

Meet West in East: New Routing of Old Footprints in the Heritage Tourism in Macao



Yuanyuan Cao and Eusebio C. Leou

Abstract After centuries of cohabitation in a tiny seaside town, a unique example of coexistence has been demonstrated in Macao, by forming different living communities, lifestyles, and cultures from Chinese and Portuguese. The incorporation of the “Historic Centre of Macao” as World Heritage List in 2005 by UNESCO marks the universal value of the Sino-Lusophone cultural mixture from east and west, which would be an irreplaceable attraction for tourists, especially for those fascinated with Portuguese culture destinations or historic background. However, current tourist arrival in Macao is mostly from Chinese-speaker, which means that there’s a room for cultivating incoming tourists from the source of non-Chinese-speaker. The purpose of this study is to explore the possible undiscovered inbound visitors’ source to Macao, by introducing the theme of “Portuguese Origins (Origem Portuguesa)”. By introducing the mentioned concept into the new routes design for the certain visitors, it aims to build a new approach of the destination image to Macao, by emphasizing its cultural attraction besides the current gaming destination. The spatial analysis module of ArcGIS is used in this study to code the “Portuguese Origins” in Macao. Through the field measurement and consultative interview methods, this study confirmed that the concept of “Portuguese Origins” can demonstrate the cultural uniqueness in Macao, which would be a positive impact on the attractiveness of non-Chinese-speaker inbound tourists. To the finding, four theme routes of “Portuguese Origins” are designed by linking the relevant locations in Macao, in order to serve as the tourist attractions with these optimal paths.

Keywords Heritage tourism · Macao · “Portuguese Origin” · ArcGIS · Optimal path

JEL Classification Z32 Tourism and Development

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1 Introduction

Macao is a prosperous port and plays an important strategic role in the development of international trade. Since the middle of the sixteenth century, Macao has gradually been under the governance of Portugal until China resumed the exercise of sovereignty over Macao in 1999. As one of the most important bridgeheads of cultural exchanges between China and the West in modern times, for more than 400 years, various cultures have collided and exchanged with each other in Macao, forming today's unique cultural atmosphere in Macao.

On July 15, 2005, the "Historic Centre of Macao" was incorporated as World Heritage List of UNESCO and became the 31st World Heritage site in China. It marks the universal value of the Sino-Lusophone cultural mixture from east and west. Meanwhile, it provides Macao with an opportunity and a bright spot. The "Historic Centre of Macao" is a historic district with the old urban area of Macao as the core, which is connected by adjacent squares and streets, including 8 front plots and 22 buildings. From the perspective of spatial layout, the cultural relics buildings in the "Historic Centre of Macao" are mainly distributed in strips, which are quite dense. This area is the core part of the residence of foreigners who used to be mainly Portuguese. With main streets and many squares, it connects the important historical buildings in Macao and has basically maintained its original appearance. This large-scale building complex, with a unified style, presents all the typical characteristics of a seaport city and a traditional Sino-Lusophone settlement, which is different from any city in China. It would be an irreplaceable attraction for tourists, especially for those fascinated with Portuguese culture destinations or historic background. Nowadays, with the continuous development of tourism, cultural heritage tourism is favored by tourists, and cultural heritage tourism has also become an important part of Macao's tourism industry (Xuli, Yu Mingjiu, 2022). In the current trend, it is necessary to explore the image of a tourism destination that is more suitable for Macao. It is worth mentioning that many world cultural heritage sites are strictly isolated and protected, and visitors can only view from a distance rather than close contact. Or after the tourists leave, only an empty city is left. The "Historic Centre of Macao" is still the activity center of Macao residents, reproducing scenes of Macao residents' lives, which is the unique charm of the Historic Centre of Macao (Yan Jun, 2009). However, current tourist arrival in Macao is mostly from Chinese-speaker, which means that there's a room for cultivating incoming tourists from the source of non-Chinese-speaker.

The spatial analysis module of ArcGIS is used in this study to code the "Portuguese Origins" in Macao. Through the field measurement and consultative interview methods, this study confirmed that the concept of "Portuguese Origins" can demonstrate the cultural uniqueness in Macao, which would be a positive impact on the attractiveness of non-Chinese-speaker inbound tourists. This study uses the optimal path model in ArcGIS to link the relevant places in Macao and designs four new routes with Portuguese elements as the theme, so as to enrich and expand the new

direction of the external promotion of Macao's cultural heritage tourism. By emphasizing the cultural attraction of Macao outside the current gambling destination, explore a more sustainable destination image.

2 The Concept of “Portuguese Origins”

The Convention for the protection of the world cultural and natural heritage was adopted at the general conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1972. In 1976, the World Heritage Committee was established, and the first batch of the world heritage list was established in 1978. So far, more than 194 countries have signed the Convention, making it an international legal instrument for the protection of cultural and natural heritage that most people abide by. As of June 2022, there are 1154 world heritages in the world heritage list, distributed in 167 countries, including 897 cultural heritages, 218 natural heritages, and 39 composite heritages. Of the 1154 world heritage sites, 14 are related to Portuguese historical factors. These sites are spread across three continents: Africa, America, and Asia, which is an important witness to the great discovery era and the spread of Portuguese culture around the world. Although the first Portuguese settlements were related to the strategic choice of occupying territory, exploiting natural resources or evangelizing, because they coexisted with the local culture for a long time, they adapted to the local reality and absorbed the indigenous customs while retaining their own culture. This adaptation to local realities and cultural blending reflects the uniqueness of Portugal's cultural heritage in Africa, America, and Asia. These world heritage sites related to Portuguese historical factors are officially named as “Portugal origin” (UNESCO, 2021). Monuments, group of buildings or sites that meet any of the above six criteria can be called “Portuguese Origins”. The “Portuguese Origins” in world heritage sites are not only distributed in Portuguese-speaking countries, but also in non-Portuguese-speaking countries, such as Macau, China.

In this paper, the concept of “Portuguese Origin” is adopted in order to figure out the certain sites in Macao as tourist attractions. By referring to the definition of “world cultural heritage” adopted at the 17th UNESCO conference in Paris in 1972, and in combination with consultative interviews, the main body of “Portugal origin” consists of monuments, group of buildings and sites. The selection criteria are as follows:

- (i) to represent a masterpiece of Portuguese creative genius;
- (ii) to exhibit an important interchange of human values within a cultural of Portugal, on developments in architecture or technology, monumental arts, town-planning, or landscape design;
- (iii) to bear a unique or at least exceptional testimony to a Portuguese cultural tradition which is living or which has disappeared;

- (iv) to be an outstanding example of a type of building, architectural, or technological ensemble or landscape which illustrates (a) significant stage(s) in Portugal history;
- (v) to be an outstanding example of a traditional settlement, land-use, or sea-use which is representative of Portuguese culture, or interaction with the environment especially when it has become vulnerable under the impact of irreversible change;
- (vi) to be directly or tangibly associated with events about Portugal or living Portuguese traditions, with Portuguese artistic or literary works of outstanding universal significance. (We consider that this criterion should preferably be used in conjunction with other criteria).

3 Research Method

Geographic information system (GIS) is a kind of database system used to acquire, save, operate, explore, and manage spatial or geographic data. Specifically, GIS is a large geographic information discipline used in a wide range of disciplines. It can connect engineering, planning, logistics, insurance, telecommunications, and commerce and carry out data analysis and visual services on this basis.

As one of the most important functions of GIS, network analysis plays an important role in the layout design of various pipe networks and pipelines, such as transportation and tourism, electronic navigation, urban planning, electric power, communication, and so on. It is one of the hot spots and difficulties in current research. In daily life, the commonly used path optimization methods mainly include parallel shortest path search algorithm, ant colony algorithm, EBSP algorithm, and Dijkstra algorithm. They have their own characteristics in space complexity, time complexity, ease of implementation, and scope of application.

The optimal path analysis is the most basic and key problem in the traffic network analysis. The optimal path is not only the shortest distance in the general geographical sense, but also can be extended to other measures, such as cost, time, physical consumption, and so on. Taking “Macau historical center” as an example, this paper establishes an optimal path model based on the influence of multifactor comprehensive factors and compiles a path optimization application program based on the path model by comprehensively using ArcGIS, ArcMap, and other software to discuss the optimal path of the “Portuguese Origins” road network, with a view to developing four new routes to visit Macau’s cultural heritage for tourists from non-Chinese-speaking zone, so as to provide some reference for tourists to travel and visit.

The data comes from the Baidu map image. The acquisition time is April 30, 2022. The study area covers about 16.1678 ha. The image resolution is 500 m. The GCS_WGS_1984 system is adopted. The remote sensing image map of the research target, the sites of the “Portuguese Origins” located in the Peninsula of Macau, can be margined as Fig. 1.



Fig. 1 Map of the Peninsula of Macau by remote sensing image. *Source* Drown by the authors

Data acquisition and input is the first step of establishing GIS, which lays the foundation for the next steps. Then, according to the image of the road network of the research area, it is vectorized to obtain the vectorization results of the road grade in the study area and form the road network data in the study area, as shown in Fig. 2.

The geographical distribution of “Portuguese Origins” in the study area is another issue to be solved, which should include the following contents: accurate longitude and latitude coordinate information, and relevant secondary factor information. Among them, the longitude and latitude coordinates have been corrected.

This study adopts the Dijkstra algorithm, which is the most commonly used in the optimal path algorithm. First, it takes the starting point as the center to search out a solution with the lowest cost or the best in the local scope (that is, the route that



Fig. 2 Road network of the research area the sites of the “Portuguese Origins” located in the Peninsula of Macau. *Source* Drown by the authors

takes the least time and the shortest distance in the tourist feasible walking network). Determine the path from the starting point to the solution, and then use the above method again to expand the search outward layer by layer until the end point is found.

Through consulting interviews, the concept of “Portuguese Origins” can be involved with several sites of the current UNESCO World Heritage Site of “the Historical Center of Macau”, as well as several other historical sites within the Peninsula of Macau, which can be generated with four routes with certain themes. These theme routes are

- Theme 1: Route of the Portuguese Social Community and Daily Life;
- Theme 2: Route of the Portuguese Religious Life;
- Theme 3: Route of the Portuguese Civil Life and Fortress;
- Theme 4: Route of the Portuguese Governance and Military Sites.

Theme 1: Route of the Portuguese Social Community and Daily Life;

The length of this theme route is about 3.76 km. Walking along this route, tourists can experience the life of local residents and play the role of ordinary citizens of Macao for a day. As the starting point of the route, Escola Ling Nam has a long history and elegant environment. This is followed by the Autoridade Monetária de Macau, a Macao Regulatory Body established on December 20, 1999, as the currency and

State Administration of Foreign Exchange of the territory on July 1, 1989. The Small Monetary Authority is a witness to the development of history and a silent reflection of the profound changes in the local political and economic environment. After that, we will pass three squares with Portuguese style. The square is surrounded by the first Portuguese settlement in Macao. For example, Praça de Luís de Camões is one of the few places in Macao where there are trees, bus stops, seats, and car parking. There are also schools and residential spaces nearby. With dense trees and seating, the square is a perfect place for community residents and tourists to stay and cool off, with a strong atmosphere of daily life in Macao. After that, tourists will come to Teatro Dom Pedro V. This is the first Western-style theater in China, which is used for drama and concert performances. It is also the place where the Portuguese community held important activities in that year. Teatro Dom Pedro V is the only European theater building in Macao. Its dark green doors and windows and red roof are set off by green as the main color, and the surrounding environment with yellow as the main tone is harmonious coexistence and personality. It is worth mentioning that in addition to performing music, songs, and dances, Teatro Dom Pedro V also provided local residents with a new type of entertainment like film at the beginning of the twentieth century. It is the first place in China to show films and also witnessed the Asian Premiere of Puccini’s Opera “Madame Butterfly”. Largo do Lilao is one of the earliest Portuguese settlements in Macao. The Portuguese word “Lilao” means “water spring”, while the Chinese name “a-po” comes from the Cantonese “old lady”. There are many stories, poems, and ballads related to the Largo do Lilao, which shows that Largo do Lilao is of great significance to the local Portuguese. As the material carrier of urban collective memory, they all symbolize the indelible root connection between Largo do Lilao and Macao people. The important position and significance of Largo do Lilao is not only that it is at the core of the historical corridor, but also because it reflects the symbiosis of multiculturalism. The end of this route is Jardim do Sao Francisco which is located on the top of the mountain. It has Portuguese style and can overlook the panoramic view of Macao. It is a popular place for local residents to take wedding photos (see Table 1).

Table 1 Sites and geographical coordinates of Theme 1: Route of the Portuguese Social Community and Daily Life. Source Organized by the authors

Sites of the factors of “Portuguese Origins”	Longitude	Latitude
Biblioteca Sir Robert Ho Tung	113.53767	22.19244
Autoridade Monetária de Macau	113.54834	22.19553
Escola Ling Nam	113.54797	22.19521
Praça de Luís de Camões	113.53946	22.19946
Largo do Lilao	113.53496	22.18855
Largo de Santo Agostinho	113.53815	22.19226
Teatro Dom Pedro V	113.53827	22.19226
Praça do Tap Seac	113.54695	22.19815
Jardim do Sao Francisco	113.53335	22.18487

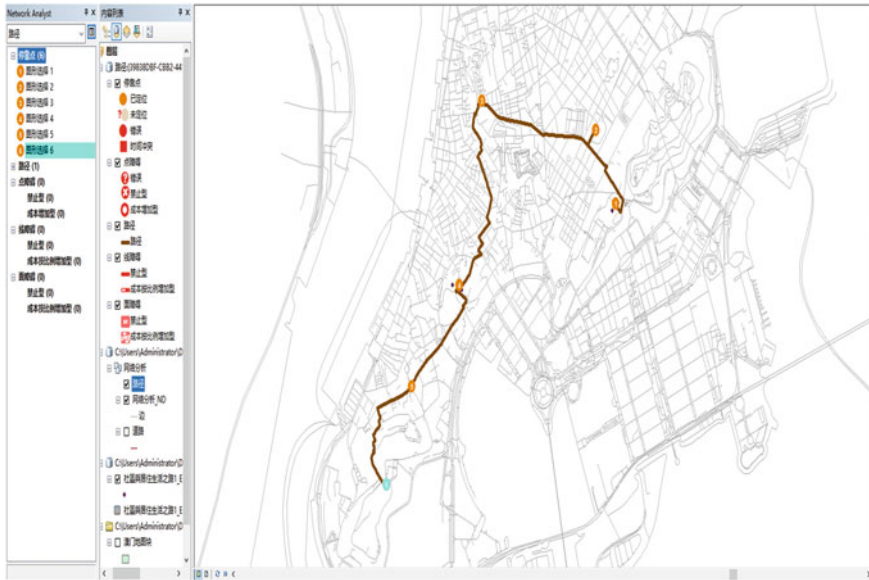


Fig. 3 Optimal path of Theme 1 for tourists: Route of the Portuguese Social Community and Daily Life. *Source* Organized by the authors

Through the vectorization operation of the research area and the introduction of the geographical coordinates of relevant places, the optimal path of Theme 1 is obtained (Fig. 3).

Theme 2: Route of the Portuguese Religious Life;

The length of this theme route is about 3.38 km. Walking along this route, tourists can experience the integration of western religion and Eastern Society within an urban area. This route is mainly religious. For more than 400 years, the Chinese and Portuguese have worked together to create different living communities in the historical urban area of Macao. These living communities not only show Macao’s Chinese and Western architectural art characteristics, but also show the integration and respect of the different religions, cultures, and living habits of the Chinese and Portuguese people. This kind of warm, simple, and inclusive community atmosphere brewed by the Chinese and Portuguese people is a place of great characteristics and value in Macao, and it is also an irreplaceable attraction for tourists (see Table 2).

Through the vectorization operation of the research area and the introduction of the geographical coordinates of relevant places, the optimal path of Theme 1 is obtained (Fig. 4).

Theme 3: Route of the Portuguese Civil Life and Fortress;

The length of this theme route is about: 3.40 km. Walking along this route, tourists can observe the historical architecture of the Portuguese domination period, mostly

Table 2 Theme 2:
Geographical coordinates of the integration of western religion and Eastern Society.
Source Organized by the authors

Sites of the factors of “Portuguese Origins”	Longitude	Latitude
Igreja da Sé Catedral	113.54151	22.19349
Largo da Sé	113.54112	22.19366
Igreja de S. Lourenço	113.5366522	22.1906677
Igreja de St. António	113.53958	22.19891
Igreja do Seminário de S. José	113.53732	22.1917
Igreja de S. Domingos	113.54039	22.1948
Praça Santo Domingo	113.54045	22.19446
Praça Jesus Memorial	113.54084	22.19691
Ruínas da Antiga Catedral de São Paulo	113.54085	22.19743
Igreja de St. Agostinho	113.5384266	22.1917854
Museu de Arte Cardeal Newman de Macau	113.54792	22.19676
Colina do Bispo	113.53523	22.18681

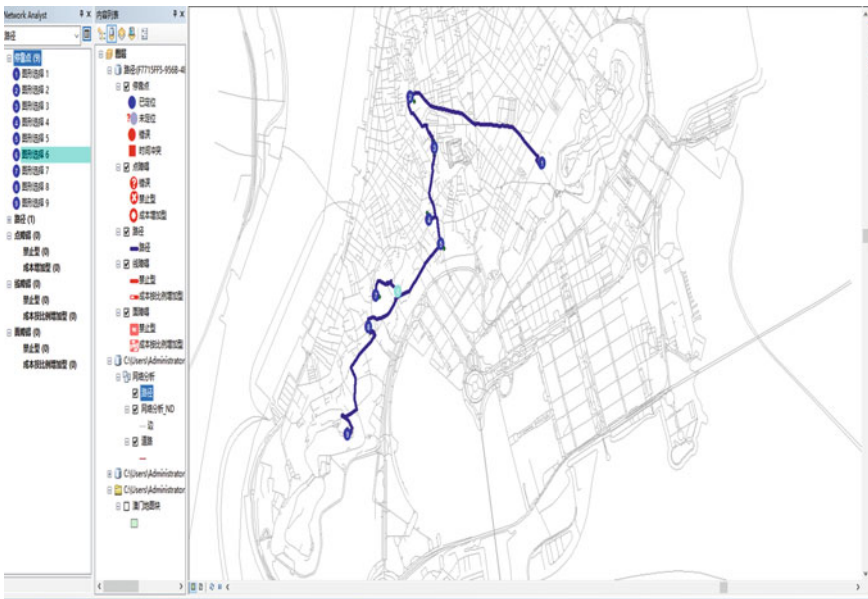


Fig. 4 Theme 2: The optimal path for tourists. *Source* Organized by the authors

Table 3 Theme 3: Geographical coordinates of municipal governance and fortification road. *Source:* Organized by the authors

Sites of the factors of “Portuguese Origins”	Longitude	Latitude
Leal Senado	113.53952	22.19331
Largo do Senado	113.53998	22.19382
Santa Casa da Misericórdia	113.54018	22.19372
Ruínas Da Antiga Muralha Da Cidade	113.54053	22.19764
Fortaleza de S. Paulo do Monte	113.54223	22.19704
Quartel dos Mouros	113.53264	22.18737
Fortaleza da Guia	113.54968	22.19661
Tunel do Monte da Guia	113.54994	22.19699

with public functions. Visitors may experience the art design of colonial style within the historical center of Macao during the route sightseeing. This is a route for tourists interested in military affairs. Military/defense related sites along the way witnessed the wonderful history of Macao. Take the Fortaleza de S. Paulo do Monte for example, it was the core of Macao’s defense system at that time, and together with other forts, it formed a wide artillery defense network covering the east and west coasts. The northwest wall facing the Chinese mainland is mainly made of granite. The subwall is relatively low and there is no muzzle, which mainly shows its defensive role overseas and the Portuguese’s friendly attitude toward the Chinese authorities at that time (see Table 3).

Through the vectorization operation of the research area and the introduction of the geographical coordinates of relevant places, the optimal path of Theme 1 is obtained (Fig. 5).

Theme 4: Route of the Portuguese Governance and Military Sites.

The length of this theme route is about: 3.38 km. Besides the route of Theme 3, tourists can continuously observe the historical architecture of the Portuguese domination period, mostly with public functions. Visitors may experience the art design of colonial style within the historical center of Macao during the route sightseeing. The Macao Portuguese government (1887-December 19, 1999) was the government agency of Macao during the Portuguese colonial period, and Macao was also an overseas province of Portugal at that time. Therefore, many government buildings of this period have been left in Macao. This route allows tourists to really touch the era that is not far away. Take the site of the Fundação Oriente in the route as an example. It was built in the 1970s. The original site was the villa of Manuel Pereira, a Portuguese Royal aristocrat, financial adviser and one of the founders of the Macao Insurance house. This building may be the first villa style garden house in Macao. Later, it was rented to the East India Company. The new tenants brought their country’s architectural models and methods, and renovated them, which in essence had British influence. At that time, people invented a new Portuguese English word—“Casa garden” to describe this mansion. In 1885, the site became the property of the



Fig. 5 Theme 3: The optimal path for tourists. Source Organized by the authors

Portuguese Government. After the 1960s, it was changed into the James H Museum. It is now the site of the Fundação Oriente, and the interior has been transformed into an exhibition space. The building adopts the southern European style. There are Spanish marble steps at the entrance of the main gate and an ancient Roman porch. The outer wall is white, the window line and the female wall are pink, and the interior decoration is magnificent. The layout of this house creates a precedent for garden style residences in Macao. The places in this route have strong historical elements. Walking through them, the past years seem to be able to reappear in the minds of tourists (see Table 4).

Table 4 Theme 4: Geographical coordinates of Macao Portuguese government road. Source Organized by the authors

Sites of the factors of “Portuguese Origins”	Longitude	Latitude
Fundação Oriente	113.53985	22.20004
Consulado Geral de Portugal em Macau	113.54361	22.19517
Escola Portuguesa de Macau	113.54255	22.19128
Clube Militar de Macau	113.54429	22.19161
Gabinete do Governado Macau	113.53731	22.19047
Consulado Geral de Portugal em Macau	113.53656	22.18636
Fundação Macau	113.54024	22.19279
Clube de Ténis do Exército	113.53473	22.18496



Fig. 6 Theme 4: The optimal path for tourists. Source Organized by the authors

Through the vectorization operation of the research area and the introduction of the geographical coordinates of relevant places, the optimal path of Theme 1 is obtained (Fig. 6).

4 Findings

After the above analysis and verification, this paper can conclude the following conclusions, which are listed as follows.

Macao has the universal value of the Sino-Lusophone cultural mixture from east and west. This undoubtedly has great attraction for tourists who are obsessed with Portuguese cultural destinations or historical backgrounds. At this stage, most tourists arrival in Macao is mostly from Chinese-speaker, which means that there’s a room for cultivating incoming tourists from the source of non-Chinese-speaker. This paper is based on the concept of “Portuguese Origin” put forward by Portuguese officials to explore Macao’s potential tourist market. It aims to build a new image of Macao destination and promote the development of cultural heritage tourism in Macao by emphasizing the cultural attraction of Macao outside the current gambling destination.

Referring to relevant theories and using the method of consultative interview, this paper defines the concept of “Portuguese Origins” for the first time. Meanwhile, this study confirmed that the concept of “Portuguese Origins” can demonstrate the cultural uniqueness in Macao, which would be a positive impact on the attractiveness of non-Chinese-speaker inbound tourists. Moreover, on the basis of on-site measurement, the ArcGIS spatial analysis module in GIS is comprehensively used to establish

the optimal path model, and on the basis of which, the path optimization application program is compiled to discuss the optimal path of the “Portuguese Origins” road network, so as to provide a certain reference for tourists to travel and visit. The study found that connecting the relevant sites of “Portuguese Origins” in Historic Centre of Macao through ArcGIS can create four new routes for Macao’s cultural heritage and open up a new direction for the promotion of Macao’s cultural heritage tourism besides the current gaming destination, which is of practical significance. Now that the Chinese government has apparently relaxed its grip on COVID-19, Chinese people are keen to travel. If the unique cultural background of Macao can be utilized to develop tourism activities, it will have a positive impact on the development of Macao tourism.

5 Conclusion

The “Historic Centre of Macao” World Heritage site is a unique piece of cultural coexistence in a global context, which reflects the cultural integration of east and west. Referring to relevant theories and using the method of consultative interview, this study defines the concept of “Portuguese Origins (Origem Portuguesa)” for the first time. This study confirmed that the concept of “Portuguese Origins” can demonstrate the cultural uniqueness in Macao, which would be a positive impact on the attractiveness of non-Chinese-speaker inbound tourists. The spatial analysis module of ArcGIS is used in this study to code the “Portuguese Origins” in Macao. By introducing the mentioned concept into the new routes design for the certain visitors, it aims to build a new approach of the destination image to Macao, by emphasizing its cultural attraction besides the current gaming destination. This study has a certain practical significance in expanding the new direction of Macao tourism. However, there are still shortcomings, such as insufficient routes. In the future, we look forward to more relevant routes to continuously enrich the connotation of Macao tourism.

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