, runners.	On the basis of the city landmark lighthouse elements, incorporating the Rizhao seaside characteristics of the rudder, the back of the souvenir engraved running people, the lighthouse to indicate the road, the 360-degree rotating rudder to control the direction of sailing, portraying the love of running, the city and life.
2021	The lighthouse, the word "sun", the blue sky, the blue sea.	Rizhao's "Ri" character is artistically deformed, such as the growing tree, carved out the fifth anniversary of the wheel, symbolizing the fifth anniversary of the Rizhao Half Marathon; it also looks like a circle of track clustered around the lighthouse element, echoing the blue sky and blue sea, to record the marathon enthusiasts' sweat and love.
2022	Lighthouse, waves, coastline	The towering lighthouse stands on the coastline, the sun and the lighthouse light reflect each other. Surging waves and Rizhao landmarks collide with the waves, the sun reflects the picture of the sea and sky, runners in the waves on the edge of the sun, showing the green ecological scene of the Rizhao seaside life movement.
2023	Lighthouse, Blue Sky, Blue Sea, Golden Beach	The lighthouse can be DIY, presenting the sunrise seascape picture, the sun rises from the sea level to illuminate the sea and the waves, constituting the unique scenery of Rizhao.
2024	Lighthouses, waves, light	The lighthouse, as an iconic element of the Rizhao Marathon, stands like a firm guardian guiding the runners along the coast, and the integration of the logo adds a unique identity to the event and enhances its recognition. The surging waves symbolize the spirit of struggle and determination of the runners, while the radiant light signifies the vitality and passion of the Rizhao Marathon, as well as the glory of the runners on the field.

Souvenir design is not only about the pursuit of external elegance, but also focuses on the deep integration of internal emotion and culture. This project carefully selects the unique black clay of Rizhao, and by virtue of the exquisite hand-carving skills and delicate glaze treatment, each piece of work has a unique flavor. Among them, the waves are carved in openwork, showing the exquisite craftsmanship of black pottery, which is as thin as cicada wings; the lighthouse is

presented in relief, the seagulls are engraved, and the sailboat is embossed. The overall design is in black color, exuding a mysterious and charming luster, presenting the aesthetic quality of primitive simplicity and rich aesthetic interest. After high-temperature firing, the clay surface forms a smooth black glaze like a mirror, which not only highlights the rustic beauty of the material, but also enhances the artistic value of the work. The souvenir is not only a deep tribute to the nature and culture of Rizhao, but also a beautiful messenger connecting the past and the future and conveying a healthy and upward attitude towards life.



Figure 1. Marathon souvenir plan (self drawn)

## 4.2. Experimental Methods and Procedures

In order to realize the unique visual effect of black pottery, this experiment adopts high temperature firing process to produce samples. After the clay is formed, the texture and color effects of the final product are observed by adjusting different firing temperatures and glaze treatments. After completing the firing, functional attributes such as longevity, abrasion resistance, and storability were evaluated through simulated use scenarios, wear and tear experiments, and storability tests.

### 4.2.1. Temperature test

Temperature tests included firing in the low-temperature interval, the medium-temperature interval, and the high-temperature interval. It was found that the low-temperature interval (800°C~ 1000°C) saw the initial sintering of the clay and the initial reaction of the glaze. In the medium temperature range (1000°C~ 1200°C) the clay is more completely sintered and the fluidity of the glaze begins to show, forming a preliminary color. High temperature range (1200°C~ 1350°C) the clay reaches the optimal sintering state, the glaze is completely fused, forming a smooth mirror-like black glaze, while ensuring the hardness and gloss of the black pottery.

#### 4.2.2. Glaze type testing

Experiments on glaze types included unglazed firing, transparent glaze firing, and black glaze firing, and it was found that unglazed firing was able to reflect the original color and texture of the clay. Transparent glaze can form a transparent protective film on the surface of the black pottery and enhance the luster without affecting the black color of the clay. Black glaze can apply a layer of black glaze on the surface of the clay to further deepen the color of black pottery and increase its artistic effect.

#### 4.2.3. Functional testing

Functional attributes such as longevity, abrasion resistance and storability are evaluated through simulated use scenarios, wear and tear experiments, and storability tests. In the simulated use scenario experiment, the souvenir is placed in a humid environment, and its surface is observed to be free of color fading, deformation and other changes. In the wear and tear test, artificial wear and tear is used, and the surface of the souvenir is rubbed with sandpaper, and the wear and tear of the surface is observed to be in good condition. The storability test was conducted by placing the souvenirs in boxes and bags, observing that there was no breakage or deformation, and checking whether they were easy to carry and collect. It was found that the souvenirs were durable, moderate in weight and suitable for long time collection.

In summary, during the research and production process of marathon souvenir modeling design innovation, we adopted a rigorous and scientific experimental method to ensure that the artistic value and practicality of the souvenir are given equal importance. In the selection of experimental methods, we focused on the integration of traditional techniques and modern technology, and comprehensively evaluated the production effect of the souvenirs through high temperature firing process, testing of different glaze types and functionality testing. It was finally determined that the souvenirs were made with a combination of unglazed firing, transparent glaze firing and black glaze firing, and finally finished by high temperature sintering. Through these experimental methods and processes, we not only verified the feasibility of black pottery culture in the design of Rizhao Marathon souvenirs, but also further improved the quality and quality of souvenirs.

### 4.3. Market Research and Consumer Feedback Analysis

The market research was conducted by means of questionnaires and interviews, of which the questionnaires were distributed through online channels and a total of 800 valid questionnaires were collected. The samples covered runners and spectators of different ages, genders, occupations and participation experiences to ensure the broad representativeness of the research results. In-depth interviews were conducted with a total of 30 respondents. The interviews centered on satisfaction with souvenirs, suggestions for improvement, and willingness to buy, in order to obtain more in-depth consumer feedback. The following conclusions were drawn from the research:

In terms of appearance design, most respondents (85%) were satisfied with the appearance design of the souvenirs, believing that they integrated the spirit of the marathon and the local characteristics of Rizhao, and that they had high artistic value and aesthetic significance. In particular, the unique texture and exquisite craftsmanship of the black ceramic material left a deep impression on the respondents.

In terms of material selection, the black pottery material was widely praised for its unique historical and cultural heritage and environmental attributes. 78% of the respondents said that the choice of black pottery as a souvenir material not only reflects the respect for traditional culture, but also conforms to the pursuit of environmental protection and healthy living by modern people.

In terms of cultural symbolism, respondents generally believe that the lighthouse, waves, sailboats and other elements in the souvenirs not only represent the natural scenery and city image of Rizhao, but also imply the spirit of hard work and positive attitude towards life of the marathon. 90% of respondents said that these cultural symbols increase the collection value and commemorative significance of the souvenirs.

In terms of practicality, in terms of utility, some respondents (45%) suggested that the size and weight of the souvenirs were not moderate enough to make them convenient to carry and collect. It is suggested that in future design, consideration could be given to introducing versions of different sizes and weights to meet the needs of different consumers.

In summary, the unique texture of the black ceramic material and high-quality handmade craftsmanship were widely praised. In particular, the appearance design of the souvenirs integrates the dynamic shape of the spirit of the marathon and the elements of the local characteristics of Rizhao, and most of the interviewees showed positive interest in the souvenirs and considered them to be more attractive in the market.

## 5. Summary and Outlook

### 5.1. Summary of the study

Based on the black pottery culture, this study explores and practices the design of souvenirs for the Rizhao Marathon, aiming at integrating the local culture and the spirit of the sports event, and creating souvenirs with both cultural connotation and market attraction. Through in-depth analysis of the black pottery culture, Rizhao Marathon and its target groups, a series of souvenirs with local characteristics are successfully designed and their feasibility is verified by experiments.

The main result of the research is reflected in the innovative integration of design concepts. The traditional craft of black pottery and the sports spirit of the marathon are combined organically to create a souvenir that meets modern aesthetics. The design adopts simple and abstract shape, integrating the elements of the marathon and the geographical and cultural characteristics of Rizhao, which not only retains the artistry of black pottery, but also has the functionality of modern souvenirs. Through the realization of this design concept, the souvenir not only shows the unique charm of local culture, but also reflects the spiritual connotation of the sports event. In terms of production process, this study combines the traditional black pottery handcraft with modern pottery technology, which guarantees the high precision and artistic effect of the souvenir production and improves the production efficiency at the same time. With the help of the black pottery high temperature firing process, the texture and visual effect of the souvenirs are ensured to meet the market's high demand for the quality of souvenirs. The combination of traditional and modern technology makes the souvenirs both artistic and meets the market's demand for innovation and practicality.

Through extensive market research and consumer feedback, we gained an in-depth understanding of consumer expectations of souvenirs in terms of functionality, cultural value and personalization. The research results show that souvenirs based on black pottery culture have greater potential in the market. Consumers attach particular importance to the cultural connotation and symbolic meaning of souvenirs, believing that they can not only serve as a symbol of personal achievement, but also reflect the close connection between the event and local culture.

### 5.2. Research Outlook

#### 5.2.1. Cross-cutting cooperation and outreach

Actively cooperate with culture and art, sports events and tourism organizations, formulate specific cooperation plans and promotion strategies, make souvenirs based on black pottery

culture the iconic commodities of Rizhao Marathon, and jointly enhance the cultural identity and commercial influence of the event brand. For example, it can cooperate with tourist attractions to launch special tourist routes and promote the souvenirs as tourist accompanying gifts; and jointly organize exhibition activities with cultural and art institutions to show the results of the design of black pottery culture and marathon souvenirs.

### 5.2.2. Technological innovation and digital transformation

Make full use of digital design, 3D printing, virtual reality (VR) and augmented reality (AR) and other technologies to develop specific application programs. For example, digital design software will be used for more accurate souvenir modeling, and 3D printing will be used to achieve rapid sample production and enhance the interactivity and market competitiveness of souvenirs.

### 5.2.3. International Market Expansion

With the accelerated internationalization of the marathon, in-depth cross-cultural design and market research is being carried out. Study the cultural characteristics, aesthetic preferences and consumption habits of different countries and regions, combine the black pottery culture with local cultural elements to create souvenirs with global appeal. Formulate international marketing plan, choose suitable overseas marketing channels, and promote Rizhao Marathon souvenirs to the international market.

### 5.2.4. Big Data and Artificial Intelligence Applications

Establish a comprehensive big data collection system to collect data on consumer preferences in souvenir design and purchasing behavior. Use artificial intelligence algorithms to analyze these data and accurately grasp the changing trends of consumer demand. Based on the results of the analysis, optimize souvenir design and customization services to better adapt products to market trends.

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