

# Cultural Gene Translation: Semiotic Practice of Regional Elements in High-Speed Rail Interior Design

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**Abstract:** This paper explores the semiotic application of regional cultural elements in high-speed rail interior design, focusing on the application and challenges of cultural gene translation in design. As a modern means of transportation, high-speed rail interior design not only fulfills functional requirements but also serves as a crucial vehicle for cultural expression and emotional transmission. Drawing on a semiotic theoretical framework, this paper explores the process of cultural gene translation and reconstruction in high-speed rail interior design, emphasizing the selection, deconstruction, and innovation of regional cultural elements. By analyzing regional cultural symbols in high-speed rail design both domestically and internationally, this paper proposes modern strategies for the translation of cultural symbols and explores the balance between a sense of place and a global perspective in design. Furthermore, this paper explores challenges facing high-speed rail interior design, such as the misunderstanding and misuse of cultural symbols, the conflict between regional elements and modern design, and how to achieve the transmission of regional cultural identity in a globalized context. Finally, this paper explores future directions for cultural gene translation in high-speed rail interior design, particularly the integration of diverse cultures, technological innovation, and cultural heritage.

**Keywords:** Cultural DNA translation; Regional elements; High-speed rail interior design; Semiotics; Cultural symbols; Design innovation; Globalization

## 1 INTRODUCTION

High-speed rail, a representative form of modern transportation, has experienced rapid global development in recent years. As a vital mode of public transportation, high-speed rail not only provides rapid transportation but has also become a platform for cultural exchange and social interaction. With the continuous expansion of the high-speed rail network, striking a balance between high speed and comfort, and incorporating more cultural elements into the limited space of trains, have become key concerns for designers and researchers [1]. In this process, high-speed rail interior design, particularly the incorporation of regional cultural elements, has gradually taken a new direction—not only optimizing spatial functionality but also deeply reflecting cultural identity and emotional connection. How to transform local culture and symbolic language into the unique cultural “DNA” of high-speed rail through interior design has become a topic worthy of in-depth research [2].

In the field of public transportation design, the incorporation of cultural elements is often a key means of enhancing the user experience. Design no longer simply meets basic functional

requirements; it also carries the mission of cultural communication and identification. Especially for high-speed rail, a transportation vehicle with such widespread social influence, how to effectively translate regional cultural elements through semiotics and integrate them into train interior design without sacrificing modernity and comfort has become a crucial issue in contemporary design. Regional culture is more than just a continuation of historical heritage. It symbolizes local characteristics and folk customs and serves as an emotional connection in modern society [3]. Therefore, translating these elements into a symbolic system within high-speed rail interior design, creating visually recognizable cultural symbols, presents a challenge for designers.

This study aims to explore how regional cultural elements can be translated semiotically in high-speed rail interior design, and to identify cultural design approaches that meet the needs of modern high-speed rail. Specifically, this paper examines the concept of cultural gene translation and how regional cultural elements can be transformed into practical symbols within high-speed rail interior design through semiotic methods. Cultural gene translation is not only a reinvention of traditional cultural symbols but also a modern interpretation and innovation of local culture within a modern design context [4]. Through a semiotic analysis of high-speed rail interior design, this paper explores how regional cultural elements convey unique cultural messages through design techniques such as form, color, and materiality, thereby enhancing the cultural experience value of high-speed rail beyond its role as a means of transportation.

This study is significant in filling the current academic gap in the relationship between regional cultural elements and high-speed rail interior design. While existing research on high-speed rail design has focused extensively on design functionality and aesthetics, there is a paucity of research on how to express regional culture through language design and how to innovatively apply cultural symbols within a modern design context. By introducing semiotics theory, this article not only provides cultural guidance for high-speed rail interior design but also promotes the application of design theory in public transportation, providing theoretical support and practical experience for future high-speed rail interior design.

## 2 THEORETICAL FRAMEWORK

Semiotics, the study of symbols and their meaning, was first established by scholars such as Ferdinand de Saussure and Charles Sanders Peirce and has gradually developed into a multidisciplinary theoretical framework. Semiotics not only focuses on the structure and use of symbols but also examines the relationship between symbols, culture, and society. In the field of design, semiotics is widely applied to interpret the meaning and function of design elements, revealing the cultural context of design language and its social symbolic effects [5]. In high-speed rail interior design, semiotics provides an effective framework, enabling designers to achieve deep interaction between space, culture, and users through the translation and creation of symbols [6]. Design is not only a combination of function and aesthetics; it is also a form of symbolic expression, conveying and communicating cultural connotations through design symbols. Therefore, the application of semiotics in design not only helps to enhance the cultural depth of design but also promotes the innovation and diversification of design language.

Cultural gene translation is an interdisciplinary concept derived from the theory of gene translation in biology. It refers to the transformation of cultural characteristics into symbolic

systems with new meanings through design. In the design field, the core of cultural meme translation lies in extracting elements with core value and meaning from a culture's original symbols and recreating and expressing them in a modern way [7]. Cultural memes refer to more than just traditional symbols or patterns; they more deeply represent the spirit and emotions of a culture [8]. Therefore, the translation process must consider not only formal changes but also the transmission of cultural connotations. In high-speed rail interior design, cultural meme translation manifests itself by recoding regional cultural symbols through modern design languages (Such as materials, forms, and colors) to create a spatial atmosphere with local characteristics [9]. In this way, high-speed rail is not only a means of transportation but also a vehicle for cultural dissemination, providing users with unique regional cultural experiences in the context of globalization.

Regional cultural elements are rich in content, encompassing history, customs, art, language, and other aspects. Every region possesses its own unique cultural memes, which are expressed through language, landscape, architecture, clothing, and other means, becoming symbols of local identity and individuality. The uniqueness of regional cultural elements makes them an essential element in high-speed rail interior design. From a semiotic perspective, regional cultural symbols are not only visually recognizable but also evoke emotional identification and psychological responses within a specific cultural context [10]. Regional cultural symbols are often conveyed through elements such as images, patterns, colors, and materials, embedding them within space through design language. For example, traditional Chinese patterns, distinctive architectural styles, and even expressions in local languages can all be imbued with new symbolic meaning through the translation of design elements, becoming an important bridge for passengers to perceive culture.

In high-speed rail interior design, the use of regional cultural elements must consider not only the visual presentation of the symbols but also how these elements can be integrated with functionality and comfort within modern spaces to create a cultural experience that resonates with passengers' emotional needs. The use of regional cultural symbols is not merely a formal presentation; it is also a transmission and re-creation of cultural connotations. This process requires designers not only to possess profound cultural insight but also to employ semiotic methods to organically integrate these traditional cultural symbols with modern design language, creating high-speed rail interior designs that are both modern and imbued with cultural significance.

### 3 CULTURAL BACKGROUND OF HIGH-SPEED RAIL INTERIOR DESIGN

The historical evolution of high-speed rail interior design is closely tied to the development of high-speed rail itself. From its initial simple, functional layout to today's highly integrated, modern design, interior design has gradually evolved from pragmatism to a more humanistic and artistic approach. The origins of high-speed rail interior design can be traced back to the 1960s. At that time, design focused primarily on improving transportation efficiency and comfort, with carriage interiors often adopting a simple, functional layout. With advancements in high-speed rail technology and increases in speed, interior design has gradually focused on passenger comfort, visual experience, and the creation of a cultural atmosphere. Especially since the 21st century, as high-speed rail has become a key symbol of modern urbanization, interior design has moved beyond simple functional requirements to incorporate more humanistic and artistic elements, becoming a vehicle for conveying regional culture and history.

High-speed rail interior design in different countries exhibits significant differences. These

differences are reflected not only in terms of technology and functionality, but also in the diverse understandings and demands of public space design within different cultures. Take Japan's Shinkansen and China's high-speed rail as examples. Japanese high-speed rail interior design places great emphasis on detail and comfort, embracing minimalist and refined design styles, with an emphasis on natural and environmentally friendly materials, in line with the cultural concepts of harmony and tranquility. Chinese high-speed rail interior design, on the other hand, emphasizes modernity and innovation, featuring diverse styles. Beyond comfort and high technology, it also strives to showcase China's rich history and culture through visual elements. From carriage layout and material selection to color palette and decorative elements, traditional Chinese cultural symbols, such as Peking Opera masks and traditional dragon patterns, are incorporated. These designs are more than just decorative; through symbolic interpretation, they allow passengers to experience a rich cultural heritage and a sense of belonging during their journey.

As high-speed rail becomes a vital component of the global transportation system, incorporating regional culture into its interior design has become a crucial topic in the design field. Regional culture is expressed in a variety of ways, and designers, drawing on a deep understanding of local history, art, and customs, can translate these cultural elements into concrete design language. For example, in China, regional cultural symbols are often translated through traditional patterns, colors, and symbolic objects, such as the blue and white color scheme of blue-and-white porcelain, elements of embroidery, and even natural landscapes from landscape paintings. These designs not only showcase local characteristics but also allow passengers to experience a rich cultural atmosphere while enjoying the convenience of high-speed rail. In contrast, in some European countries, the integration of regional cultural elements is often more concise, focusing on interpreting local cultural symbols through modern design language. For example, the delicate lines and design elements that symbolize freedom and elegance are common in French high-speed rail design.

The integration of culture and function is one of the core challenges of high-speed rail interior design. Beyond the basic functional requirements of speed, comfort, and safety, designers must consider how to effectively convey regional culture through design, allowing passengers to experience the cultural essence of different places in a short journey. Every detail of the interior, including the seat layout, the choice of materials, the lighting design, and even the patterns on the seatbacks and curtains, can contain rich regional cultural information. During this process, designers must not only ensure the accurate translation of cultural symbols but also balance the practicality and modernity of the space, ensuring that high-speed rail interior design conveys culture while remaining functional and aesthetically pleasing.

In terms of regional cultural expression in high-speed rail interior design both domestically and internationally, China's high-speed rail is particularly prominent. Chinese high-speed rail design emphasizes the integration of traditional cultural symbols with modern design language, reflecting both the preservation of traditional culture and a vision for the future. For example, various Chinese high-speed rail models are often personalized based on the characteristics of different regions, reflecting local customs and folklore. In contrast, high-speed rail interior design abroad emphasizes simplicity and functionality, incorporating cultural elements through abstraction and symbolism, often employing simplified symbols of

local characteristics. These symbols may be abstract representations of natural landscapes or symbolic motifs of historical and cultural heritage. In this way, while foreign high-speed rail design retains certain local characteristics, it places greater emphasis on cultural universality and sharing within the context of globalization. Therefore, the differences in regional cultural expression between domestic and international high-speed rail interior design reflect not only differences in design style but also a diverse collision and fusion of cultural backgrounds, social needs, and technological capabilities.

#### **4 SEMIOTIC PRACTICE OF REGIONAL CULTURAL ELEMENTS IN HIGH-SPEED RAIL INTERIOR DESIGN**

Design language from a semiotic perspective is a crucial component of high-speed rail interior design, particularly when translating regional cultural elements. With visual symbols, language design not only conveys functional information but also carries deeper cultural meaning. Visual symbols include elements such as shape, color, and material. They not only have physical functions but also evoke associations and identities with specific cultures. For example, geometric shapes such as circles and straight lines used in design not only influence the layout and flow of a space but may also represent harmony, perfection, or power within a particular culture. Color plays a particularly significant role in design, not only aesthetically pleasing but also carrying metaphorical meaning within cultural symbols. In traditional Chinese culture, red represents joy and good fortune, blue is often associated with freshness and tranquility, and green symbolizes nature and vitality. The use of these colors in high-speed rail interior design not only makes the space more visually appealing but also allows passengers to feel an emotional connection with local culture. The choice of materials is also imbued with symbolism. For example, wood is often associated with nature, warmth, and tradition, while metal or glass represents modernity and the future. By establishing this symbolic system, high-speed rail interior design achieves multi-dimensional expression, from functional to cultural.

The translation and re-creation of cultural symbols is a key innovative practice in high-speed rail interior design. Traditional cultural symbols often exist in a fixed form, but in modern design, designers need to modernize these symbols, giving them new life in the context of the new era. This translation is more than a simple reproduction of traditional symbols; rather, it involves reinterpreting and imbuing them with new cultural connotations within a new design context. For example, the traditional Chinese dragon pattern does not appear in its original form in high-speed rail interiors, but is reconstructed through abstract lines and shapes, presenting it in a simple, modern way. At the same time, designers need to recreate and transcend these symbols based on modern aesthetics and comfort requirements, so that they can evoke passengers' emotional resonance with traditional culture while avoiding excessive indulgence in traditional limitations and adapting to the fast-paced lifestyle of modern times. This translation and re-creation of cultural symbols gives high-speed rail interiors a modern feel while also conveying a strong cultural atmosphere.

Specifically, case studies can help us better understand the practical application of regional cultural elements in high-speed rail interior design. For example, the interior design of Beijing's



high-speed rail and subway trains fully embodies the integration of regional elements. Beijing boasts a rich history and culture, so designers have incorporated traditional Beijing elements, such as architectural elements from the Forbidden City, patterns from Peking Opera masks, and decorative symbols from ancient palaces, to convey the city's sense of history and imperial aura. These elements have been abstracted and simplified through modern design techniques, preserving their cultural connotations while also meeting the comfort and modernity requirements of high-speed rail interiors. The interior design of Beijing's high-speed rail trains is not only about functional spaces but also about the visual expression of cultural symbols, allowing passengers to experience the cultural heritage of Beijing, a city where history and modernity intertwine.

The Changsha high-speed rail's interpretation of Hunan cultural symbols demonstrates another approach to symbolic processing of regional culture. Hunan culture, a vital part of traditional Chinese culture, possesses distinct local characteristics, particularly through the unique use of red and landscapes. In the Changsha high-speed rail design, designers skillfully incorporate regional elements, such as Hunan embroidery patterns and the ripples of the Xiang River, into the carriage interiors. Through modern interpretations of these traditional elements, the unique charm of Hunan culture is showcased while maintaining the modernity and comfort required of high-speed rail interiors. For example, the delicate patterns of Hunan embroidery are transformed into wall decorations within the carriages, while elements of landscape painting are abstracted into simple lines and blocks of color. This approach preserves the symbolism of Hunan culture while also aligning with the fast-paced demands of modern travel.

Shanghai's high-speed rail design cleverly expresses the symbols of Jiangnan culture. Jiangnan culture is renowned for its water towns, gardens, and exquisite craftsmanship. Designers have incorporated these symbols into the carriage design through elements of ink painting and garden landscapes. The water ripples, bamboo forest motifs, and the lush greenery of Jiangnan gardens in the Shanghai high-speed rail interiors are reimaged through modern design techniques, showcasing the gentle beauty and delicacy of Jiangnan while meeting the modern demands of high-speed rail. Through this interpretation of regional cultural symbols, the Shanghai high-speed rail interiors create a unique cultural atmosphere, allowing passengers to experience the rich cultural flavor of Jiangnan throughout their journey.

These examples demonstrate how regional cultural elements are translated and reimaged through the practice of semiotics in high-speed rail interior design. Whether it is the traditional symbols of Beijing, the Hunan culture of Changsha, or the Jiangnan style of Shanghai, through the clever use of design language, the high-speed rail is not only a means of transportation, but also a carrier of cultural exchange and transmission.

## 5 DESIGN METHODS AND STRATEGIES FOR CULTURAL GENE TRANSLATION

The design approach of cultural gene translation requires in-depth exploration and practice within the framework of semiotics. The selection and construction of symbols is crucial in this process. Symbols are more than simple combinations of patterns, forms, or colors; they carry specific cultural backgrounds and historical sentiments. Therefore, in high-speed rail

interior design, designers must carefully select and construct appropriate symbol systems based on the characteristics of regional culture. This process requires understanding the deeper meanings of different symbols and the cultural connotations they represent, so they can be appropriately applied in the design. For example, traditional crafts or natural landscapes of a particular region may be transformed into symbolic patterns. These symbols must not only be visually appealing but also evoke an emotional resonance in passengers with the region's culture. In the symbol selection process, designers must comprehensively consider cultural diversity and the universality of symbols, ensuring that the selected symbols adapt to modern aesthetic trends while retaining their cultural identity.

The deconstruction and reconstruction of cultural symbols is another crucial aspect of semiotic design. In modern high-speed rail interior design, traditional cultural symbols often require a reconstructive process before they can be re-expressed and recreated within the context of modern design language. Deconstruction involves more than just reworking the external form of a symbol; it involves reexamining and recreating the cultural connotations behind it. Through innovative deconstruction of traditional symbols, designers fuse historically rich cultural symbols with modern design concepts, creating symbols that are both historically and modernly relevant. For example, traditional architectural decorative patterns can be reconstructed through simplified lines and abstracted patterns, creating new symbols with contemporary aesthetic value. Through such deconstruction and reconstruction, traditional cultural symbols can transcend the limitations of time and space, align with modern design concepts, and breathe new life into high-speed rail interior design.

The innovative application of regional elements requires designers to maintain the uniqueness of regional cultural symbols while incorporating innovative modern design thinking. The core of this strategy lies in the modern examination and integration of regional cultural symbols. In high-speed rail interior design, designers must conduct a deep cultural interpretation of regional cultural symbols to ensure that the essence of the symbols is preserved while avoiding the rigidity and outdatedness of traditional symbols. For example, elements unique to a region, such as natural landscapes, folk crafts, and traditional colors, should not only showcase cultural uniqueness in design but also be innovated through modern materials and technologies to give them new vitality. Innovative regional cultural symbols not only allow passengers to experience a rich local cultural atmosphere but also demonstrate the designer's aesthetic and creative abilities in the context of globalization.

In high-speed rail interior design, balancing local and global sensibilities is a crucial issue. As a modern means of transportation, high-speed rail design must adapt to global demands while also ensuring the unique expression of regional culture. Designers need to organically integrate local characteristics with modern design requirements within the globalization trend. For example, through abstraction, regional cultural symbols can be expressed globally. This approach not only reflects the uniqueness of regional culture but also meets international aesthetic standards and functional requirements. This balance is reflected not only in visual design but also in the functional layout of the space, the use of materials, and the presentation of cultural symbols. In this way, high-speed rail becomes not only a means of transportation connecting different places but also a venue for the exchange and collision of different cultures.

Design strategies that enhance user experience are an essential component of cultural gene

translation design. High-speed rail interior design isn't just about meeting functional requirements; it also needs to enhance passengers' cultural identity through design. In this process, the incorporation of emotional design plays a crucial role. Emotional design not only focuses on passenger comfort but also stimulates emotional resonance through the transmission and interaction of cultural symbols. For example, by cleverly incorporating local symbols into train interiors, passengers can feel a connection to their hometown or cultural background during their brief journey, thereby strengthening their identification with that culture. This emotional connection not only enhances the passenger experience but also infuses high-speed rail interior design with cultural connotations and humanistic care.

The transmission and interaction of cultural symbols are key means of enhancing the user experience in high-speed rail interior design. Design should not only ensure that cultural symbols are visually appealing but also enhance their appeal and expressiveness through passenger interaction. For example, through interactive devices or digital media within the train carriages, passengers can gain a deeper understanding of the cultural background of the region where the high-speed rail is located, fostering a deeper perceptual connection with the local culture. Through these interactive designs, cultural symbols are vividly conveyed through passengers' cognition and emotions, transforming design into more than just superficial decoration, becoming a bridge for cultural exchange and emotional experience.

Through design methods and strategies based on a semiotic perspective, the cultural DNA of regional elements is fully reflected in high-speed rail interior design. This not only showcases the unique charm of local culture, but also meets the needs of modern design, providing passengers with a travel experience with greater cultural depth and emotional value.

## **6 CHALLENGES AND FUTURE DEVELOPMENT OF CULTURAL GENE TRANSLATION IN HIGH-SPEED RAIL INTERIOR DESIGN**

High-speed rail interior design faces numerous challenges in the practice of cultural gene translation. First, misunderstanding and misuse of cultural symbols are common issues in the design process. Due to the diversity and complexity of regional cultural symbols, designers may sometimes misunderstand these symbols or, to cater to market demands, oversimplify or distort their true meaning. When regional elements are over-commercialized or misused, they can lose their original cultural value and even become empty decorative symbols. For example, iconic symbols of certain local cultures may appear superficial and formulaic due to a lack of in-depth cultural understanding. Such designs not only fail to convey authentic cultural significance but may also cause misunderstanding and resentment among local cultural groups. The misuse of cultural symbols in design directly impacts the cultural depth and artistic value of high-speed rail interior design and further alienates the relationship between design and culture.

Furthermore, the conflict between regional elements and modern design is a significant challenge. Modern high-speed rail interior design pursues a design philosophy of simplicity, high functionality, and contemporary aesthetics, while traditional regional cultural elements often possess distinct local characteristics and are more complex in form and structure. When translating regional cultural elements into high-speed rail interiors, designers face the



challenge of avoiding formal conflicts while maintaining the uniqueness of cultural symbols. For example, some traditional cultural elements are heavily decorative, which clashes with the simplicity and practicality emphasized by modern design. Presenting these cultural elements in a way that aligns with modern aesthetics and finding the right balance within the design is a key challenge in high-speed rail interior design. Designers need to continuously explore ways to modernize traditional cultural symbols so that they reflect the unique characteristics of regional culture while retaining the functionality and aesthetics of modern design.

Another challenge lies in balancing regional cultural identity within high-speed rail interior design. High-speed rail is a global means of transportation that needs to adapt to the cultural needs of different regions and countries. However, in this globalized world, how to preserve and convey the uniqueness of local culture while ensuring passengers feel comfortable and connected in this cross-cultural environment presents a design challenge. Overemphasizing regional elements can make the design appear too localized, making it difficult to adapt to the needs of passengers in different regions; while over-emphasizing regional cultural elements can make the design lose its cultural roots and emotional resonance. Therefore, finding a balance between globalization and localization—respecting the uniqueness of regional cultures while meeting the needs of passengers from diverse cultural backgrounds—is a long-term challenge in high-speed rail interior design.

Despite numerous challenges, the future of cultural translation in high-speed rail interior design remains promising. With increasing globalization and cultural diversity, high-speed rail interior design will gradually move towards a multicultural integration approach. In future designs, interaction and exchange between different regions and cultures will become the norm. Designers will place greater emphasis on integrating diverse cultural symbols, enriching the design language of high-speed rail interiors through a multicultural fusion. This integration will be reflected not only in diverse decorative styles but also in spatial layout, material selection, and color palettes. Through cultural integration within a global perspective, designers can create high-speed rail interiors that both reflect local cultural characteristics and conform to international aesthetics, thereby providing passengers around the world with a richer cultural experience.

With the continuous advancement of technology, the integration of technological innovation and cultural elements will become a key direction in future high-speed rail interior design. Modern technologies, such as augmented reality (AR), virtual reality (VR), and digital design tools, will provide designers with more ways to express regional cultures. Designers can use interactive screens, smart devices, and virtual displays to present regional cultural elements to passengers in a more vivid and interactive way. This fusion of technology and culture not only makes high-speed rail interior design more modern but also provides passengers with a more immersive cultural experience. For example, through digital projection, passengers can see cultural stories and historical background related to their region within the carriage, enhancing their understanding and identification with the culture.

The dual approach of cultural heritage and innovative design will also be the future development trend of high-speed rail interior design. High-speed rail interior design not only bears the responsibility of conveying regional culture but also requires infusing new creativity into the process of innovation. Designers need to seek innovative design methods while

respecting traditional culture, so that traditional culture can be revitalized in a modern environment. This combination of heritage and innovation will ensure that high-speed rail interior design not only has a profound cultural heritage but also a sense of the times and is forward-looking.

In short, while cultural translation in high-speed rail interior design faces challenges such as cultural misunderstandings and conflicts between regional elements and modern design, with the continuous development of design concepts, innovative technological approaches, and the diversification of cultural identities, future high-speed rail interior design will find a better balance between multicultural integration, the fusion of technology and culture, and cultural heritage and innovation. High-speed rail interior design will become more than just a decorative element of transportation space; it will also symbolize global cultural exchange and the coexistence of diverse cultures.

## 7 CONCLUSION

This in-depth study of the semiotic application of regional cultural elements in high-speed rail interior design yields several key findings. First, the application of semiotics in design offers a novel means of cultural expression for high-speed rail interior design. By selecting and translating regional cultural symbols, design can convey not only functional information but also deeper cultural meaning. High-speed rail interior design is not merely a physical spatial layout; it is also a vehicle for cultural exchange. Through the expression of design language, regional elements are presented, strengthening passengers' cultural identity and emotional resonance. Second, the translation of regional cultural elements is a complex process, requiring both preserving the core cultural essence and meeting the aesthetic and practical requirements of modern design. This process involves more than a simple reproduction of cultural symbols; rather, it involves deconstructing, reconstructing, and innovating them, imbuing traditional elements with new vitality.

Based on this research, the proposed theory of cultural gene translation offers significant theoretical contributions and practical guidance for high-speed rail interior design. This study theoretically sheds light on the concept of cultural gene translation and provides an in-depth analysis of the translation and re-creation of cultural symbols within a semiotic framework. By analyzing the characteristics and translation strategies of different regional cultural symbols, this study provides designers with a new perspective for understanding and applying regional elements, helping them achieve cultural transmission and innovation in high-speed rail interior design. On a practical level, this study offers specific design methods and strategies for high-speed rail interior design, particularly in the selection and construction of symbols, and the deconstruction and reconstruction of cultural symbols. These methods and strategies not only help designers better understand and utilize regional cultural symbols but also maintain cultural uniqueness and innovation within the context of modern design.

Future research will focus on the interdisciplinary application of cultural gene translation in design across diverse fields. With globalization and technological advancements, the boundaries of design language are becoming increasingly blurred, and cultural exchange and integration will become a key theme in design. Against this backdrop, future research could

further explore the cross-cultural translation of regional cultural symbols in a globalized context, as well as how to effectively transmit cultural symbols across diverse national and cultural contexts. Furthermore, with the continuous advancement of technology, the application of technologies such as virtual reality and augmented reality will provide new means of expression for cultural gene translation. Combining these emerging technologies with traditional cultural elements to create more immersive and interactive cultural experiences will be a key research direction.

In summary, this study, through its exploration of the semiotic translation of regional cultural elements, deepens our understanding of cultural expression in high-speed rail interior design, proposes a concrete theoretical framework and practical strategies, and provides valuable insights for future design research and innovation. With technological advancements and deepening globalization, the concept of cultural gene translation will be applied to a wider range of design fields, becoming a powerful tool for cultural exchange and innovation.

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