DOI: 10.53469/jgebf.2026.08(05).06

# Optimization of AI-Empowered Cross-Cultural Communication in the Hainan Free Trade Port

**Kun Qian**

School of Tourism and Wellness, University of Sanya, Sanya 572000, China

**Abstract:** ***Breakthroughs in artificial intelligence (AI), especially in machine translation, intelligent subtitling, AI-generated content (AIGC), and computer vision, have provided more efficient and accurate solutions for cross-cultural communication. As a major pilot zone for China's opening-up, the Hainan Free Trade Port urgently needs to use AI technologies to improve information transmission in government communication, cultural promotion, and smart governance. However, AI-enabled cross-cultural communication still faces challenges such as contextual misinterpretation, insufficient cultural adaptation, and inadequate data regulation, all of which affect the accuracy and effectiveness of communication. This study examines the application of AI in policy communication, cultural brand promotion, and smart city management. On the basis of case analysis, it proposes optimization pathways such as the construction of AI corpora, the improvement of intelligent translation, and data-visualization-based communication strategies. The findings indicate that AI-empowered cross-cultural communication has broad application prospects, but its technological adaptability still needs to be further enhanced so as to strengthen the influence of the Hainan Free Trade Port in the global communication system.***

**Keywords:** AI empowerment, Cross-cultural communication, Hainan Free Trade Port, Smart governance, Data visualization**.**

## 1. Introduction

### 1.1 Research Background and Significance

Against the background of deepening globalization, cross-cultural communication has become an important driving force for international exchange, economic cooperation, and cultural integration. The rapid development of artificial intelligence (hereafter AI), especially its progress in machine translation, intelligent subtitling, AI-generated content (AIGC), and computer vision, has provided more efficient tools for cross-cultural communication and human-machine communication [1]. As an important pilot zone for China's opening-up, the Hainan Free Trade Port needs to use AI technologies to optimize its capacity for information transmission in government communication, cultural promotion, and smart city development. At present, however, AI still faces a number of adaptive challenges in cross-cultural communication, including contextual misunderstanding, mistranslation of culture-loaded terms, and data bias; these issues make culturally responsive AI design particularly important [2]. It is therefore of practical significance to explore optimization pathways for AI-empowered cross-cultural communication and to improve its adaptability and effectiveness across different cultural contexts.

The Hainan Free Trade Port has already introduced AI technologies in several fields to enhance its capacity for cross-cultural communication.

For example, in cultural communication, AI has promoted the application of intelligent design technologies, making the international promotion of local cultural IP more targeted. In smart city management, AI-based visual analysis and drone inspection systems have improved urban governance capacity and helped communicate Hainan's smart-city governance experience internationally. These technologies may also help shape the geographical imagination of domestic and international audiences toward the Hainan Free Trade Port and strengthen the symbolic construction of Hainan as a participant in global governance [3]. These examples show that AI-empowered cross-cultural communication has broad development prospects, but its optimization still requires further exploration in order to ensure accuracy, cultural adaptability, and communicative influence in information dissemination.

### 1.2 Research Objectives and Questions

This study focuses on how artificial intelligence can optimize cross-cultural communication in the Hainan Free Trade Port. It analyzes the application of AI in government information dissemination, cultural brand promotion, and smart city management, and proposes optimization pathways through case analysis so as to strengthen Hainan's competitiveness in the global communication system.

### 1.3 Research Methods and Innovation

This study adopts a case-analysis approach. By selecting representative AI-empowered cases from the Hainan Free Trade Port, it examines the advantages and limitations of AI in machine translation, intelligent subtitling, AIGC, and computer vision, and offers a reasonable assessment of the practical effects of AI-enabled communication.

The innovation of this study lies in three aspects. First, it is grounded in real cases and emphasizes practical value, thereby ensuring the operability of its findings. Second, it examines AI-empowered cross-cultural communication from multiple dimensions, including technology, application, and cultural adaptability. Third, it proposes optimization pathways for implementing AI in cross-cultural communication, including the construction of AI corpora, the improvement of intelligent translation, and mechanisms for intelligent content review. These proposals can provide decision-making support for governments, enterprises, and research institutions in the Hainan Free Trade Port and contribute to the improvement and upgrading of its international communication system.

## 2. Literature Review and Theoretical Foundations

### 2.1 Current Research on Cross-Cultural Communication

Research on cross-cultural communication focuses on the ways in which information is exchanged across different cultural backgrounds, involving multiple dimensions such as language, social cognition, and communication strategy. Major theories include high-context and low-context communication theory [4], pragmatics [5], cultural dimensions theory [6], and the theory of globalization and localization [7]. These theories provide important theoretical support for the application of artificial intelligence in cross-cultural communication. In recent years, scholars have paid increasing attention to cultural adaptation in social media, news communication, brand marketing, and policy communication. Existing studies suggest that digital media and AI technologies are changing the modes of cross-cultural communication and reshaping the ways in which global audiences receive, interpret, and affiliate with information [1][8]. Nevertheless, researchers also point out that AI remains inadequate in contextual adaptation, the understanding of culture-loaded terms, and the subtlety of information transmission, and therefore its cross-cultural communication capacity needs to be further optimized [2][9].

### 2.2 Current Research on AI in Cross-Cultural Communication

The application of artificial intelligence in cross-cultural communication is mainly concentrated in technological fields such as machine translation, speech recognition, intelligent subtitling, and text generation (AIGC). Neural machine translation (NMT) has made progress in improving fluency and contextual adaptability, but further optimization is still needed in terminology consistency and cultural adaptation. Speech recognition has been widely applied in conference interpreting, intelligent subtitles, and government communication. Some countries and institutions have already adopted AI-based speech recognition for multilingual policy interpretation in order to improve the efficiency of international communication [1]. In addition, AI-generated content (AIGC) is increasingly used in journalism, social media, and brand marketing, where it can “optimize content communication strategies and improve the adaptability of cross-cultural information” [10]. However, the application of AI in cross-cultural communication still faces challenges, especially in ethical governance, information authenticity, and cultural adaptability. These issues require further study and optimization to ensure the rationality and effectiveness of AI in cross-cultural communication.

### 2.3 Theoretical Framework

This study is based on cross-cultural communication theory, pragmatics, and globalization-localization theory. It also incorporates technical models such as natural language processing (NLP), machine learning, and computer vision to analyze the adaptability of AI in cross-cultural communication and its directions for optimization. Cultural adaptation theory and pragmatics provide theoretical foundations for AI translation and intelligent subtitling, while globalization-localization theory explains how AI-generated content (AIGC) can preserve local cultural features while participating in global communication [7]. Natural language processing (NLP) can be used to improve the contextual understanding of AI translation, machine learning and data analysis can support the intelligent optimization of communication strategies, and computer vision is widely used in intelligent subtitling, drone monitoring, and visualized cultural communication.

## 3. Technical Foundations and Limitations of AI-Empowered Communication

The rapid development of AI technology has promoted the intelligent transformation of cross-cultural communication. Important progress has been made in machine translation, speech recognition, intelligent subtitling, and AI-generated content (AIGC), making cross-linguistic communication more efficient and accurate. As an important national pilot zone for opening-up, the Hainan Free Trade Port is actively exploring how to use AI technologies to enhance the cross-cultural adaptability of government information dissemination, cultural brand promotion, and smart city development, thereby advancing its global communication strategy. Nevertheless, AI applications in cross-cultural communication still face challenges such as insufficient contextual adaptation, cultural misunderstanding, and data bias. How to optimize AI-empowered cross-cultural communication has therefore become an urgent research issue.

### 3.1 Core Technological Architecture of AI-Empowered Cross-Cultural Communication

The technical implementation of AI in cross-cultural communication mainly relies on core architectures such as natural language processing (NLP), computer vision, machine learning, and big-data analytics. Transformer-based architectures have also become an important technical foundation for contemporary AI translation and language generation [11].

3.1.1 Natural language processing (NLP):

Through neural networks and deep-learning algorithms, NLP improves the contextual understanding of AI translation, enhances the accuracy of terminology matching, and strengthens adaptability to culture-loaded terms and metaphorical expressions. In this way, it helps reduce mistranslation and improves the accuracy of cross-cultural communication.

3.1.2 Computer vision:

Computer vision is widely applied in intelligent subtitling, image recognition, and content understanding. For example, AI can analyze contextual information in video subtitles, improve the accuracy of subtitle generation, and optimize the cultural adaptation of visual content so that audiovisual communication better fits the cultural cognition patterns of target audiences.

3.1.3 Machine learning and big-data analytics:

By analyzing user behavior, language patterns, and communication content, AI can optimize cross-cultural communication strategies. For example, Netflix uses AI recommendation systems to analyze viewing habits among different cultural groups and deliver audiovisual content more precisely, thereby improving communication effects [12]. Similarly, the Hainan Free Trade Port can use AI to analyze the preferences of international investors and tourists, optimize the targeted delivery of cultural products and tourism information, and improve the precision of cross-cultural communication.

Together, these technologies constitute the basic architecture of AI in cross-cultural communication and provide key support for improving the accuracy of information dissemination and the adaptability of cultural communication.

### 3.2 Supporting Functions and Limitations of AI in Cross-Cultural Communication

The core supporting functions of AI in cross-cultural communication are mainly reflected in language translation, speech recognition, content generation, and visual recognition.

Neural machine translation (NMT) technologies, such as DeepL, Baidu Translate, and other large language models, rely on deep-learning models and have greatly improved the fluency and readability of multilingual text conversion. However, AI still has limitations in terminology consistency, the handling of culture-loaded terms, and metaphorical expression, and therefore it may fail to convey semantic meanings accurately across different cultural backgrounds.

In addition, intelligent subtitling and speech-recognition technologies, such as the automatic subtitle systems of Netflix and YouTube, have improved the accessibility of information in films, television, and international conferences, enabling non-native audiences to understand content more accurately. Nevertheless, these technologies still face problems such as insufficient contextual understanding and unstable handling of dialects and slang, which may affect the effectiveness of cross-cultural communication.

In terms of content generation (AIGC), AI has been widely used in news reporting, social media marketing, and cultural promotion. For example, AI can automatically generate text, video, and image content according to audience needs, thereby improving the adaptability of cross-cultural communication. However, AIGC still faces challenges in the precision of cultural expression, the naturalness of emotional transmission, and the adaptation of values. Further optimization is therefore needed to ensure that the content it generates is consistent with the cultural cognition habits of target audiences.

Finally, the development of computer vision enables AI to analyze and generate image and video content that meets the needs of target cultural audiences. Technologies such as intelligent image recognition, automatic subtitling, and multimodal interaction offer strong technical support for international communication, but there remains substantial room for improvement.

Although AI applications have greatly improved the efficiency and precision of information exchange in cross-cultural communication, they remain insufficient in contextual adaptation, cultural sensitivity, and data fairness. It is therefore necessary to further optimize technical models and improve the capacity of AI to adapt information across different cultural environments, so that it can meet the needs of cross-cultural communication more accurately.

## 4. Major Application Scenarios of AI in Cross-Cultural Communication in the Hainan Free Trade Port

AI technology has become an important support for the development of international communication capacity in the Hainan Free Trade Port. It has broad application prospects in government communication, cultural promotion, smart city development, and other fields. In the context of the Hainan Free Trade Port, the main AI-empowered application scenarios may include the following:

### 4.1 AI-Empowered Intelligent Subtitling and Machine Translation

#### 4.1.1 Intelligent subtitling

One of the core challenges of cross-cultural communication is the language barrier. The Hainan Free Trade Port needs to ensure that information can be accurately understood by audiences from different linguistic backgrounds. In this context, AI-empowered neural machine translation (NMT) and intelligent subtitling systems can play an important role in international conferences, audiovisual communication, and cross-border business. The Hainan Free Trade Port regularly holds international forums, investment promotion meetings, and cross-border cooperation conferences. The application of AI intelligent subtitling can provide real-time multilingual subtitles in such settings, allowing participants to obtain accurate information immediately and thereby improving the efficiency and fluency of cross-cultural exchange. For instance, by combining speech recognition with NMT, AI can convert conference speeches in real time and generate synchronized multilingual subtitles, significantly reducing the burden of human translation and improving the cross-cultural communication experience. In addition, the film, television, and cultural communication of Hainan can also rely on AI intelligent subtitling systems to expand global influence. To better promote Hainan's tourism and cultural industries, AI can be used to generate high-quality subtitles that conform to the linguistic habits of audiences in different countries, thereby increasing overseas acceptance. At the same time, Hainan-produced films and television works can use AI intelligent subtitling to improve the viewing experience of overseas audiences, making local Hainan culture more globally communicable.

#### 4.1.2 Machine translation

The Hainan Free Trade Port has an increasing demand for efficient and accurate translation in policy release, business negotiation, and legal-text processing, and the application of AI machine translation can greatly improve the efficiency of information dissemination. At present, multilingual

publication of government information has become an important component of the international communication system of the Hainan Free Trade Port. Government websites have gradually adopted AI translation technologies to provide multilingual policy interpretation in Chinese, English, French, Russian, and other languages, ensuring that foreign-funded enterprises and international investors can quickly and accurately obtain policy information about Hainan. At the same time, AI translation can make necessary improvements to policy texts so that they are more consistent with the legal-language conventions of different countries and can reduce misunderstanding caused by mistranslation.

Beyond policy communication, AI is also important in the translation of legal contracts and business documents. Supported by legal-terminology databases, AI can substantially improve the translation accuracy of legal contracts and business agreements related to the Hainan Free Trade Port. This helps international enterprises understand local regulations and the business environment more efficiently, thereby strengthening the confidence of foreign investors.

### 4.2 AI-Empowered Cultural Communication

4.2.1 AI-generated content (AIGC)

As an important national pilot zone for opening-up, the Hainan Free Trade Port is also a major hub for multicultural exchange. How to use AI technologies to enhance the global influence of Hainan's cultural brands is therefore an important issue in the practice of cross-cultural communication in the Hainan Free Trade Port. At present, AI-generated content (AIGC) is increasingly used in cultural creation, brand promotion, and social media marketing. In the process of cultural promotion, Hainan can explore how to use AI to generate high-quality promotional copy, tourism videos, and multilingual social media content, thereby greatly improving the efficiency and precision of cultural communication.

4.2.2 AI-driven cultural marketing

Through data analysis, personalized recommendation, and social media optimization, AI can support the precise communication of Hainan's cultural brands and enhance their influence in the international market. Based on big-data analytics, AI can identify the cultural preferences of global consumers, precisely deliver Hainan's cultural products and tourism content, and optimize marketing strategies so as to strengthen the fit between content and target audiences. At the same time, AI-empowered social media communication can also become an important driving force for the international dissemination of Hainan's distinctive local culture. It can optimize the communication effects of Hainan culture on international social platforms and increase both global audience reach and interaction.

AI-based cultural marketing can not only enhance the global adaptability of Hainan's cultural brands but also facilitate the efficient dissemination of cultural content, making local Hainan culture easier for the international market to accept. In the process of bringing Hainan's cultural brands onto the international stage, the precise analytical and intelligent optimization capabilities of AI will further expand the coverage and influence of cultural promotion.

### 4.3 Application of AI in Intelligent Government Affairs

4.3.1 Application of AI in government information release

As the internationalization of government services in the Hainan Free Trade Port continues to improve, the introduction of AI has promoted the intelligent transformation of government information dissemination and enabled government information to reach global audiences more efficiently. The Hainan provincial government may gradually adopt an AI-plus-human approach to translating policy documents, thereby improving the transparency and international adaptability of policy communication and reducing errors in human translation. In fact, with AI-based speech synthesis, the Hainan government is already able to provide multilingual policy broadcasts, ensuring that stakeholders such as foreign-funded enterprises and international investors can quickly obtain the latest policy information about Hainan. In addition, intelligent government-service assistants can already provide multilingual consultation and policy interpretation through AI-driven intelligent customer-service systems, thereby improving the government-service experience of international investors and enterprise users.

4.3.2 Application of AI in intelligent approval

The Hainan Free Trade Port has explored intelligent reform in administrative approval and territorial-space governance through machine-managed planning and related digital regulatory mechanisms. Hainan's "machine-managed planning" practice integrates more than 90 categories of planning-related data, supports machine-based review and coding, and contributes to more efficient government services [13]. By further integrating AI with credit supervision, policy interpretation, and approval decision-making, the transparency of government affairs in the Hainan Free Trade Port can be further improved, and the trust of international investors can be continuously strengthened. AI-empowered intelligent government affairs not only improves the accuracy of policy communication but also advances the internationalization of government services in the Hainan Free Trade Port.

## 5. Case Analysis of AI-Empowered Cross-Cultural Communication in the Hainan Free Trade Port

AI technology has already formed typical application models in intelligent government affairs, cultural communication, and smart city development in the Hainan Free Trade Port, providing strong technical support for improving Hainan's cross-cultural communication capacity. This section selects two representative cases, namely the cultural communication of the Qiguyu (pufferfish) IP and the intelligent drone inspection system, to examine the application practices, effects, and optimization directions of AI-empowered cross-cultural communication.

### 5.1 AI-Empowered Cultural Communication: Global

**Promotion of the Qiguyu IP**

5.1.1 Case background

The role of the cultural IP industry in cross-cultural communication has become increasingly prominent, and the introduction of AI technologies offers innovative possibilities for the design, generation, and dissemination of cultural content. At the 2025 Lingshui New Year Sea Breeze Carnival, Hainan Lingzhi Technology and Furong Cultural Technology jointly launched the AI-empowered "Qiguyu IP" and used AI design and social media marketing technologies to promote this IP in the international market [14].

5.1.2 Application practice of AI technologies

The application of AI in the global communication of the "Qiguyu IP" is mainly reflected in intelligent design, content generation, and social media communication. First, by combining deep learning and computer vision, AI learns the biological features, dynamic posture, and local cultural elements of the Qiguyu, and automatically generates multiple design options, thereby providing efficient creative support for designers. Second, in the promotion process, AI optimizes marketing strategies through data analysis and adjusts promotional content according to user preferences in different national markets, making the IP image more consistent with the market needs of different cultural backgrounds. In addition, AI-driven intelligent recommendation systems improve the precise delivery of cultural IP on international social media platforms and increase audience interaction and brand recognition.

5.1.3 Case effects

The AI-empowered "Qiguyu IP" has improved the efficiency of cultural IP design and provided a useful example of how AI can support the international expression of local cultural resources. This case indicates that the application of AI in cultural creative design and cross-cultural communication not only improves design efficiency but also helps strengthen the competitiveness of cultural IP in the global market.

### 5.2 AI-Empowered Smart City Development: Cross-Cultural Adaptation of the Intelligent Drone Inspection System

5.2.1 Case background

With the advancement of smart city development in the Hainan Free Trade Port, how to use AI to improve the international communication capacity of urban management has become an important issue. In 2024, the "drone-based edge-side intelligent inspection application system for building facades," developed by Hainan Flying Technology Co., Ltd., was selected as an outstanding innovative application case at the 2024 World Artificial Intelligence Conference [15]. By combining AI-based visual analysis for intelligent inspection of building facades, the system optimizes urban management and provides support for the international dissemination and promotion of Hainan's smart-city governance experience.

5.2.2 Application practice of AI technologies

In this case, the application of AI in smart city governance is mainly concentrated in visual analysis, intelligent data management, and multilingual adaptation. The drone system is equipped with high-resolution cameras and infrared thermal-sensing technologies. Through AI-based visual analysis, it can automatically detect structural problems in buildings and generate intelligent inspection reports through multilingual data visualization, thereby improving the international communicability of urban governance experience. In addition, the system uses AI for data prediction and risk assessment, providing intelligent decision-making support and making urban management more precise and efficient.

5.2.3 Case effects

The application of the AI visual-analysis system has improved the intelligent level of urban management in the Hainan Free Trade Port, increasing the efficiency and accuracy of building inspection while strengthening the international communication potential of Hainan's smart-city management experience. If combined with multilingual data visualization and standardized technical reporting, such systems can enable international urban-governance institutions to learn from Hainan's smart-city development experience more intuitively and promote international cooperation in urban governance.

### 5.3 Case Summary and Optimization Directions

Through the two cases of Qiguyu IP cultural communication and the intelligent drone inspection system, this section has analyzed the application of AI in cross-cultural communication in the Hainan Free Trade Port. The study shows that AI improves IP design efficiency and global adaptability in cultural communication, and strengthens intelligent urban management and international communication capacity in smart city development. However, the application of AI in cross-cultural communication still needs further optimization, including deep training for cultural adaptability, international promotion of visual-analysis technologies, and ethical governance of intelligent content. These measures are necessary to ensure that AI plays a more accurate and efficient role in the international communication system of the Hainan Free Trade Port. In the future, the Hainan Free Trade Port may continue to deepen the practice of AI in public diplomacy, international cooperation, and global communication, promote new models of AI-empowered cross-cultural communication, and offer Hainan's experience to the global communication system.

## 6. Optimization Pathways for the Application of AI in Cross-Cultural Communication

Although artificial intelligence (AI) has demonstrated broad application value in government communication, cultural promotion, and smart city development in the Hainan Free Trade Port, problems remain, including insufficient cultural adaptability, limited translation accuracy, and an incomplete data-governance mechanism. To further optimize the pathway

of AI-empowered cross-cultural communication, this section proposes targeted strategies in four areas: improving the cultural adaptability of AI translation, optimizing AI-empowered cultural creativity and marketing, enhancing the role of AI in smart city communication, and improving AI governance mechanisms. These strategies are intended to ensure that the international communication system of the Hainan Free Trade Port becomes more precise, efficient, and compliant.

### 6.1 Improving the Cultural Adaptability of AI Translation

When AI translation processes cross-cultural communication content, it still faces problems such as unstable terminology, mistranslation of culture-loaded terms, and insufficient contextual adaptation, all of which affect the accuracy of information dissemination and audience understanding. To optimize the cultural adaptability of AI translation, it is first necessary to build an AI corpus dedicated to the Hainan Free Trade Port. Such a corpus should integrate multilingual texts such as government announcements, policy regulations, business agreements, and cultural promotion materials, thereby establishing a localized AI training dataset and improving the terminology consistency and cultural adaptability of AI translation systems. In addition, an "AI + human post-editing" model, or a human-in-the-loop (HITL) approach, should be introduced. On the basis of AI translation, senior translators should conduct manual cross-checking of terminology and integrate cultural information so as to ensure the accuracy and adaptability of information expression. Meanwhile, it is necessary to train AI models systematically and specifically through pragmatics and intercultural communication theory, optimize the ability of AI translation to recognize context, and enable it to adjust expressions more accurately across different cultural backgrounds, thus reducing information bias caused by cultural misunderstanding and mistranslation.

### 6.2 Optimizing AI-Empowered Cultural Creativity and Marketing

The international promotion of Hainan's cultural brands requires the support of AI technologies to ensure that communication content can adapt to the cultural backgrounds and market needs of different countries and regions. First, AI can be combined with big-data analysis and market-trend prediction to optimize the global marketing strategies of Hainan's cultural brands in a targeted manner and improve the precision delivery of cultural products in the international market. For example, by analyzing the behavioral data and interest preferences of international users, AI can adjust the design direction of Hainan cultural IP, such as the Qiguyu IP, so that it better meets the aesthetic needs of target markets. Second, "AI + human" collaboration can be used to optimize the localized communication of cultural products. By combining AI-generated content (AIGC) with human creativity, cultural products can both conform to international market trends and retain the uniqueness of Hainan culture. Third, in social media communication, intelligent recommendation systems can optimize the personalized distribution of Hainan cultural content on the basis of user-behavior analysis, enabling audiences in different countries to receive Hainan cultural-promotion information that matches their cultural interests and thereby improving the precision and influence of cross-cultural communication.

### 6.3 Strengthening the Role of AI in Smart City Communication

The smart city development experience of the Hainan Free Trade Port needs to be communicated more effectively to the international community in order to improve the efficiency of global cooperation in urban governance. First, the multilingual adaptability of AI-generated smart city data reports should be further optimized to ensure that Hainan's smart-city experience and technologies can be accurately conveyed to international audiences. The AI-based intelligent drone inspection system developed by Hainan Flying Technology has already demonstrated value in international urban-management cooperation, but the translation quality and visual presentation of AI-generated urban-management data reports still need to be improved so that they better conform to the reading habits of different cultural backgrounds. Second, AI-based visual-analysis technologies can be used for the cross-cultural adaptation of smart city communication. For example, AI-generated smart city data visualization can improve presentation effects at international urban-governance forums and make Hainan's urban-governance experience more intuitively understandable and acceptable to the international community. In addition, an AI-driven smart city interactive platform can be established so that international investors, enterprises, and government institutions can quickly obtain Hainan's smart-city governance experience through intelligent AI interaction systems, thereby improving the efficiency of global cooperation in smart governance.

### 6.4 Improving AI Governance Mechanisms to Ensure Objectivity in Cross-Cultural Communication

AI applications in cross-cultural communication must ensure information authenticity and compliance, and avoid negative impacts on the international communication image of the Hainan Free Trade Port caused by AI misjudgment, data bias, and cultural misunderstanding. It is therefore essential to establish a review mechanism for AI-generated content. The Hainan government should set up a mechanism that combines human review with technical monitoring for AI-generated content, ensuring that AI translation, cultural promotional materials, and policy-interpretation content comply with the norms of cross-cultural communication and avoiding major errors and the dissemination of misinformation. The AI-plus-human review model currently used by Netflix has been shown to be effective in optimizing the cultural adaptability of AI-translated subtitles, and the Hainan Free Trade Port may draw on similar mechanisms to improve the accuracy of AI-empowered cross-cultural communication. In addition, to ensure the objectivity of cross-cultural communication content, Hainan should refer to international AI ethics standards [16] and establish an ethical review and risk-assessment system for AI-generated content in the Free Trade Port, thereby preventing AI-generated content from misleading or discriminating against different cultural groups. Finally, in government communication, security governance for AI-based government information dissemination should

be optimized to ensure that AI-generated information complies with international information-security standards and strengthens international confidence in the Hainan Free Trade Port.

## 7. Conclusion and Prospects

### 7.1 Major Findings

This study has examined the application of artificial intelligence (AI) in cross-cultural communication in the Hainan Free Trade Port. It analyzed the role of AI in government communication, cultural promotion, and smart city development, and proposed optimization pathways through case studies and technical assessment. The study finds that AI improves the accuracy and efficiency of information dissemination and plays an important role in machine translation, intelligent subtitling, AIGC generation, and computer vision. However, cultural adaptability, contextual understanding, and data governance remain major challenges for AI in cross-cultural communication. Optimizing AI-empowered communication models is therefore imperative.

### 7.2 Policy and Practical Recommendations

To optimize the application of AI in cross-cultural communication in the Hainan Free Trade Port, comprehensive improvement is needed in technological enhancement, cultural adaptation, and policy governance. First, a dedicated AI corpus for the Hainan Free Trade Port should be constructed to optimize translation systems and improve terminology consistency and cultural adaptability. Second, review mechanisms for AI-generated content (AIGC) should be improved to ensure the accuracy of cultural communication and avoid information bias. Third, the international communication application of AI in smart city development should be promoted, and AI-based visual analysis and data visualization should be optimized to improve the global adaptability of Hainan's smart city experience. In addition, AI governance should be strengthened and mechanisms for AI ethics and content review should be established to ensure the fairness and credibility of cross-cultural communication.

### 7.3 Future Research Directions

In the future, the development of AI in cross-cultural communication will focus on multimodal AI, including the integration of text, speech, and video, as well as affective computing and intelligent content adaptation. In international policy communication, cultural product promotion, and smart city governance in particular, AI applications will place greater emphasis on contextual adaptation and precise communication. The Hainan Free Trade Port can further deepen the practice of AI in the global communication system, public diplomacy, and international cooperation, promote new models of AI-empowered cross-cultural communication, and provide innovative pathways for improving international communication capacity.

## References

[1] Lewis S. C., Guzman A. L., and Schmidt T. R. Automation, Journalism, and Human-Machine Communication: Rethinking Roles and Relationships of Humans and Machines in News[J]. Digital Journalism 7.4(2019):409-427. https://doi.org/10.1080/21670811.2019.1577147

[2] Ożegalska-Łukasik N., and Łukasik S. Culturally Responsive Artificial Intelligence: Problems, Challenges and Solutions[J/OL]. Intercultural Relations 7.2(14)(2023):106-119. https://doi.org/10.12797/RM.02.2023.14.07

[3] Luo Zhiwei, Wang Min. National Brand Practice from the Perspective of Critical Geopolitics: A Case Study of the Hainan Free Trade Port[J]. Tropical Geography 42.7(2022):1169-1179. https://doi.org/10.13284/j.cnki.rddl.003505

[4] Hall E. T. Beyond Culture[M]. New York: Anchor Books (1976).

[5] Levinson S. C. Pragmatics[M]. Cambridge: Cambridge University Press (1983).

[6] Hofstede G. Culture's Consequences: International Differences in Work-Related Values[M]. Beverly Hills/London: Sage Publications (1980).

[7] Robertson R. Globalization: Time-Space and Homogeneity-Heterogeneity[M]. In Featherstone M., Lash S., and Robertson R. (eds.). Global Modernities. London: Sage Publications (1995):25-44.

[8] Zappavigna M. Discourse of Twitter and Social Media: How We Use Language to Create Affiliation on the Web[M]. London: Bloomsbury Publishing (2012).

[9] Bender E. M., Gebru T., McMillan-Major A., and Shmitchell S. On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?[C]. Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency (FAccT '21). New York: ACM (2021): 610-623. https://doi.org/10.1145/3442188.3445922

[10] Schultz D. E., and Kitchen P. J. Communicating Globally: An Integrated Marketing Approach[M]. Lincolnwood, IL: NTC Business Books (2000).

[11] Vaswani A., Shazeer N., Parmar N., et al. Attention Is All You Need[C]. Advances in Neural Information Processing Systems 30(2017):5998-6008.

[12] Gomez-Uribe C. A., and Hunt N. The Netflix Recommender System: Algorithms, Business Value, and Innovation[J]. ACM Transactions on Management Information Systems 6.4(2015): Article 13. https://doi.org/10.1145/2843948

[13] National Development and Reform Commission. More than 90 Categories of Planning-Related Data Integrated: Hainan's "Machine-Managed Planning" Empowers Intelligent Territorial-Space Governance [EB/OL]. https://www.ndrc.gov.cn/xwdt/ztzl/hnqmshggkf/zjhn/20211l/t20211129_1305713.html, 2021-11-29/2026-05-21.

[14] China Daily. This Spring Festival, AI Design Helps the Qiguyu IP Go Viral [EB/OL]. https://tech.chinadaily.com.cn/a/202502/05/WS67a319ada310be53ce3f4302.html, 2025-02-05/2026-05-21.

[15] People's Daily Online Hainan. A Hainan Company's Application Selected as an Outstanding Innovative Application Case at the 2024 World Artificial Intelligence Conference [EB/OL].

https://hi.people.com.cn/n2/2024/0704/c231190-40900703.html, 2024-07-04/2026-05-21.

[16] Jobin A., Ienca M., and Vayena E. The Global Landscape of AI Ethics Guidelines[J]. Nature Machine Intelligence 1.9(2019): 389-399. https://doi.org/10.1038/s42256-019-0088-2