

Geo-Economic Cooperation in Northeast Asia: Regional Development Impacts

Jung-Yi Wang

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This paper examines the multifaceted dynamics of geo-economic cooperation in Northeast Asia, particularly emphasizing the trilateral interactions among China, Japan, and South Korea. Through a mixed-methods research approach that integrates quantitative analysis with qualitative case studies, we investigate how geographical, political, economic, and cultural factors collectively shape regional cooperation patterns and their subsequent development outcomes. The research demonstrates that while substantial economic interdependencies have emerged across the region, persistent political tensions rooted in historical grievances constrain opportunities for deeper institutional integration. Our empirical findings underscore the critical importance of simultaneously addressing underlying geopolitical challenges while strategically leveraging existing economic complementarities to promote sustainable and inclusive regional development. The study contributes to the broader understanding of regional integration theory by providing evidence-based insights into the complex interplay between economic cooperation and political stability in one of the world's most economically dynamic yet politically fragmented regions.

Keywords: Northeast Asia, Geo-economic cooperation, Regional integration, Economic development, Trade relations

1. Introduction

Northeast Asia constitutes one of the world's most economically dynamic yet politically complex regional systems, encompassing major economies including China, Japan, and South Korea. The region's sustained pursuit of economic development through strategic geo-economic cooperation has assumed increasing significance as emerging economic powers deploy sophisticated diplomatic, political, and financial strategies centered on commodity circulation and comprehensive economic integration[1]. Understanding these multifaceted interactions has become crucial for analyzing the profound impact of

Corresponding Author: Jung-Yi Wang is with Department of Technology and Finance, CTBC Business School, Taiwan, Taiwan

Eamil: jung@ctbc.edu.com

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geo-economic cooperation on regional development trajectories and outcomes [2].

The contemporary landscape of geo-economic cooperation in Northeast Asia manifests through complex interactions among geographical proximity, political system variations, economic structural complementarities, and deeply rooted cultural dynamics. These multidimensional interactions create opportunities and constraints fundamental to understanding regional development impacts and their broader implications for global economic integration[3]. The geographical characteristics of the region significantly influence trade route optimization, natural resource distribution patterns, and infrastructural development priorities. At the same time, diverse political systems ranging from democratic republics to socialist market economies shape trade policy formulation, investment strategy implementation, and diplomatic relationship management[4].

The geo-economic dynamics within Northeast Asia are further influenced by the strategic interests and economic policies of external major powers, particularly the United States and Russia, whose involvement can significantly impact regional cooperation mechanisms and development outcomes[5]. This external dimension adds complexity to regional integration processes and requires careful consideration in policy formulation and strategic planning.

This study draws upon several well-established theoretical frameworks to comprehensively analyze geo-economic cooperation dynamics. Adaptive Differentiation Theory offers valuable insights into how export-oriented firms strategically respond to protectionist trade environments, suggesting that firms can effectively transform institutional constraints into competitive opportunities through strategic resource deployment and market positioning[6]. The resource-based view emphasizes that firms possessing valuable, rare, inimitable, and non-substitutable resources can achieve sustainable competitive advantage even under adverse economic conditions, providing a theoretical foundation for understanding firm-level responses to regional cooperation initiatives[7].

Regional integration theories, including neofunctionalism and intergovernmentalism, offer valuable analytical frameworks for understanding cooperation dynamics and their evolution over time[8]. Neoliberalism emphasizes the importance of free markets and reduced state intervention in fostering sustainable economic growth through comprehensive trade liberalization and regulatory harmonization processes. Conversely, mercantilist perspectives highlight the central role of state power and strategic national interests in shaping regional integration processes and outcomes[9]. Constructivism provides a complementary theoretical perspective by focusing on

the fundamental role of shared norms, values, and identities in fostering regional cohesion and sustainable cooperation frameworks[9].

The research addresses several critical questions surrounding geo-economic cooperation in Northeast Asia through systematic identification of key drivers and impediments to regional collaboration, comprehensive evaluation of impacts on economic growth, social progress, and environmental sustainability, rigorous assessment of the effectiveness of existing cooperation mechanisms, and development of evidence-based policy recommendations for enhanced regional integration and sustainable development.

The study significantly contributes to understanding regional economic dynamics while providing practical guidance for policymakers and stakeholders seeking to foster meaningful cooperation and shared prosperity throughout Northeast Asia. By examining both successful cooperation initiatives and persistent challenges, the research offers a balanced perspective on the potential and limitations of geo-economic cooperation in promoting regional development.

2. Regional Landscape and Economic Interdependence

2.1 Geographic and Political Context

The geographic landscape of Northeast Asia encompasses remarkable diversity, extending from China's vast continental landmasses with their abundant natural resources to Japan's mountainous archipelago characterized by technological innovation capabilities, and the strategically positioned Korean Peninsula that serves as a critical bridge between continental and maritime Asia. China's varied topography, including extensive coastlines, major river systems, and diverse climatic zones, significantly influences regional trade route development and natural resource distribution patterns across the broader region[10]. Japan's limited natural resource endowment necessitates strategic reliance on sophisticated maritime trade networks and continuous technological innovation to maintain its competitive position in regional and global markets. In contrast, the Korean Peninsula's strategic location at critical regional crossroads shapes fundamental geopolitical dynamics and security considerations[11].

The geography of Northeast China and the Korean Peninsula features two major mountain ranges that significantly influence regional connectivity and development patterns: The Lesser Khingan Mountains and the Changbai Mountains, both of which affect transportation infrastructure development and cross-border economic activities[12]. These geographical features create opportunities and challenges for regional economic integration, requiring

sophisticated planning and coordination to maximize benefits while minimizing constraints.

The political landscape throughout Northeast Asia is characterized by complex bilateral and multilateral relationships shaped by historical legacies, divergent national interests, and evolving strategic priorities[13]. China's emergence as a global economic power has fundamentally influenced regional dynamics, with its increasingly assertive foreign policy creating both significant opportunities for economic cooperation and substantial challenges for neighboring countries seeking to maintain strategic autonomy[14]. Persistent historical grievances and unresolved territorial disputes, including the ongoing Senkaku/Diaoyu Islands dispute and continuing Korean Peninsula tensions, represent significant impediments to deeper regional cooperation and institutional integration[15].

The region serves as a primary theater for major power competition, where neither China, Japan, nor the United States appears prepared to allow any of the others to achieve regional dominance. This creates a complex strategic environment that influences all aspects of regional cooperation[16]. This competitive dynamic requires careful navigation by regional actors seeking to maximize economic benefits while maintaining strategic flexibility and national sovereignty.

2.2 Economic Structures and Trade Relations

Northeast Asia exhibits profound economic interdependence through increasingly robust trade and investment flows developed over several decades of sustained economic growth and market liberalization. China is a central manufacturing hub and rapidly expanding consumer market, attracting substantial investment from Japan and South Korea while simultaneously exporting manufactured goods to global markets and creating complex value chain relationships[17]. Japan and South Korea leverage their advanced technological capabilities and sophisticated industrial economies to export high-value-added products. They invest significantly in research and development activities that benefit the region through knowledge spillovers and technology transfer.

By the end of 2015, China had established itself as the largest trading partner of ASEAN countries for six consecutive years, demonstrating the region's growing economic interconnectedness and the central role of trade relationships in fostering regional integration[1]. This pattern of deepening economic integration has continued to evolve, creating increasingly complex

networks of trade, investment, and technological cooperation that span multiple sectors and industries.

The economic structures across Northeast Asia reveal significant complementarity and emerging competition dynamics that require careful management to maximize mutual benefits. China's manufacturing prowess, Japan's technological innovation capabilities, and South Korea's industrial strengths create substantial opportunities for beneficial specialization and economic cooperation. However, they simultaneously generate potential vulnerabilities to external financial shocks and market disruptions[18]. Regional trade agreements, most notably the Regional Comprehensive Economic Partnership (RCEP), represent ambitious attempts to enhance financial integration by systematically reducing trade barriers and promoting cross-border investment flows through comprehensive policy coordination.

The RCEP represents the world's largest free trade agreement regarding economic scope and impact, covering almost one-third of global GDP and population, thereby creating unprecedented opportunities for regional economic integration and development[19]. The agreement's implementation has significant implications for regional value chain development, market access expansion, and regulatory harmonization across participating economies.

2.3 Digital Economy and Innovation

The digital economy transformation fundamentally reshapes Northeast Asia's economic landscape, creating substantial opportunities for sustainable growth and enhanced regional connectivity. Strategic investment in advanced digital infrastructure, comprehensive promotion of digital literacy programs, and development of conducive regulatory environments are essential for unlocking the digital economy's full potential across the region. Cross-border e-commerce platforms and digital trade mechanisms facilitate greater market access opportunities, reduce transaction costs for businesses and consumers, and enhance consumer choice through expanded product and service availability[20].

Technological innovation and systematic industrial upgrading have become essential for achieving long-term economic growth and maintaining regional competitiveness in increasingly sophisticated global markets. Taiwan's government has implemented comprehensive policy support mechanisms to enhance industry resilience against trade policy pressures while maintaining competitiveness through sustained innovation and technological advancement[7]. These policy approaches provide valuable models for other regional economies seeking to navigate complex global trade dynamics while maintaining technological competitiveness.

The development of regional innovation ecosystems is critical to sustaining long-term economic growth and technological advancement. These ecosystems facilitate collaboration among universities, research institutions, and businesses to accelerate the commercialization of new technologies and create high-value employment opportunities that contribute to sustainable regional development.

3. Cooperation Mechanisms and Challenges

3.1 Institutional Frameworks

Geo-economic cooperation in Northeast Asia manifests through diverse and increasingly sophisticated mechanisms, including comprehensive trade agreements, substantial investment flows, major infrastructure development projects, and evolving regional institutions. Trade agreements such as bilateral and multilateral free trade agreements and customs unions systematically reduce trade barriers, promote enhanced goods and services exchange, and strengthen economic interdependence through regulatory harmonization and policy coordination[21]. Investment flows, encompassing both foreign direct investment and portfolio investment strategies, serve as primary drivers of economic growth, promote essential technology transfer processes, and foster comprehensive industrial development across participating economies[22].

Regional institutions play increasingly essential roles in facilitating meaningful dialogue, promoting sustainable cooperation, and coordinating policies on critical economic and political issues that affect regional stability and prosperity. ASEAN is Southeast Asia's most significant regional organization, functioning as the primary driving agent for regional order in trade facilitation, economic integration, security cooperation, and identity formation processes[23]. The Regional Comprehensive Economic Partnership, representing the world's largest free trade agreement by economic coverage, enhances foreign trade competitiveness and promotes expanded trade relationships among member countries through comprehensive market access provisions and regulatory cooperation mechanisms[24].

The ASEAN Plus Three process, which includes the ten ASEAN member states plus China, Japan, and South Korea, provides a crucial institutional forum for promoting sustained dialogue and practical cooperation on economic development, political stability, and security issues that affect regional prosperity and stability[25]. This multilateral framework has evolved to address increasingly complex regional challenges while maintaining flexibility to adapt to changing circumstances and emerging opportunities.

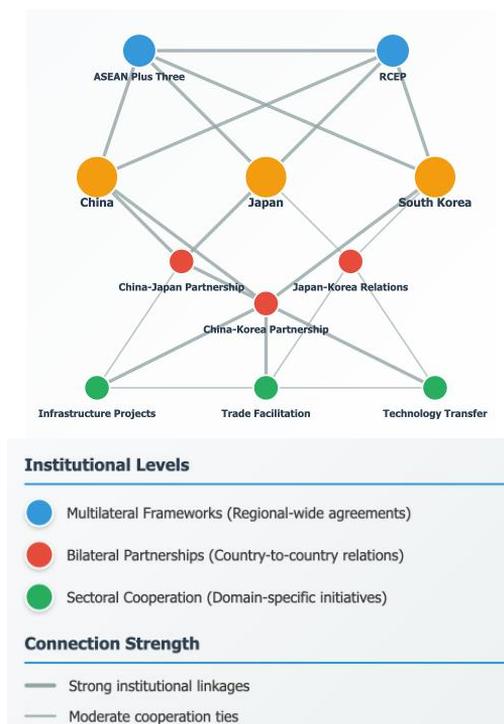


Fig. 1 Northeast Asia Cooperation Framework

Fig. 1 illustrates the multi-level nature of regional cooperation, showing how multilateral agreements (ASEAN Plus Three, RCEP) connect with bilateral relationships and specific sectoral cooperation initiatives. The framework demonstrates the interconnected nature of cooperation mechanisms across different institutional levels.

3.2 Infrastructure Development and Connectivity

Major infrastructure development projects represent critical components of regional cooperation strategies designed to enhance connectivity and facilitate expanded trade and investment flows across Northeast Asia. The Belt and Road Initiative represents an unprecedented infrastructure development project with global scope, connecting Asia, Europe, and Africa through comprehensive networks of roads, railways, ports, and other essential facilities designed to promote economic growth and regional integration. These ambitious projects have the potential to encourage substantial economic growth, enhance regional connectivity, and foster deeper geo-economic cooperation through improved transportation and communication networks[26].

The Belt and Road Initiative possesses significant potential to reshape economic geography throughout Central Asia and beyond, potentially leading to substantial income gains and accelerated regional development through improved connectivity and market access[27]. However, successfully implementing such large-scale infrastructure projects requires careful planning, adequate financing, and effective governance mechanisms to achieve desired development outcomes.

China's substantial capabilities in infrastructure construction, including advanced expertise in railways, highways, bridges, and tunnels that have reached world-advanced levels, enable significant contributions to ASEAN infrastructural development and regional economic growth[28]. Nevertheless, projects within the BRI framework that lack proper planning and implementation may fail to achieve desired development goals, highlighting the importance of comprehensive project evaluation and management[29].

Regional cooperation initiatives can also address non-traditional security threats through improved information sharing mechanisms and enhanced emergency response capabilities that benefit all participating countries[30]. These cooperative approaches to security challenges demonstrate the broader benefits of regional integration beyond purely economic considerations.

3.3 Major Challenges to Cooperation Political Tensions and Security Issues

Fig. 2 presents the significant challenges facing regional cooperation alongside corresponding response mechanisms and their outcomes. The figure effectively visualizes how the region attempts to address various impediments through diplomatic, economic, and institutional measures while depicting the varying degrees of success achieved.

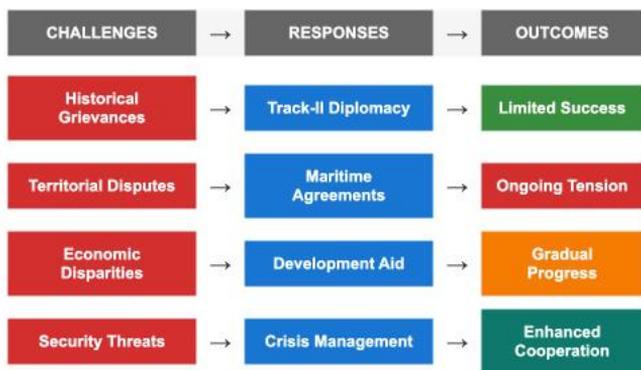


Fig. 2 Challenge-Response Matrix in Northeast Asia Cooperation

Political tensions constitute the most significant impediments to deeper geo-economic cooperation throughout Northeast Asia, creating persistent obstacles to developing robust cooperative frameworks and institutional mechanisms. Historical animosities rooted in wartime experiences and ongoing territorial disputes continue to foster mutual mistrust and suspicion among regional actors, thereby impeding the establishment of comprehensive cooperative frameworks necessary for sustainable regional integration[31].

Rising East Asian maritime tensions between China and its neighbors since 2009 can be attributed to multiple interconnected factors, including China's increasingly assertive naval policies, expanding United States regional military presence, and persistent territorial disputes that create ongoing sources of tension and conflict[32]. The persistent failure to reconcile divergent historical interpretations and adequately address historical injustices has significantly damaged inter-state relations throughout Northeast Asia, creating ongoing obstacles to deeper cooperation[33].

Without the proper transparency measures and confidence-building mechanisms, regional states face the risk of security dilemma dynamics that could potentially trigger unstoppable arms race dynamics, further undermining regional stability and cooperation prospects[34]. These security challenges require careful management through diplomatic engagement and institutional cooperation to prevent escalation and maintain regional stability.

Significant economic disparities among Northeast Asian countries create substantial imbalances in trade relationships and investment flows, potentially exacerbating existing inequalities and creating obstacles to balanced regional development. More economically developed economies such as Japan and South Korea often possess decisive competitive advantages in high-technology industries and advanced manufacturing sectors, while developing economies within the region face substantial challenges in attracting foreign investment and participating effectively in sophisticated global value chains[35].

These development disparities require targeted policy interventions and cooperative mechanisms to promote more balanced regional development while ensuring that all participants benefit from expanded economic integration and cooperation. Addressing these disparities is essential for maintaining political support for regional cooperation initiatives and ensuring sustainable long-term integration.

Northeast Asia faces an expanding range of nontraditional security threats, including climate change impacts, natural disasters, and pandemic diseases, that require collective action and carefully coordinated responses across national boundaries. These emerging threats highlight the fundamental need for enhanced regional cooperation mechanisms to address disaster preparedness, climate

resilience, and public health security challenges that transcend national borders[36].

Transforming developmental processes toward greater equity, enhanced resilience, and improved sustainability can contribute to significant risk reduction throughout the region while promoting more balanced and inclusive development outcomes[37]. The COVID-19 pandemic demonstrated the critical importance of regional cooperation in addressing health emergencies and the interconnected nature of security challenges in the contemporary global environment[38].

These non-traditional security challenges require innovative approaches to regional cooperation that can effectively address transnational threats while respecting national sovereignty and maintaining political support for cooperative initiatives. Developing effective responses to these challenges represents an opportunity for enhanced cooperation and a test of regional institutions' capacity to address complex contemporary challenges.

4. Impact on Regional Development

4.1 Economic Growth and Integration

Geo-economic cooperation substantially contributes to regional economic growth and integration through systematically promoting trade expansion, investment facilitation, and technological innovation diffusion throughout Northeast Asia. Increased trade and investment flows directly contribute to higher productivity levels, expanded job creation, and improved regional living standards through market access expansion and efficient resource allocation. Regional economic integration facilitates the strategic development of sophisticated regional value chains, enabling countries to specialize in different production stages while enhancing overall competitiveness in global markets through coordinated industrial development strategies.

Fig. 3 demonstrates the multidimensional impacts of economic integration across Northeast Asia, illustrating how trade liberalization, investment flows, and infrastructure development create interconnected benefits for economic growth, employment generation, and productivity enhancement. The matrix shows positive correlations between integration depth and development outcomes across all participating economies.



Fig. 3 Regional Economic Integration Impact Matrix

The establishment of comprehensive free trade agreements and strategic economic partnerships systematically lowers trade barriers, promotes enhanced investment flows, and fosters closer economic ties through regulatory harmonization and policy coordination mechanisms. Regional infrastructure development initiatives, including advanced transportation networks and integrated energy grids, enhance economic integration and connectivity by facilitating the efficient movement of goods, services, and people across national borders while reducing transaction costs and improving market access[39].

These integration processes create positive feedback effects that reinforce economic cooperation and create incentives for deeper integration over time. The development of regional value chains particularly benefits smaller economies by providing access to larger markets and enabling participation in sophisticated production networks that would otherwise be inaccessible.

4.2 Technological Innovation and Knowledge Sharing

Geo-economic cooperation catalyzes technological innovation and knowledge sharing through collaborative research and development projects,

comprehensive technology transfer agreements, and strategic joint ventures that leverage regional complementary capabilities. This collaboration drives significant innovation in critical sectors, including information technology, biotechnology, and renewable energy technologies, enhancing regional competitiveness while promoting sustainable development objectives[40].

Joint research programs focused on clean energy technologies accelerate the development and deployment of renewable energy sources while contributing to global efforts to address climate change and environmental degradation. Collaborative artificial intelligence initiatives promote innovation across various industries while building regional capacity in emerging technologies to shape future economic development[41].

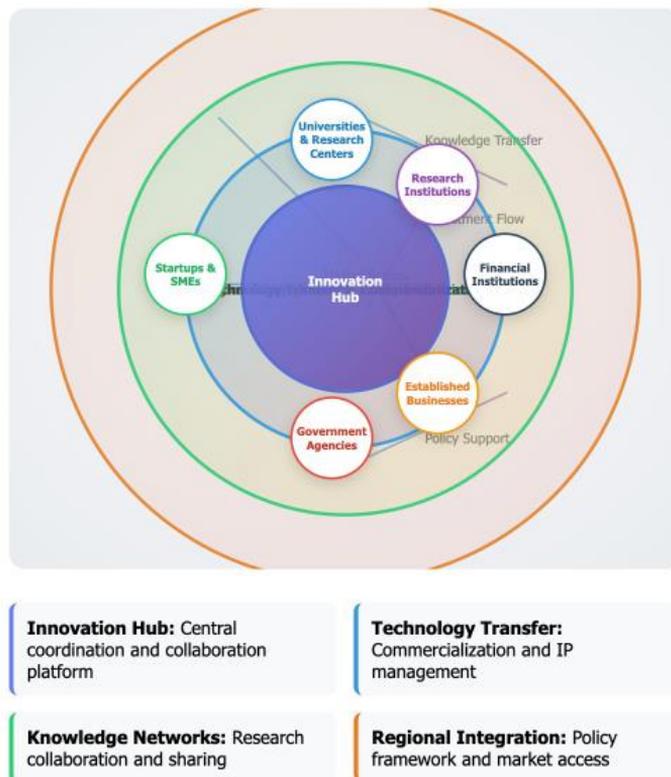


Fig. 4 Innovation Ecosystem Development Framework

Fig. 4 illustrates the comprehensive innovation ecosystem that emerges through regional cooperation. It shows how universities, research institutions, businesses, and governments collaborate to create knowledge networks, facilitate technology transfer, and promote innovation commercialization. The framework

demonstrates the multi-stakeholder approach required for effective innovation ecosystem development across Northeast Asia.

Regional innovation ecosystems develop environments where universities, research institutions, and businesses collaborate effectively to commercialize new technologies and create high-value employment opportunities. These ecosystems facilitate knowledge spillovers and technology transfer processes that benefit all participating economies while promoting technological advancement and industrial upgrading.

Regional cooperation in technology development also helps address common challenges such as digital divides and technological capacity constraints that might otherwise limit individual countries' ability to participate in global technology networks and benefit from technological advancement.

4.3 Environmental Sustainability and Green Growth

The pursuit of green economy principles and sustainable development objectives has gained significant momentum throughout Northeast Asia. This is driven by growing concerns about climate change impacts, environmental degradation, and resource scarcity challenges that require coordinated regional responses. The transition toward green economy models requires substantial investments in renewable energy infrastructure, energy efficiency improvements, sustainable transportation systems, and circular economy practices that maximize resource utilization while minimizing environmental impacts.

Green innovation and sustainable finance mechanisms are essential components of comprehensive sustainable development strategies, which can address environmental challenges while promoting economic growth and social development[42]. These approaches require careful coordination among governments, businesses, and civil society organizations to ensure effective implementation and maximum impact.

Regional governments must prioritize comprehensive environmental protection measures, low-carbon growth strategies, and green development policies while emphasizing strategic investment in new service sectors and sustainable industries to foster environmentally sustainable regional development[43]. Investment and capacity development in green manufacturing processes, sustainable urbanization initiatives, food security programs, and sustainable agricultural practices are crucial for achieving comprehensive environmental sustainability throughout the region.

Developing regional approaches to environmental challenges creates opportunities for shared learning, technology transfer, and coordinated policy

responses that can achieve greater impact than individual national efforts while building regional capacity for addressing future environmental challenges.

4.4 Regional Stability and Security

Geo-economic cooperation contributes substantially to regional stability and security by systematically fostering economic interdependence, promoting sustained dialogue, and reducing incentives for military confrontation among regional actors[44]. Economic interdependence creates substantial shared interests that reduce the likelihood of military confrontation, as countries become increasingly reliant on each other for trade relationships, investment flows, and economic prosperity that would be jeopardized by military conflict.

Regional dialogue mechanisms and cooperation on security issues enhance trust-building and confidence-building measures, promote peaceful dispute resolution procedures, and prevent the escalation of tensions through institutional channels and diplomatic engagement. These cooperative approaches to security challenges demonstrate the potential for economic cooperation to contribute to broader regional stability and peace.

Moreover, geo-economic cooperation enables more effective approaches to addressing non-traditional security threats such as terrorism, cybercrime, and climate change through coordinated efforts that leverage shared resources and expertise to combat these challenges effectively. These cooperative security approaches build institutional capacity while addressing transnational threats that individual countries cannot effectively address independently.

The development of economic interdependence and institutional cooperation mechanisms creates stakeholders in regional stability while providing alternative channels for addressing disputes and managing tensions that might otherwise escalate into military confrontation.

5. Conclusions and Future Perspectives

The research demonstrates that geo-economic cooperation in Northeast Asia requires addressing complex political, economic, and cultural interactions. The study establishes that political trust-building and resolution of historical grievances form the foundation for sustainable regional cooperation. Without this political foundation, economic initiatives remain vulnerable to disruption and fail to achieve their potential.

Economic integration through trade liberalization, investment facilitation, and infrastructure development is the primary mechanism for unlocking regional economic potential. These economic linkages create beneficial interdependencies

while strengthening regional stability. Cultural exchange programs prove equally critical, fostering shared identity and common purpose across national boundaries. Successful cooperation initiatives require sustained commitment from all participating nations, with institutional effectiveness directly correlating to political will and resource allocation.

The policy implications indicate that trust-building initiatives must establish conducive economic cooperation and cross-border investment environments. Enhanced economic integration creates new growth opportunities, while environmental sustainability and green growth strategies must be integrated into all cooperation frameworks. Cultural programs promoting mutual understanding contribute significantly to regional harmony and social cohesion.

Future research should examine how emerging technologies, particularly artificial intelligence and blockchain, will reshape cooperation patterns. The influence of non-state actors, including multinational corporations and civil society organizations, requires deeper investigation. Environmental implications of expanded cooperation, especially climate change mitigation and resource management, demand a comprehensive analysis. Comparative studies of different cooperation mechanisms will optimize policy interventions and institutional design.

Strategic implementation requires developing robust multilateral frameworks that address economic opportunities and political sensitivities. Investment in digital infrastructure development supports e-commerce growth, innovation, and regional connectivity. Green finance mechanisms must channel resources toward sustainable development projects, while regional crisis management capabilities should address non-traditional security threats through collective action.

Northeast Asian geo-economic cooperation has significant potential for regional development, economic growth, and enhanced stability. Realizing this potential requires systematic efforts to address existing challenges through sustained collaboration and long-term vision. The convergence of interests in economic development, regional stability, and cultural exchange provides a strong foundation for strengthening cooperation.

To navigate trade and investment complexities in an era of rapid technological progress and shifting global dynamics, policymakers must prioritize technological capability development as the cornerstone of competitive advantage. Through sustained commitment to cooperation and innovation, Northeast Asia can emerge as a leading model for regional integration and sustainable development in the 21st century.

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Jung-Yi Wang holds a master's degree in advanced management from Chang Jung Christian University and is a candidate for a doctorate in business from Feng Chia University. He works at CTBC Business School as a full-time assistant professor in the Department of Technology and Finance. He is also the head teacher and general manager of the Master of Smart Health Management program. He has been working in private universities for 24 years. He supervises school-wide procurement and contracting, campus construction, campus safety, sports team management, and admissions in administrative work. In terms of teaching, he currently offers courses related to business and management in the undergraduate department and courses on international political and economic situations in the master's program. To respond to the future development trends of the "smart" and "healthy" industries, he is currently committed to studying and researching health field planning, health facility management, and innovative service marketing. He hopes to cultivate health industry professionals with creative thinking and leadership