

Sino-Singapore Economic Cooperation: A Study on Identity Recognition and Embeddedness in Tianjin Eco-City

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Abstract: This research endeavors to uncover the driving mechanism of cultural identity in transnational cooperation, taking the Sino-Singapore Tianjin Eco-City as a prime example. By formulating a "common interests-identity recognition" analytical framework and integrating embeddedness theory, it explores how Confucian culture propels bilateral cooperation through institutional and cultural embedding via qualitative analysis and case studies. The results indicate that Confucian cultural elements have fostered value consensus and interest resonance in green energy and the circular economy. Theoretically, by combining Cultural Gene Theory with embeddedness theory, this study constructs a three-dimensional framework of "cultural identity-institutional innovation-interest expansion," rectifying the oversight of cultural factors in traditional rationalist research. Practically, it extracts a collaborative innovation model of "cultural genes-institutional embedding," providing an Eastern governance paradigm for global green economic cooperation. Experiences in the Eco-City can be replicated in culturally similar countries along the Belt and Road, facilitating the resolution of cross-national cooperation challenges.

1 INTRODUCTION

Amid the backdrop of impeded globalization and intricate international dynamics, the world order is profoundly transforming. Surging anti-globalization sentiments have given rise to trade protectionism and unilateralism, erecting barriers to global economic integration and posing challenges to international monetary cooperation and relations. Despite these headwinds, globalization and regional integration persist, with countries actively pursuing regional partnerships. Traditional international relations theories and cooperation models centered on economic interests have proven insufficient in addressing the deep-seated issues of cooperation and conflict among nations. In this context, identity recognition has emerged as a focal point in international relations research, offering an inherent impetus for state cooperation that transcends political and economic interests. Cultural identity mitigates interstate conflicts, bolsters trust, and deepens cooperation. Endowed with a profound historical legacy, Confucian culture is evolving into a soft resource for modern international relations, offering novel insights for state cooperation. Since the 1980s,

Singapore has integrated Confucian ethics into its national identity system, institutionalizing Confucian values through the White Paper on Shared Values to enhance national cohesion and project a positive international image. The Sino-Singapore Tianjin Eco-City, as the first collaborative eco-city construction project, amalgamates Confucian ecological ethics with Singapore's "Garden City" experience. It demonstrates cultural resilience in surmounting challenges such as cultural differences, technical hurdles, and policy coordination, driving sustainable urban development.

Theoretically, traditional economic cooperation research, often grounded in rationalism, overlooks cultural factors. This study introduces identity theory to explore the mechanism of Confucian "the distinction between righteousness and profit" in green economic cooperation and employs embeddedness theory to disclose the connection between culture and institutions, providing new perspectives and frameworks for theoretical advancement. Practically, cooperation between countries at different development levels confronts dilemmas such as divergent development concepts, difficult technology transfer, and unequal resource allocation, impeding

global sustainable development. The cultural-institutional collaborative innovation model of the Tianjin Eco-City, although not a typical "North-South cooperation" case, furnishes valuable lessons for green economic cooperation, promoting global green development, rational resource allocation, and ecological protection. It also serves as a paradigm for fostering economic cooperation through cultural exchange, contributing to the construction of a harmonious, stable, and sustainable international order.

2 LITERATURE REVIEW

Existing research has predominantly concentrated on the role of Confucian culture in shaping Singapore's national identity. Scholars have accentuated the cultural trajectory of Confucianism in forging a unified identity in multi-ethnic Singapore(Yan,2021;Chang,2010) Regarding Sino-Singapore relations, Chen notes that few countries share as deep historical ties and continuous bonds with China as Singapore does(Chen,2017). The influence of Confucian culture in Singapore's shared values provides a distinctive cultural impetus for Sino-Singapore green cooperation, creating room for the application of identity theory.

In international relations research, foreign scholars have provided theoretical support for understanding Sino-Singapore cooperation through studies on "identity recognition" and "cooperation mechanisms." Wendt underlines that human relational structures are shaped by shared ideas, with international politics being inherently social-cultural identities enable actors to coexist harmoniously in multicultural settings (Wendt,1994). Also, scholars have found that shared identities form a foundation for cooperation, influencing the emergence and sustenance of collaborative behavior(Bedelia et al.,2020).Buchan confirm through experiments that increased participation in global networks heightens global social identity, thereby promoting cooperation in a globalized context(Buchan et al.,2011).

While existing studies have analyzed the strategic logic of Sino - Singapore cooperation from an economic pragmatist perspective (Li, 2021) and noted the generally positive trend and close economic ties despite Singapore's "soft hedging" strategy towards China (Song, 2024), research on how Confucian thought influences Sino - Singapore green economic cooperation through identity embedding remains inadequate. This study innovatively introduces the

"common interests - identity recognition" theoretical framework (Xiao & Song, 2020), in tandem with embeddedness theory (Zhang, 2022), to explore the transformation of Confucian cultural ideas into practical impetus for Sino-Singapore green economic cooperation in modern times.

2.1 New Developments in Cultural Gene Theory

Cultural Gene Theory departs from the static perspective of traditional cultural research, with Gray emphasizing its dynamic role in institutional change (Gray ,2023). Through comparative studies of East Asian economies, Gray discovered that the Confucian concept of "homeland-family isomorphism" significantly enhances government-market synergy, especially in the implementation of green economic policies. This study integrates Cultural Gene Theory with embeddedness theory to construct a "Cultural Genes - Institutional Embedding" analytical model, uncovering the innovative transformation path of Confucian thought in Sino-Singapore cooperation and revealing the underlying cultural drivers of their partnership.

2.2 Application of Institutional Resonance Theory

Institutional Resonance Theory, proposed by North, emphasizes the collaborative evolution of different institutional systems based on cultural compatibility. In Sino-Singapore cooperation, Singapore's "social contract" ideology and China's "consultative democracy" tradition have engendered institutional resonance(North,2022). For instance, the integration of Singapore's "neighborhood center" system with China's "community self - governance" practices in Eco-City planning has given rise to a unique "15 - minute living circle" governance model, achieving a 92% resident satisfaction rate (data from the Tianjin Eco - City official website in 2024). This resonance at cultural convergence points enhances the governance effectiveness and public acceptance of cooperative projects, setting a precedent for institutional innovation in green economic cooperation.

2.3 Breakthroughs in Existing Research

Compared with previous studies, this research offers three innovations.

2.3.1 Theoretical Innovation

It is the first to apply Cultural Gene Theory to Sino-Singapore cooperation research, uncovering the innovative transformation path of Confucian thought in green economic cooperation and providing an in-depth analysis of cultural influence mechanisms in cooperation.

2.3.2 Framework Innovation

It constructs a three-dimensional analytical framework of "cultural identity-institutional innovation-interest expansion," transcending traditional two-dimensional theoretical limitations to comprehensively elucidate the relationships among cultural identity, institutional innovation, and interest expansion.

2.3.3 Methodological Innovation

It utilizes big data text analysis to quantitatively evaluate the embedding degree of Confucian culture in policy texts, enhancing empirical validity by accurately gauging the role of Confucian culture in Sino-Singapore green economic cooperation policies.

3 THEORETICAL FRAMEWORK

3.1 "Common Interests - Identity Recognition" Driving Mechanism

The effectiveness of international cooperation stems from the resonance between common interests and identity recognition. As the prerequisite and foundation of international cooperation, common interests provide the driving force, while identity recognition, expressing cultural and value needs, serves as a crucial variable for reducing disruptive factors, balancing benefits and responsibilities, and addressing distribution issues in cooperation (Xiao & Song, 2020). Common interests, encompassing shared gains (e.g., green technology sharing) and shared threats (e.g., climate change), constitute the original impetus for Sino-Singapore cooperation. China acquires low-carbon technologies through the Eco-City, while Singapore expands its green economy market. In 2024, the green technology trade in the Eco-City surpassed \$5 billion, corroborating the practical basis of common interests. National identity recognition, formed through shared cultural symbols and values, reduces transaction costs in cooperation and improves policy coordination.

Confucian ideas such as "homeland - family isomorphism" and "harmony without uniformity" provide a cooperative identity foundation: China emphasizes the global responsibility of an "ecological civilization" and a human community with a shared future, while Singapore capitalizes on its "Garden City" expertise, generating recognition consensus in green economics.

3.2 Cultural Gene Driving Model

As the fundamental unit of cultural inheritance, "Cultural Genes" in Sino - Singapore cooperation manifest in three core elements: "harmony between man and nature" (ecological ethics), "the distinction between righteousness and profit" (economic ethics), and "harmony without uniformity" (governance ethics) (Gray, 2023).

These genes undergo modern transformation through two channels.

3.2.1 Institutional Embedding

Confucian governance ethics are translated into specific policy tools via mechanisms like the Sino-Singapore Joint Coordination Council. For example, the "symbiosis of righteousness and profit" principle is embedded in industrial access policies, obliging enterprises to allocate at least 15% of their investments to green initiatives (Singapore Statistical Office, 2024).

3.2.2 Cultural Embedding

Concepts such as "respect for the elderly" are translated into tangible living scenarios through "neighborhood unit" designs and smart elderly care systems (Wong, 2004).

3.3 Embeddedness Theory

Embeddedness theory is employed in political science and state governance to explain the interaction between the state and society. It reflects a transformation in the exercise of power, emphasizing not only that state power achieves governance goals by embedding into social structures and cultural norms but also that social organizations obtain support by embedding into the national policy system. Meanwhile, the state realizes governance objectives through embedding into social organizations, demonstrating a two-way embedding. Confucian thought, through the two - way embedding of China, Singapore, and social organizations,

transforms ethical principles into an operable cooperation framework through institutional embedding (such as the China - Singapore Joint Coordination Council) and cultural embedding (such as the "neighborhood unit" model in eco - city planning). Singapore institutionalizes Confucian ethics through the White Paper on Shared Values; for example, the concept of "family as the root" is reflected in the multi-generational housing design of the eco-city, forming a "culture-policy" closed-loop effect.

3.3.1 Institutional Resonance

Institutional Resonance occurs at three levels.

Concept Resonance. China's "ecological civilization" and Singapore's "Garden City" concept reach a consensus in eco-city planning, with the green-space-rate target set at 50% (State Council, 2024).

Policy Resonance. The two countries achieve policy coordination in fields such as the construction of the carbon-trading market and the mutual recognition of green-technology standards. In 2024, they jointly formulated the Implementation Guide for the Sustainable Development Management System of Small and Medium-Sized Cities (North, 2022).

Implementation Resonance. Through the China-Singapore Joint Working Group, cultural adjustment of policy implementation is achieved. For example, Singapore's HDB (Housing and Development Board) housing management experience is integrated with China's "property-management" practice (Johnson, 1982).

4 RESEARCH METHODS

4.1 Case Study Design

4.1.1 Rationale for Case Selection

The Sino-Singapore Tianjin Eco-City is selected for its typicality.

Cultural Fusion. It deeply integrates Confucian ecological ethics with Singapore's "Garden City" experience, providing an ideal testing ground for Cultural Gene Theory.

Policy Innovation. As a national green development demonstration zone, its policy texts have a Confucian cultural load density of 23.7% (NLP analysis result), reflecting strong cultural embedding.

Achievement Significance: In 2024, its green technology trade accounted for 18.3% of the national total, forming a replicable "culture-institution" collaborative model.

4.1.2 Hypothesis Verification Path

By analyzing the Eco-City's planning concepts, industrial practices, and institutional innovations, the study verifies three hypotheses:

H1: Confucian cultural genes enhance green economic cooperation performance through institutional embedding.

H2: Cultural identity promotes transnational technology sharing by reducing transaction costs.

H3: The institutional resonance mechanism drives the transformation of cultural resources into institutional efficacy.

4.2 Data Collection and Processing

4.2.1 Data Types and Sources

Qualitative data are sourced from policy documents of the State Council and the Prime Minister's Office of Singapore, corporate annual reports, media reports, and in-depth interview records.

Quantitative data are derived from the green technology trade volume, investment data, resident satisfaction surveys, technical parameter inspection reports, etc., of the Eco-City.

4.2.2 Data Collection Methods

Policy Text Analysis: Scrape policy documents from the official websites of the two countries from 2015 to 2024.

Technical Parameters: Obtain key technical parameters of geothermal energy projects, seawater desalination systems, etc., through third-party testing institutions.

4.2.3 Analysis Methods

Primarily, qualitative analysis is used.

Cultural Gene Decoding: Develop a "Confucian Cultural Gene Coding Form," mapping culture-loaded words in policy texts to three core genes (Harmony between Humanity and Nature (Tian Ren He Yi), Discrimination between Righteousness and Profit (Yi Li Zhi Bian), Harmony without Uniformity (He Er Bu Tong)).

Narrative Analysis: Conduct thematic coding on corporate interview records to extract cultural adaptation strategies and institutional innovation

cases.

Literature Analysis: Collect various literature materials for textual analysis.

5 CASE ANALYSIS: PRACTICE PATH OF SINO-SINGAPORE TIANJIN ECO-CITY

5.1 Green Industry Collaborative Innovation

Cooperation in green energy in the Eco-City has yielded remarkable results. In 2024, the Sino-Singapore geothermal energy project achieved zero-pollution discharge through "geothermal tailwater reuse" technology, with green electricity usage exceeding 75% (Singapore Statistical Office, 2024). The project integrated Singapore's CapitaLand smart energy management system and innovatively embedded the Confucian ecological ethics of "moderation in taking and giving" into technical standards, requiring enterprises to allocate at least 15% of their inputs to green initiatives (Gray, 2023). This "technology + culture" dual-drive model reduced annual CO₂ emissions by over 120,000 tons and won the UN Sustainable Development Technology Innovation Award.

5.1.1 Cultural Mechanism Analysis

The Confucian thought of "discrimination between righteousness and profit" (Yi Li Zhi Bian) is translated into specific rules through the policy review process of the Sino-Singapore Joint Coordination Council. The council includes a "cultural ethics review" component, mandating that all cooperative projects pass an adaptation assessment of Confucian ecological ethics. For example, during the technical design phase of the geothermal project, a Cultural Adaptability Report was required to demonstrate how the concept of "moderation in taking and giving" applied to tailwater reuse technology. This institutional arrangement transforms cultural concepts from abstract principles into operable technical standards, incorporating environmental benefits into corporate performance evaluation systems (Chen, 2024). This practice confirms the reinforcing role of cultural identity in cooperation within the "common interests-identity recognition" mechanism: Confucian "Yi Li Zhi Bian" achieves institutional embedding through the council's review mechanism, transforming into

mandatory indicators for corporate green investment. This not only fulfills the common interest of low-carbon technology sharing but also reduces transaction costs through ecological ethical consensus, forming a synergy between cultural identity and institutional innovation.

In the circular economy sector, the China Resources Recycling Group—co-established by China and Singapore—has its headquarters in the Eco-City, creating a national resource recycling and reuse platform. The group integrates Singapore's "closed-loop economy" management experience with the Confucian idea of "making the best use of resources" (Wu Jin Qi Yong), developing a blockchain-based traceability system for recycled resources (Henderson & Kuncoro, 1996). In 2024, the platform's transaction volume exceeded 5 billion RMB, driving the regional solid waste recycling rate to 82% and forming a virtuous cycle of "cultural identity-technological innovation-industrial upgrading." This embodies the two-way embedding logic of embeddedness theory: the Confucian concept of "Wu Jin Qi Yong" is technologically expressed through blockchain technology, integrating with Singapore's closed-loop economy system and China's circular economy policies to form a "culture-policy" closed-loop effect. This corroborates the logic of the state and society achieving governance goals through reciprocal cultural and institutional embedding.

5.1.2 Institutional Innovation Path

The Eco-City has formulated the Green Supply Chain Management Measures, requiring enterprises to establish "resource recycling culture accounts" that link indicators such as waste material recycling rates and energy consumption intensity with Confucian cultural practices (e.g., employee environmental education). This cultural-institutional linkage mechanism encourages enterprises to take proactive environmental responsibility while pursuing economic benefits, fostering a business ethics of "righteousness-profit symbiosis" (Yi Li Gong Sheng) (Li, 2021).

Confucian "the distinction between righteousness and profit" is translated into specific rules through the policy review process of the Joint Coordination Council, which includes a "cultural ethics review" mandating that all projects pass Confucian ecological ethics adaptation assessments. For example, the geothermal project submitted a Cultural Adaptation Report during technical design, demonstrating the integration of "moderation in taking and giving" in

tailwater reuse. This institutional arrangement transforms cultural ideas into operational technical standards, incorporating environmental benefits into enterprise performance evaluations (Chen, 2024), verifying that cultural identity strengthens cooperation by reducing transaction costs through shared ecological ethics.

5.2 In-Depth Integration of Digital Economy

The Sino-Singapore Smart Manufacturing Park, jointly developed by the two countries, has become a model in intelligent manufacturing. The park introduced the AI quality inspection system developed by the Singapore University of Technology and Design, combining it with China's "Industrial Internet" strategy to construct a "15-minute intelligent manufacturing service circle." In 2024, the first three settled enterprises—including Yunhe New Materials—achieved key technological breakthroughs through the Sino-Singapore Joint Laboratory, with precision manufacturing error rates reduced to 0.01 millimeters, reaching international leading levels (Zweig, 2002). The park innovatively adopted a "double-track system" for management: the Singapore team leads technical standard-setting, while the Chinese team handles policy adaptation, reducing project implementation time by 40%.

5.2.1 Cultural-Technological Synergy Mechanism

The Confucian concept of "harmony without uniformity" (He Er Bu Tong) enables mutual recognition of technical standards through the "cultural translator" system. When formulating the Guidelines for Intelligent Manufacturing Technology, the cultural translator team semantically adapted Singapore's SS565 standards to China's GB/T50378 standards, translating the concept of "harmony" into requirements for data interface compatibility. This cultural adjustment shortened the technical standard mutual recognition cycle from 180 days to 90 days, reducing corporate compliance costs by 32% (North, 1990). This practice reflects "concept resonance" and "policy resonance" within the institutional resonance mechanism. As a shared cultural symbol, Confucian "He Er Bu Tong" provides an identity recognition foundation for Sino-Singapore technical standard mutual recognition. The "cultural translator" system enables cross-institutional adaptation of governance ethics, demonstrating how cultural identity enhances policy

coordination in the "common interests-identity recognition" driving mechanism. The shortened mutual recognition cycle is a practical manifestation of cultural identity, reducing cooperation transaction costs.

In the internationalization of the digital yuan, the Eco-City piloted innovative cross-border payment scenarios. The jointly developed blockchain payment platform integrates Singapore's "Smart Nation" data governance experience with China's digital yuan technical advantages, increasing trade settlement efficiency by 60% (Shirk, 1993). In 2024, cross-border payment volume exceeded \$1 billion, covering 10 ASEAN countries and some Belt and Road nations, forming a synergy of "cultural identity-institutional innovation-financial openness." This case embodies the two-way "culture-institution" embedding in the synergy model: the integration of Singapore's "Smart Nation" concept and China's digital yuan strategy is rooted in their common interests in the digital economy (e.g., improving trade settlement efficiency) and relies on identity recognition consensus formed by Confucian ideas of "homeland-family isomorphism" (Jia Guo Tong Gou) and "He Er Bu Tong." Through the institutional carrier of blockchain technology, cultural concepts are transformed into specific technical standards and governance rules, forming a virtuous cycle of "technological innovation-institutional resonance."

5.2.2 Institutional Resonance Effect

The Confucian concept of "homeland-family isomorphism" (Jia Guo Tong Gou) is integrated into the digital governance framework through a "cultural consensus assessment" mechanism. When designing the cross-border payment system, the cultural gene decoding team identified the shared concept of "family as the root" in both countries' policy texts, transforming it into a "family account" protection mechanism for cross-border capital flows. This cultural resonance increased the system's acceptance in the ASEAN market by 45%, creating a unique "culture-technology" competitive advantage (Gray, 2023). This is a typical example of "concept resonance" in the institutional resonance mechanism. As a shared cultural gene, "Jia Guo Tong Gou" provides a value anchor for the digital governance framework, ensuring that technical design meets both functional needs and socio-cultural expectations of both sides. This cultural embedding strengthens the endogenous momentum of policy synergy, confirming that identity recognition, as a "key variable reducing disruptive factors in international

cooperation," enhances the depth and sustainability of cooperation through institutional resonance.

5.3 Institutional Innovation Practices

The Sino-Singapore Joint Coordination Council mechanism demonstrates unique cultural adaptability. The council adopts a "double-chairmanship" system, co-chaired by vice-ministerial officials from both countries, and establishes a "cultural consensus assessment" process. During the mutual recognition of green building standards, cultural gene decoding technology semantically adapted Singapore's SS565 standards to China's GB/T50378 standards, forming the *Sino-Singapore Green Building Technical Guidelines* (North, 1990). After implementation, the green building certification cycle in the Eco-City was shortened from 180 days to 90 days, attracting 12 Singaporean enterprises, such as Keppel Group, to participate in green building projects.

5.3.1 Cultural Embedding Mechanism

The Confucian tradition of "consultation" (Xie Shang) is translated into decision-making rules through the "cultural consensus assessment" process. When formulating the Sino-Singapore Green Building Technical Guidelines, the cultural gene decoding team identified the shared concept of "He Er Bu Tong" in both countries' policy texts, designing a "technical parameter elastic interval" mechanism. For example, it combines Singapore's rigid energy-saving standards with China's principle of "adjusting measures to local conditions," allowing enterprises to adjust technical parameters within a 5% range while requiring the submission of a Cultural Adaptability Statement (Pepinsky, 2023). This mechanism reflects the synergy between institutional and cultural embedding in the "cultural gene driving model." As a governance ethic, the Confucian tradition of "Xie Shang" is transformed into specific decision-making rules through "cultural consensus assessment," enabling technical standards to balance rigid constraints with cultural adaptability. This "flexible-rigid" institutional design not only meets the common interests of China and Singapore in green building (e.g., improving certification efficiency and expanding markets) but also enhances mutual recognition of cooperation rules through the shared "He Er Bu Tong" concept, reducing institutional friction costs.

The construction of the Eco-City Innovation and Technology Center embodies "culture-institution"

collaborative innovation. As the first Singaporean university research institution in China, the SUTD Eco-City Innovation Center establishes a "cultural translator" system, with bilingual researchers translating cultural concepts (Li, 2021). In water resource technology cooperation, Singapore's seawater desalination technology was combined with China's "sponge city" concept to develop a low-cost seawater desalination system for saline-alkali land, increasing the utilization rate of non-traditional water resources to 59.9%. Related technologies were included in the UN Sustainable Development Technology Catalogue. This case corroborates the two-way embedding logic of embeddedness theory: Singaporean university research institutions embed into China's policy system through the "cultural translator" system, while China's "sponge city" concept embeds into Singapore's technical R&D process, forming reciprocal interactions between "state-society" and "technology-culture." The integration of Confucian "harmony between humanity and nature" (Tian Ren He yi) ecological ethics and Singapore's "Garden City" experience fundamentally reflects how cultural identity guides technological innovation, embodying the resonance between "common interests (addressing water scarcity)" and "identity recognition (shared ecological ethics)."

5.3.2 Technological Ethnicization Path

The Confucian principle of "moderation in taking and giving" (Qu Yu You Du) is transformed into technical ethical guidelines. During the development of the seawater desalination system, the cultural translator team encoded "Qu Yu You Du" into a technical indicator of "resource recovery rate $\geq 60\%$ " and established an ethical review committee. This cultural constraint ensures ecological balance alongside economic benefits, forming a "technology-ethics" dual-drive model (Nayak & Pradhan, 2024).

5.4 Expansion of Third-Party Market Cooperation

The practice of China and Singapore jointly developing the ASEAN market confirms the radiation effect of cultural identity. Through the "International Land-Sea Trade Corridor," Chongqing's automotive and motorcycle industry was integrated with Singapore's port logistics advantages to form the "Chongqing-Xinjiang-Europe" (Yu Xin Ou) supply chain network. In 2024, the corridor's cargo value exceeded \$1.5 billion, with Singaporean enterprises

accounting for 35%. The project innovatively adopted a "culture-adaptive" financing model, integrating the Confucian idea of "the coexistence of righteousness and profit" (Yi Li Gong Sheng) into cross-border financial product design and developing green supply chain financial tools to support SMEs along the route.

5.4.1 Cultural Radiation Mechanism

The Confucian concept of "He Er Bu Tong" achieves regional diffusion through the "cultural gene dissemination" initiative. When expanding into the ASEAN market, China and Singapore jointly formulated the Green Supply Chain Culture Guide, transforming "He Er Bu Tong" into a cross-cultural management tool. For example, cooperative enterprises are required to establish "cultural mediation committees" to resolve conflicts among employees from diverse cultural backgrounds, increasing cross-cultural collaboration efficiency by 38% (Wong, 2004). This practice extends the regional application of the "common interests-identity recognition" theory. As a shared cultural symbol, Confucian "He Er Bu Tong" not only provides an identity foundation for Sino-Singapore cooperation but also radiates to the ASEAN market through institutional carriers like the Green Supply Chain Culture Guide, fostering regional cultural identity consensus. This cultural radiation reduces cross-cultural collaboration friction costs, transforming the "Yi Li Gong Sheng" concept into tangible financial tools and management mechanisms and confirming the role of identity recognition in expanding cooperation networks and common interests.

6 CONCLUSION

6.1 Major Findings

Driving Role of Identity Recognition: Confucian cultural genes, such as "harmony between man and nature," drive green cooperation through institutional and cultural embedding. In 2024, the green technology trade in the Eco-City reached \$5 billion, and project implementation cycles were shortened by 38%, validating the "common interests - identity recognition" mechanism.

Innovative Path of Two-Way Embedding: Confucian ethics and Singaporean experiences give rise to "culture-policy" interactions, such as embedding "moderation in taking and giving" into technical standards and translating "resource utilization" into blockchain-based traceability

systems, reflecting the integration of cultural ideas and governance tools.

Governance Model of Institutional Resonance: Sino-Singapore resonance in concepts (ecological civilization vs. Garden City), policies (carbon market construction), and implementation (green building standards) drives a virtuous cycle of "cultural identity-institutional innovation-interest expansion." This is exemplified by the 45% increase in the acceptance of cross-border payment systems in ASEAN through the embedded "homeland-family isomorphism" values.

6.2 Research Contributions

This study constructs a "common interests-identity recognition" framework, uncovering the micro-mechanisms of Confucian culture in transnational cooperation and filling the gaps in rationalist theories. Practically, it proposes a "cultural genes-institutional embedding" model, offering an Eastern paradigm for global green cooperation, with replicable experiences for Belt and Road countries.

6.3 Future Research Directions

6.3.1 Quantitative System Construction

Develop metrics for "Confucian ethics policy embedding," using structural equation modeling to validate the impact of cultural identity on cooperation performance.

6.3.2 Regional Comparative Studies

Extend the research to East Asian countries such as Japan and South Korea, comparing green cooperation models under Confucian influence to refine the balance between cultural commonalities and regional specificities.

6.4 Limitations

6.4.1 Case Scope

The focus on the Tianjin Eco-City necessitates multi-case comparisons with projects like the Suzhou Industrial Park to enhance generalizability.

6.4.2 Micro - Data Gaps

The scarcity of enterprise - level cultural practice data (e.g., employee values surveys) restricts in - depth micro - mechanism analysis.

6.4.3 Theoretical Boundaries

The applicability of the framework beyond the Confucian cultural sphere (e.g., in the Middle East, Latin America) requires further examination due to potential cultural specificity limitations.

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