

## Research on Theme Positioning of Expressway Service Areas Based on Open Attributes

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**Abstract.** With the continuous improvement of the expressway network and the increasing demand for public travel, expressway service areas, as an important part of transportation infrastructure, have a unique theme that reflects their image. This study aims to explore the theme positioning of expressway service areas based on open attributes, and proposes innovative and practical theme positioning strategies for service areas, providing theoretical support and practical guidance for the design, construction, and management of service areas.

Keywords: expressway; service area; open attributes; theme positioning

#### 1 Introduction

Service area is an important node in the highway network, which undertakes various functions such as transportation, catering, lodging, refueling and rest. With the rapid development of society and the diversification of people's travel modes, the traditional highway service area has been unable to meet the needs of modern travel. The open attribute of highway service area will effectively connect the service area with the surrounding tourist attractions, integrate and consolidate the functions of transportation infrastructure and tourism distribution bases, bring into full play the overall benefits, realize the complementary advantages, expand the functions of the highway service area, realize the integration of traffic and tourism, and promote the coordinated development of urban and rural areas.

## 2 Domestic and International Overview

Different from the "closed" mode of traditional expressway service areas, the concept of "open" has become one of the cutting-edge themes in the field of innovation research of foreign expressway service areas in recent years. In developed countries and regions, expressway service areas have become the concentrated display window of local economy, culture and characteristic resources, and have become the gateway for expressway

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travellers to feel the natural and cultural characteristics of the place, and at the same time, they also bring considerable economic benefits to the operators of service facilities. Europe and the United States, Japan, developed regions and Taiwan's expressway open service area construction started early, the operation is mature, good reputation, effective, in the scale, layout, functional modes, operation is the domestic expressway open service area construction model. British expressway service area, beautiful landscape environment, focus on outdoor recreation space to build, rich commercial business, branding high [1]: Japanese service area has become a concentrated display of local characteristics, speciality products, commercial shopping destinations, in people's holiday life is gradually jumping on the protagonist position. Service area from the original driving on the way to a "through the point" into a driving trip "destination"[2][3]; Each service area on Taiwan's expressways uses local landscape, local characteristics or borrows a world famous landscape as the theme of the service area to form a themed service area, but the service area occupies a much larger area[4]. Foreign open service area presents clear positioning, open layout, large-scale flexible layout, beautiful landscape environment features.

China's expressway service area "open" concept in the research object is increasingly diversified, and the research level has also expanded from enterprises to industry, science and the region. Domestic research on open service areas mainly focuses on functional positioning, layout, coupling with regional economy and landscape design. Gao Jianping et al. [5] analysed the coupling relationship between open service area and social economy, divided the basic expansion function of open service area into three basic types: traffic service, industrial service and humanistic service, established the functional positioning method of open service area of motorway based on principal component analysis. Xiao Yingjie [6] analyzes the current situation and problems in the planning of expressway service areas through research, discusses the future development trend and mode, and researches the proposed expressway open service area siting and layout model and scheme evaluation method. Chen Guomei [7] sums up the current situation of domestic and foreign service area research, analyzes the common problems of domestic service areas, and elaborates the open service area of expressways. Gao Jiawei [8] summarises the current research situation of service areas at home and abroad, analyses the common problems of domestic service areas, analyses the development trend of expressway open service areas, and puts forward the planning and design strategies and methods from the five aspects of site selection, functional positioning, planning and layout, and operation and management in combination with the engineering reality. Lan Beizhang et al. [9] established the system of coupling indexes and the coupling development degree model and evaluation standard based on the coupling function of the service area influence area traffic and economy. Hu Guisong et al. [10] put forward the "three types and nine points" of the influence factor indicator system, put forward seven practical application types and their application conditions, and associated the seven types with the existing standard classification, so as to facilitate the practical application. Liu An et al. [11] analyse in detail the site selection of the service area and the characteristics of the customer groups, and construct a new paradigm for the planning of traffic and tourism integration of tourism theme-type open service area. Qiu Qiao et al. [12] focused on the achievements and representative cases

of the thematic development of Chongqing characteristic service area, and researched the theme selection, theme implementation path, and theme expression strategy.

Comprehensive research status at home and abroad, at present, there has been a more in-depth study on the construction of open service area of motorway at home and abroad, however, it is not systematic enough, especially in China, which is in the initial stage, from the results of the current construction, the number of open service area is obviously insufficient, homogenisation is serious, the theme positioning is not clear and prominent, and there is a lack of open attributes of the expressway service area of the theme of the positioning of the systematic research.

## 3 The Connotation and Extension of the Openness Attribute

## 3.1 Connotations of the Openness Attribute

An open attribute typically refers to a state or characteristic that allows access, interaction, or use by external entities or factors. Openness attributes can have different meanings and applications in different domains and contexts. The openness attribute represents a sense of inclusiveness, transparency and cooperation that helps to break down barriers and promote innovation and development, while also contributing to a more equitable, inclusive and sustainable environment.

## 3.2 Open Attributes of Traditional Highway Service Areas

The openness attribute of expressway service areas is mainly reflected in their openness to the outside world, the services they provide and the diversity of their business models. This open attribute provides a convenient and comfortable environment for road users and promotes the development of the service area economy.

#### Openness.

Motorway service areas are open places for all road users, both drivers and passengers, to stop for rest, meals, refuelling or other necessary activities. This openness makes the service area an important rest and supply point on the motorway, meeting the basic needs of people on long journeys.

#### Services Provided.

Generally speaking, service areas are equipped with basic facilities such as petrol stations, restaurants and toilets, which are open to all and provide convenient and quick services. In addition, some service areas also provide additional services such as shopping and accommodation to meet the diversified needs of different travellers.

#### **Business Model.**

In addition to basic service facilities, service areas have also attracted various types of businesses to move in and provide a richer and more diverse range of goods and

services. The openness of this business model not only increases the economic vitality of the service area, but also provides travellers with more choices and convenience.

## 3.3 Open Attributes of Open Service Areas

The openness attributes of an open service area are mainly reflected in the following aspects:

## **Openness of Service Recipients.**

Open service areas face a wide range of service objects, including not only passing expressway users, such as long-distance drivers, passengers, etc. Due to the opening of the traffic between it and the surrounding area, expressway passers-by can go to the surrounding area through the service area, and the service area can also actively absorb the residents of the surrounding area, local road tourists and other groups. The diversity of service objects makes the service area able to meet the needs of different groups of people and provide diversified service content.

#### **Opening of Service Functions.**

The open service area provides diversified service programmes. In addition to the traditional basic services such as refuelling, catering, accommodation, etc., it also expands rich service contents such as shopping, leisure and entertainment, and cultural experience. The diversified service mode makes the service area no longer just a simple resting place, but a comprehensive service centre integrating various functions to meet the diversified needs of different passengers.

#### Business Sharing.

Open service areas are no longer isolated facilities, but organisms integrated into local development. By tapping and making use of local characteristic resources, such as agricultural products and handicrafts, and establishing cooperative relationships with enterprises and farmers in neighbouring areas, commodities and services with local characteristics are introduced, and the characteristic resources of neighbouring areas are displayed for sale and advertised for promotion within the service areas, thus enriching the content of the services and improving the quality of the services. For example, the Fuyang Service Area of the Hangzhou Western Bypass is the first "open service area + idyllic complex" demonstration project in China. Fuyang service area is the country's first "open service area + idyllic complex" demonstration project, the planning of a romantic tea garden, ecological agriculture, residential holiday three plates, will be built to set the leisure resort, idyllic agricultural tourism, research and development, wedding photography and other functions in one of the residential holiday destination. Services relying on the local Chunjian tea ecological resources and traffic advantages, to create an open channel for the convenience of nearby villagers to come in to consume, expressway travellers can also go out to visit the beautiful countryside, taste the "Tea Banquet", to achieve high-speed and local business sharing, drive the sustainable development of the region's economy.

#### Logistics sharing.

Make full use of the geographical advantages and resource conditions of the service area, and use the service area as an important platform for logistics resource sharing and synergy. The service area is located along the expressway, with convenient traffic and easy access for vehicles, which has the advantages of speed and convenience, and can greatly improve the efficiency and speed of logistics transport; meanwhile, the service area has sufficient site resources and perfect functional facilities, which can achieve the optimal allocation and efficient use of logistics resources. For example, the new line of Rongwu Expressway Xiongan North Service Area, Xiongan North Service Area, as the largest unilateral footprint in Hebei Province, the most complete internal function of the open service area, through the opening of the service area organically connects the motorway with the towns along the route. Give full play to the unique advantages of the open service area, the use of service area large car square, ramp circle and expressway under the bridge space and other idle resources, to create an open, efficient warehousing and logistics centre, can effectively shorten the logistics time, reduce the cost of social logistics, so that the regional transport of goods is more convenient and economical.

#### Openness of the Layout Form.

The open service area of the motorway shows remarkable openness in the spatial layout, which is most intuitively manifested in the design of the service area's entrances and exits. The service area is not only equipped with main entrances and exits for mainline vehicles, but also has planned entrances and exits connected with local roads. These additional entrances and exits provide local residents with convenient access to the service area, and at the same time provide convenience for expressway users, enhancing the flexibility and functionality of the service area. In addition, on the basis of drawing on the advantages of the layout of the basic functional areas of the traditional service area, the open service area of the motorway has increased the spatial planning of the shared area, which not only enhances the use efficiency of the service area, but also promotes the integration and interaction between the service area and the local community, and realises the sharing of resources and the maximised use of services.

#### Openness of the Management Model.

Open service areas adopt a more flexible and open management model. In addition to the traditional self-management mode, the "outsourcing + supervision" mode has been introduced to attract more social capital to participate in the construction and management of service areas. This open business model not only reduces the operating cost of the service area, but also improves the service quality and efficiency. At the same time, the service area also actively cooperates with neighbouring enterprises to jointly develop special products and services, so as to achieve resource sharing and mutual benefit and win-win situation. At the same time, the open service area focuses on the people-oriented management concept and pays attention to passengers' needs and experiences. Through regular surveys and collection of feedback, the service area understands the needs and opinions of travellers, and continuously improves service quality

and enhances traveller satisfaction.

# 4 Thematic Positioning Strategies for Service Areas Based on Open Attributes

### 4.1 Integration of Local Characteristics and Culture

Due to the diversity of the service object of the open service area, both expressway users, but also residents of the surrounding areas, local road tourists and other customer groups, in order to fully demonstrate the promotion of regional characteristics, the theme of the service area should be positioned in close conjunction with the local culture and characteristics of the service area, through the incorporation of regional elements, history and culture, natural landscape and so on, to create a unique service area style. It can not only enhance the cultural connotation of the service area and attract tourists to stop by, but also promote the inheritance and development of local culture.

#### **Extraction of Historical and Cultural Elements.**

Historical relics and stories: Examine local historical relics, ancient buildings, legends and stories, etc., and extract representative elements, such as traditional architectural styles, historical stories, etc., for use in the architectural design of the service area, the creation of landscapes, and the display of culture. Intangible cultural heritage: Focus on local intangible cultural heritage, such as traditional handicrafts, folk music, dance, theatre, etc. These elements can be used as an important part of the cultural display and folklore experience in the service area.

#### **Extraction of Natural and Environmental Elements.**

Natural landscape: study the local natural landscape such as mountains, rivers, vegetation features, etc., and extract representative elements, such as characteristic plants, topography and geomorphology, etc., to be used in the greening landscape design and spatial layout of the service area. Regional colours and materials: analyse local regional colours and common building materials, such as locally unique stone and wood, and incorporate them into the architectural and decorative design of the service area to reflect the regional characteristics.

#### **Extraction of Social and Customary Elements.**

Folk customs: Understand local folk customs, traditional festivals, marriage and funeral customs, and extract representative elements, such as costumes, food, festivals, etc., for the design of cultural display and folk experience area in the service area. Local speciality products: Examine local speciality agricultural products, handicrafts, etc., and introduce them into the commercial business of the service area, which not only meets the shopping needs of tourists, but also demonstrates the local cultural characteristics.

## Comprehensive Refinement and Creative Integration.

Synthesis of elements: Synthesise the historical, natural and social elements extracted above to form cultural symbols and images with local characteristics. Creative fusion: On the basis of maintaining local characteristics, combining modern design concepts and technical means, creative fusion is carried out to create a unique theme of the service area. Through in-depth research and excavation of local characteristics and cultural elements, combined with the functional needs and market positioning of the service area, a theme with uniqueness and attractiveness can be refined to provide strong support for the planning and design of the service area.

## 4.2 Functionality and Practicality

For service areas with open attributes, the service functions need to meet more diversified needs, and their thematic positioning should not only focus on regional characteristics and cultural connotations, but also give full consideration to their practicality and functionality. The service area should provide all kinds of facilities and services to meet the needs of tourists, such as catering, accommodation, rest, shopping, etc., to ensure that tourists can get convenient services while enjoying the cultural experience. From a functional point of view, the theme of the service area needs to cover a variety of services required by travellers in the travel process. It includes basic service functions such as parking, refuelling, catering, rest and information consultation, and also includes shopping, leisure and entertainment, cultural experience and other rich expanded service functions. Practicality requires that the facilities and services in the service area not only meet the needs of travellers, but also be easy to use and easy to operate. Combine functionality and practicality, refine and deepen the theme of the service area, and emphasise the features and characteristics of the service area's functions and services through the theme.

#### 4.3 Market Demand and Consumer Preferences

The theme positioning of the service area should pay close attention to market demand and consumer preferences, and through market research and analysis, understand the needs and expectations of tourists, so as to determine the appropriate theme positioning. This will help enhance the market competitiveness of the service area and attract more tourists to experience it. Expressway service areas based on open attributes require a detailed study of the traffic flow, vehicle types, and traveller composition in the area where the service area is located. Combined with the needs and preferences of customer groups such as expressway users, local residents and local road tourists, the target market of the service area can be initially determined. Through questionnaires and interviews, the expectations and needs of the target market for service area facilities, services, commodities, etc. are understood. Conceptualise the theme of the service area based on the results of the market research and consumer preference study. The theme should be able to meet the market demand as well as reflect the characteristics of the service area.

## 4.4 Innovative and Forward-Looking

Innovative and forward-looking service area theme is an important direction for the development of modern service areas, especially important for service areas with open attributes, and is the key for service areas to stand out in the fierce competition in the market. Innovation and foresight, on the other hand, are important guides for service area theme design. When determining the theme of a service area with open attributes, it is important to avoid uniform theme positioning and introduce new elements and concepts to create unique theme features. At the same time, the future development trend and market changes should be fully considered, and elements such as intelligence, environmental protection and sustainable development should be incorporated to ensure that the service area can still maintain its competitiveness and attractiveness in the coming period.

#### 5 Case Validation

## 5.1 Project Overview

Qionglai City is located in the southwest of the Chengdu Plain, located in Chengdu City, "half an hour economic circle", 65 kilometres from the main city of Chengdu, the Tianfu New Area of Chengdu, about 33 kilometres, the north and Danyi County adjacent to the east of Xinjin District, Meishan City, Pengshan District, the west and Ya'an City, Yucheng District, Lushan County, the south and Pujiang County, Ya'an City, Mingshan District is connected to the important transport hub in western Sichuan Province, the city of Qionglai. an important transport hub in western Sichuan. Wenjun service area is located in Qionglai City, Qionglai high-speed Qionglai City, K37 + 104.730, set up on both sides of the north and south, of which, the south side of the service area is set up separately, the north side of the service area and the toll station set up in combination. Service area adjacent to Qionglai City District Industrial Park, adjacent to State Road 318, about 2 km from Qionglai City, location development advantages, set up as an open service area, not only for expressway passengers to provide services, but also can serve the local economic development.

#### 5.2 Mining of Geographical Features

Tap into the regional characteristics of Qionglai City, covering history and culture, tourism resources, folk customs, food specialities and other aspects, and extract the cultural characteristics of which have a strong relevance to the Wenjun service area. Qiong wine culture: Qionglai Qiong wine has a long history. It has been recorded in the Records of the Grand Historian and the Book of Han. With the passage of time, Qiong wine has gradually become a representative of China's strong-flavoured liquor, known as "the mother of China's strong-flavoured liquor". Qionglai area was awarded the title of "China's largest liquor base", many liquor companies across the country use Qiong wine as the base wine. Wenjun Culture: Qionglai's culture of Wenjun has a long history and is inextricably linked to its role as the hometown of Zhuo Wenjun, a talented

woman of the Western Han Dynasty. Zhuo Wenjun is famous for her talent and love story, which has become an important part of Qionglai's unique culture. The former residence of Wenium around the project is also an important carrier of Wenium culture. Wenjun Well and Gouweng Pavilion, where Zhuo Wenjun and Sima Xiangru used to shop and sell wine, have become a place where tourists come and go. Black tea culture: Qionglai black tea history can be traced back to 903 A.D., China's first Qionglai black tea products "fire cake" was born in Qionglai. Since then, the Song Dynasty, the coarse stem tea "West Fan tea" (horse tea) also began in Qionglai. To the Qing Dynasty, Qionglai black tea reputation, become one of the three major sources of tea in Sichuan, known as the "Qiongzhou side of the lead". Qiong kiln culture: Qiong kiln culture is an important part of ancient Chinese ceramic culture, Qiong kiln was created in the Eastern Jin Dynasty, mature in the Southern Dynasties, flourished in the Tang Dynasty, after more than eight centuries, is the birthplace of China's painted porcelain. Qionglai also has Heshan Academy as the representative of the school culture, bamboo hemp horn as an important part of the papermaking culture, national intangible cultural heritage of Qionglai bamboo weaving culture.

#### 5.3 Matching Functional Requirements

Wenjun Service Area is located near Qionglai City, the service area and its elements affecting regional traffic and socio-economics are shown in the following table1.

Table 1. Wenjun Service Area elements affecting regional traffic and socio-economics

Geo-humanitar- ian basis	Qionglai City is rich in tourism resources, including Tiantai Mountain,     Zhuxi Lake, Sui and Tang Dynasty Tile Kiln Ruins and Pingle Ancient     Town.     Wenjun well is located in Qionglai City, Qionglai Town, Liren Street, according to legend, for Sima Xiangru and Zhuo Wenjun shop to sell wine.     Qionglai City is "China's largest original liquor base", Qionglai wine is     Qionglai City speciality, China's national geographical indications products.
Transportation development	<ol> <li>Located in the south of Qionglai City, only about 2 km from the centre of the city.</li> <li>Located at the location of Tianqiong Expressway exit, it is the gateway node into the city and other scenic spots.</li> <li>The location is connected to the G318 line, which is known as the "Chinese landscape road".</li> </ol>
Industrial eco- nomic develop- ment	The service area is adjacent to China Wine Village and Baijiu Industrial Park.     Close to the important material distribution centre in western Sichuan - Tianfu New District Qionglai Industrial Park and Logistics Park.

Combined with the characteristics of the functional influencing factors of the Wenjun service area and the actual development, under the premise of opening up the external traffic, the service area needs to be equipped with basic functions, including parking, refuelling, automobile maintenance, charging piles, toilets, and other traditional

services, and at the same time, add commercial and leisure services and cultural experience functions, and open up the service area to the community to satisfy the community's daily needs for catering, shopping and other daily necessities.

#### 5.4 Market Preference Research

Wenjun service area is surrounded by relatively rich tourism and cultural resources, rich tourism resources for the service area to provide a good tourism atmosphere and customer flow. Combined with the analysis of visitor profiling, the service area's future main market segments are composed of Chengdu car theme enthusiasts, 318 self-driving tourists and other tourists from neighbouring cities. At the same time, the characteristics of tourists are mainly young and middle-aged, with family trips as the main mode of travel and strong consumption ability; focusing on the convenience of transportation, the quality of scenic spots and the demand for theme park-type projects; and the demand for tourism presents personalisation, emotionality and thematisation.

#### 5.5 Thematic Orientation Determination

Combined with regional characteristics, functional needs and market preferences, implant innovative ideas to determine the theme of Wenjun service area. Qiong wine, Wenjun culture and other elements transplanted to the service area, combined with the service area is located in the edge of the core area of the ancient city of Lingiong location advantages, refining the service area cultural theme: "Tianfu Sanli San" Super Service Area. Designed to take the meaning of "three miles three" combined with modern shaping of new landmarks, to create the Tiangiong service area "Tianfu three miles three" Super IP. three meals a day, three flavours is the people of the ancient city of Lingiong life scene portrayal of the Lingiong literati often gather on the third of March in the water, goblet to take the lead! The "Sanli San" is a super IP of the city. "Three miles three" is not only the characteristics of Qionglai ancient city culture, but also Qionglai Academy culture, celebrity culture, market culture of the space carrier, showing Qionglai people on the scene of life's beautiful aspirations. The service area is this culture and life situation as a guide, to create "Tianfu Sanli San" super IP, so that the service area stops through the fun and happy leisure experience, extend the service area customers stay time, enhance the service area of the rate of entry and consumption rate. According to the Lingiong "since ancient times called prosperous, especially the brewing of wine to win its name" Qiong wine story, the local customs and ecological economy to form a three major concepts and design themes. Create a blend of Wenjun (love) culture, Qiong wine culture of immersive experience space, to create the first gateway to Qionglai City, the theme of the first gateway service area.

#### 6 Conclusions and Outlook

The research on theme positioning of expressway service areas based on open attributes has important theoretical value and practical significance. Through reasonable theme

positioning, it can not only improve the overall image and service quality of the service area, but also promote the development of the local economy and the dissemination of culture. In the future, further in-depth research on the functional expansion and cultural integration of service areas is needed to provide more comprehensive and in-depth guidance for the development of service areas.

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