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Research on international co-operation mechanisms for financial support to sustainable development—based on the perspective of global policy practice and governance innovation

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Abstract

The present paper is an examination of the international cooperation mechanisms for financial support of sustainable development, with a focus on policy coordination, mutual recognition of standards, financial flows, risk prevention and control. These mechanisms are analysed from the perspective of global policy practice and governance innovation, and the demand for global sustainable development is taken as a point of departure. By analysing case studies in the EU, China, Southeast Asia and other regions, the study explores the effectiveness and shortcomings of the existing mechanisms and proposes optimisation paths. The study's conclusions underscore the importance of augmenting the role of multilateral platforms, fostering compatibility among standards, and innovating financial instruments as pivotal strategies to enhance the efficacy of international cooperation.

Keywords: Financial Policies; Mechanisms for International Cooperation; North-South Imbalance; Technology Finance; Green Finance

1. Introduction

The synergistic advancement of global climate governance and the Sustainable Development Goals (SDGs) is faced with numerous challenges. According to the United Nations, carbon emissions are projected to rise by 12 per cent by 2025 compared to pre-industrial levels, and average annual economic losses from extreme weather events are estimated to reach $155 billion, posing a direct threat to food security (SDG 2) and infrastructure resilience (SDG 9). The climate finance gap in developing countries is as high as USD 2.5 trillion per year (IMF, 2025), while the global allocation of green funds shows a significant North-South imbalance, with Africa's clean energy investments accounting for only 2% of the global total. Considering these observations, there is an urgent need for a systematic restructuring of international cooperation mechanisms to address structural contradictions such as fragmented rules, imbalanced financial flows and differences in governance capacity.

2. Literature Review

2.1. Policy Coordination and Rule Fragmentation

A considerable body of research has been dedicated to the coordination of policies, with F. Kai et al. highlighting a notable observation. Despite the Central European Common Classification Catalogue (CGT) screening 110 tripartite consensus activities, it was noted that 33% of the areas were found to be non-compatible due to discrepancies in local standards [1]. Furthermore, Hoffman et al. advanced the concept of 'polycentric governance', which underscores the necessity for international collaboration to achieve a balance between decentralisation and the representation of

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interests. However, this theory does not provide a comprehensive explanation of the obstacles that developing countries encounter when attempting to engage in standard-setting processes [2].

2.2. Financial Flows and North-South Imbalances

Research by the International Monetary Fund (IMF) shows that only 5% of global climate finance is allocated to adaptation, with a demand gap in developing countries of US$130-415 billion/year and less than 38% private sector participation [3]. Garcia's research further reveals that the global South faces a 'debt-climate' vicious circle, with interest payments on debt growing at a rate three times faster than investment in green infrastructure. The Garcia study further reveals that countries in the global South face a 'debt-climate' vicious cycle, with interest payments on debt growing at more than three times the rate of green infrastructure investment [4]. The case of Debt Nature Swap (DNS) in Gabon demonstrates that the linkage between debt restructuring and ecological protection has not yet been replicated at scale. Figure 1 provides a detailed global comparison of climate finance between North and South countries.

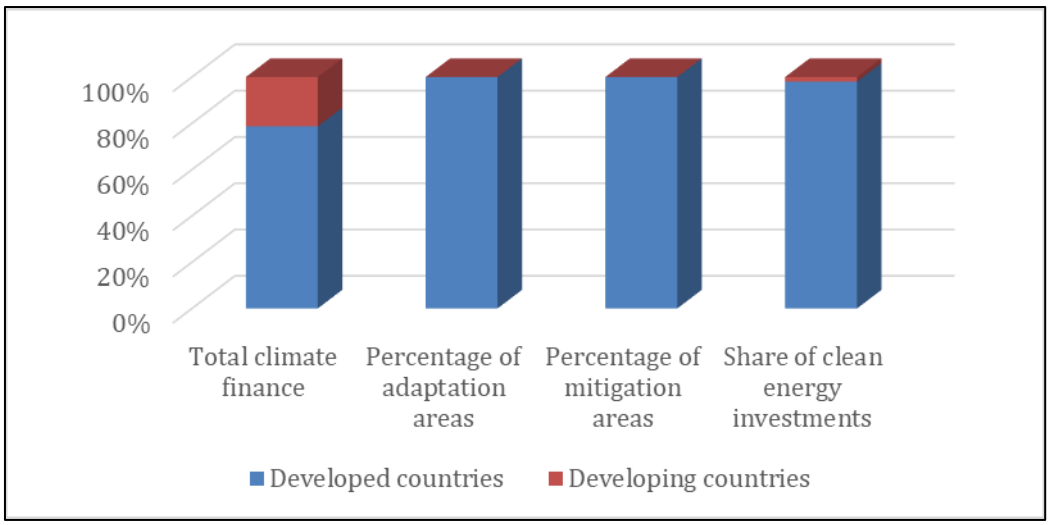

Figure 1 North-South imbalance in global climate finance flows

2.3. Technology Enablement and Innovation in Governance

The disparity between the North and the South in terms of the utilisation of digital technology is evident. Ferri et al. underscore the fact that the application rate of blockchain technology in the tracking of carbon data in developed countries is 78%, whereas in developing countries it is less than 12%. They further posit that the digital divide serves to exacerbate the differentiation of governance capacity, with developing countries still lagging in the collection and disclosure of ESG data. Consequently, there is a necessity to strengthen technological synergy by means of the 'International Science Programme on Digital Sustainability' [5]. Asokan et al. posit that the establishment of a 'methodological system for data-intensive research' has the potential to elevate SDGs research from the level of mere 'phenomenon description' to that of 'prediction-intervention'. Nevertheless, the challenges posed by interdisciplinary collaboration and data sharing must be surmounted [6].

2.4. Goal Synergy and Trade-off Paradox

The policy goals and related coordination contradictions. Soergel et al. found that there is a significant trade-off between climate policy (SDG 13) and economic growth (SDG 8) by integrating 56 SDGs indicators, and that synergies need to be achieved through new energy alternatives and technological innovations [7]. For instance, sub-Saharan African countries have the potential to integrate the objectives of poverty reduction (SDG 1) and the promotion of clean energy (SDG 7) through investments in renewable energy sources. However, it is crucial for these countries to address existing infrastructure deficits and financial shortfalls. Laumann et al.'s (2022) network analysis demonstrates that climate adaptation in the Global South is predominantly reliant on the promotion of education (SDG 4) and peaceful governance (SDG 16). In contrast, developed countries are primarily focused on industrial innovation (SDG 9) and the establishment of partnerships (SDG 17) [8].

2.5. Research Issues

Existing literature on North-South rule gaming, differences in technological empowerment and risk-sharing mechanisms is insufficient, and most of the extant studies focus on a single country or region and lack systematic international comparisons. There is an urgent need to fill the theoretical gap through cross-regional empirical evidence. This study proposes a mechanism for global climate governance by integrating authoritative international reports and cross-country cases, constructing a three-dimensional framework of 'North-South synergy - mutual recognition of standards - digital empowerment'.

3. Material and methods

3.1. Cross-regional Comparative Case Studies

Typical cases for consideration include the EU Green New Deal, China-ASEAN financial co-operation, and climate financing in Africa. Through the comparison of policy texts and the tracking of implementation effects, the differences between countries at different levels of development in terms of the adaptability of international rules, the efficiency of financial allocation and the ability of technology application are revealed.

3.2. Multi-level Dynamic System Analysis

Considering the international cooperation mechanism as a multilayered nested system comprising 'sovereign states, regional alliances and global governance institutions', the dynamic analysis framework of 'emergence-adaptation-feedback' is adopted. The focus is on the following:

Institutional layer: adaptive reconfiguration of the rule system (e.g., the tension between the EU Sustainable Financial Disclosure Regulation and Asian regional standards).

Technology layer: the disruptive effect of digital governance tools on traditional co-operation paradigms (redistribution of regulatory power triggered by blockchain technology)

Value layer: the perceived gap between North and South under the principle of ‘common but differentiated responsibilities.

3.3. Historical Institutionalism Perspective

Deconstructing the intergenerational evolution of international cooperation mechanisms through the analysis of 'time slices and key nodes'.

3.4. Interdisciplinary Theory Integration

The integration of the framework of 'polycentric governance' of environmental politics, the theory of 'path dependence' of institutional economics, and the model of 'non-linear interaction' of complexity science results in the construction of the triadic analysis dimension of 'institutional compatibility - interest coordination - technology penetration'.

4. Theoretical Frameworks

4.1. Logic of Financial Support for Sustainable Development

The core of the international cooperation mechanism of financial support for sustainable development lies in the integration of global resources through a systematic framework to promote low-carbon transition and inclusive growth [9]. Its logical starting point lies in the triple role of capital reallocation, risk hedging and value synergy.

4.2. Core Elements of International Cooperation Mechanism

The international cooperation mechanism needs to focus on the four dimensions of policy synergy, standardisation, financial flows and risk sharing [10]. Policy synergy faces the challenge of rule compatibility, for example, the China-EU Common Classification Catalogue (CGT) has a 30% rule conflict in the nuclear power and natural gas sectors [11]. This leads to a 15 per cent increase in the cost of cross-border capital flows. ASEAN validated the effectiveness of nested global governance in regional alliances by integrating member states' policies to shorten the approval cycle for cross-border green investments to 45 days, a 60% increase in efficiency. Standards harmonisation relies on data interoperability and transparency enhancement [12]. The Climate-related Disclosure (IFRS S2) issued by the

International Sustainability Standards Board (ISSB) has an application rate of less than 15% in Africa, but Singapore's FiNZ platform improves the efficiency of green capital allocation by 40% through blockchain technology, while the green bond database constructed by the Central Clearing and Settlement Corporation (CCASS) covers both domestic and overseas markets, effectively preventing 'greenwashing' risks. '3. Theoretical basis: global public

4.3. Theoretical Basis: global public goods theory, international mechanism design theory

The structural contradiction of financial flows is reflected in the imbalance between North and South and the need for tool innovation. Africa's investment in clean energy accounts for only 2% of the world, while the financial gap in the field of adaptation is as high as 130-415 billion U.S. dollars / year [13]. Gabon has demonstrated the potential of innovative tools by unlocking funds for mangrove conservation through a Debt-Eco-Swap (DNS), with carbon sink revenues covering 73% of debt principal and interest. Risk-sharing mechanisms need to be combined with dynamic risk assessment, and AI-driven GCAM models quantify the differences in financing gaps under different climate pathways to provide a basis for responsibility allocation, while the application rate of carbon data tracking in developing countries is less than 12%, highlighting the importance of technological empowerment and adaptive governance. International mechanism design theory, on the other hand, needs to balance North-South interests, such as the BRICS local currency settlement platform shortening the financing cycle by six months through exchange rate hedging.

5. Status and Practice of International Sustainable Financial Cooperation

5.1. Policy and Standards Coordination

The deepening of international cooperation on sustainable finance relies on breakthroughs in policy coordination and mutual recognition of standards. The Multilateral Common Classification Catalogue for Sustainable Finance (M-CGT), based on the China-EU Common Classification Catalogue (CGT), was released during COP29 in 2024, marking a significant progress in mutual recognition of standards between China, the EU and Singapore [14]. However, the promotion of standards still faces localisation dilemmas, for example, the Climate-Related Disclosures (IFRS S2) issued by the International Sustainability Standards Board (ISSB) has an application rate of less than 15% in Africa, exposing the shortcomings of developing countries in terms of data disclosure capabilities and regulatory suitability. The compatibility tension between the EU's Sustainable Financial Disclosure Regulation (SFDR) and the Asian regional standards is further highlighted, and there is an urgent need to balance the environmental objectives and the right to development through a dynamic rule adjustment mechanism [15]. The distribution of areas of conflict between Chinese and European Common Classification Table of Contents (CGT) rules is shown in Figure 2.

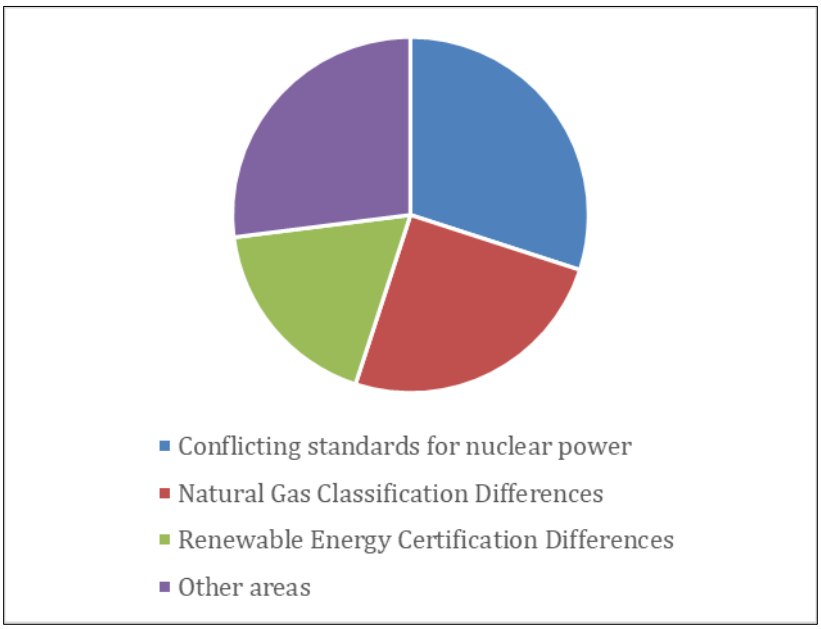

Figure 2 Distribution of conflicting areas of Chinese and European Common Classification Catalogue (CGT) rules

5.2. Platform for Multilateral Cooperation

Multilateral cooperation platforms play a central role in integrating global resources and bridging the North-South divide. the G20 Sustainable Finance Working Group promotes the innovation of climate finance mechanisms through the Transformative Finance Framework, and the 2025 Summit explicitly sets out two goals, namely 'scaling up financing for climate adaptation' and 'improving the global sustainable financial architecture' and promotes the development of a global sustainable financial architecture. The 2025 Summit clearly put forward the two major goals of 'expanding climate adaptation financing' and 'improving the global sustainable financial architecture' and pushed forward the quota reform of the International Monetary Fund (IMF), raising the voting power of developing countries to 45%, and enhancing their voice in international rule-making [16]. Multilateral initiatives represented by the Belt and Road Green Investment Principles (GIP) have leveraged private capital through mixed financing models. However, multilateral platforms still face the challenge of ineffective implementation [17].

5.3. Innovations in Regional Cooperation

Regional cooperation mechanisms have become an important complement to global governance through flexible institutional design and technological innovation. With the ASEAN Energy Transition Roadmap as the core, Southeast Asian countries have shortened the approval cycle for cross-border green investment from 120 days to 45 days through regional policy integration, and established a unified green bond certification system, which has pushed the share of renewable energy investment up to 28% [18]. Singapore's 'Financing for Net Zero (FiNZ) Action Plan' builds a net-zero data public platform (NZDPU) through blockchain technology, realises cross-chain verification of carbon data and accurate allocation of green capital, and reduces the cost of cross-border green bond issuance by 18% [19]. The cross-border financial cooperation between China and Mongolia and Russia focuses on the innovation of green financial instruments. However, regional cooperation is still constrained by the technological gap, for example, the application rate of blockchain carbon data tracking in developing countries is only 12 per cent, and technology transfer and capacity-building should be strengthened through the International Science Initiative for Digital Sustainability.

6. Typical Case Study and Optimisation Path

6.1. Case Studies

The utilisation of green sovereign bonds has emerged as a pivotal instrument in the pursuit of the Sustainable Development Goals (SDGs), with national credit endorsement and targeted fund allocation playing pivotal roles. For instance, Indonesia's Green Sukuk Green Sovereign Bond, issued in 2018, is the world's first Islamic green bond, raising funds earmarked to support climate adaptation programmes in its Nationally Determined Contributions (NDCs), including mangrove conservation and renewable energy construction [20]. The issuance of green bonds has been demonstrated to ease pressure on public finances whilst simultaneously directing global capital flows to areas of significant need within developing countries. This is facilitated by standardised issuance frameworks, of which there are numerous examples. One such example is France's Green Bond Framework, which clearly defines funding targets for renewable energy and clean transport [21].

An innovative approach for developing countries to break the debt-climate cycle is the Gabon's Debt-Nature Swap (DNS) mechanism. This innovative model provides a dual solution of debt restructuring and ecological protection for developing countries, whilst also enhancing project transparency through technical support from international organisations (e.g. The Nature Conservancy) [22].

The application of blockchain technology has the potential to transform the foundations of trust and the efficiency framework of green finance, due to its decentralised and tamper-proof characteristics. The Singaporean government's 'Financing for Net Zero (FiNZ) Action Plan' employs blockchain technology to establish a net-zero data public platform (NZDPU), facilitating cross-chain verification of carbon data and ensuring precise allocation of green capital. This initiative has been shown to reduce the cost of cross-border green bond issuance by 18% [23]. A notable disparity emerges in the adoption of blockchain technology across North and South, with the former leading the way at 78% adoption, while the latter stands at a mere 12%. Figure 3 elucidates the divergence in the utilisation of blockchain technology and its trend across North and South countries. The World Bank-led International Science Initiative for Digital Sustainability has contributed to the enhancement of African countries' carbon accounting capacity through the establishment of ESG data interfaces and the facilitation of technology transfer. However, its reach remains constrained to 20 hub nodes, accounting for 83 per cent of global green capital flows [24].

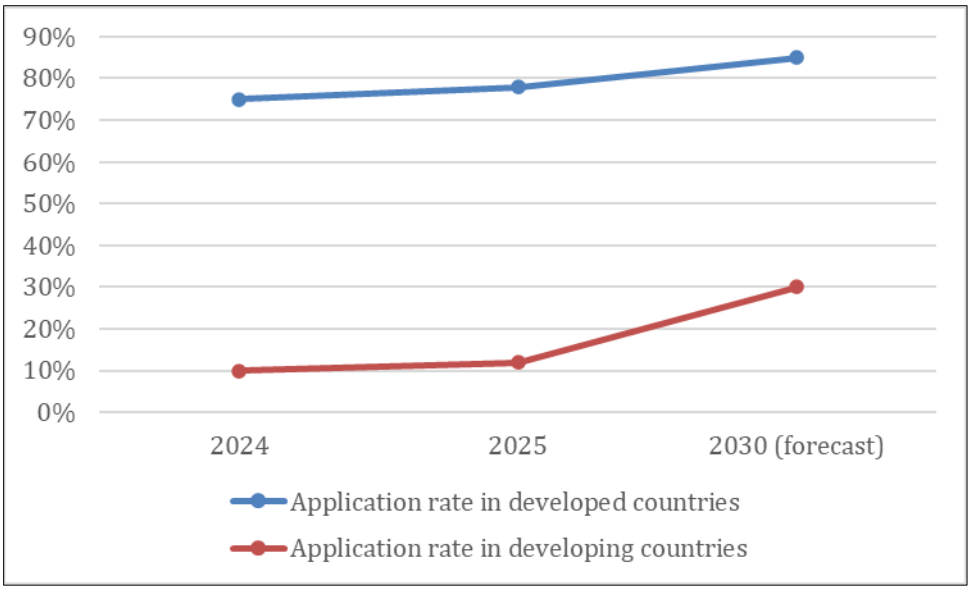

Figure 3 North-South differences in blockchain technology adoption rates

6.2. Challenges and Optimisation Pathways

The prevailing challenges encountered by contemporary international cooperation mechanisms in providing financial support for sustainable development are manifold. The issue of fragmentation of standards is especially salient; despite the China-EU Common Classification Table of Contents (CGT) having achieved consensus on areas such as nuclear power, 33 per cent of rules remain in conflict, resulting in a 15 per cent increase in the cost of cross-border capital flows. Geopolitical interference has been identified as a key factor in the resistance to cooperation, as evidenced by the underperformance of the financial commitments of the Paris Agreement (only 67% fulfilled) and the significant climate finance gap in Africa (USD 2.5 trillion/year [25]).

In order to address the aforementioned issues, it is necessary to establish a 'global-regional-national' three-level policy coordination network. At the global level, the G20 platform can be utilised to promote the mutual recognition of sovereign green bond standards, such as the cross-border replication of Indonesia's Blue Bond and Gabon's Debt Nature Swap (DNS). At the regional level, the nesting of rules between ASEAN's Energy Transition Roadmap and China-EU's CGT can be deepened, and the approval cycle for green investment can be shortened to 45 days. At the national level, the Digital Sustainability Initiative (DSI) can be employed to strengthen carbon accounting for developing countries. At the national level, it is necessary to strengthen the carbon accounting capacity of developing countries through the 'Digital Sustainable Development International Science Programme'. For example, the World Bank's NZDPU data platform has already covered 20 hub nodes, and it can be expanded to 50 nodes in the future. Concurrently, the integration of digital technology and transformational financial instruments should be encouraged. For instance, the FiNZ platform in Singapore employs blockchain technology to reduce the cost of cross-border green bond issuance by 18 per cent, and the AI-driven GCAM model can dynamically quantify the climate financing gap and optimise the allocation of responsibilities. Furthermore, it is imperative to enhance the capacity building of developing countries, as exemplified by the ADB Climate Resilience Fund, which can provide sovereign credit enhancement for Africa, increase private capital participation from 38% to 60%, and address the 'default' misjudgement of international rating agencies through the 'debt-ecological replacement' special risk hedging mechanism. 'Misjudgement.

7. Conclusions

This study demonstrates that international cooperation mechanisms for sustainable development finance have evolved dynamically across three phases: from unilateral fund transfers under the Paris Agreement (2015–2020) to digitally enabled smart contract governance (2021–2025), with future systems poised to adopt AI-driven adaptive frameworks (2026–2030). The analysis further demonstrates that regional innovations, such as the unified green bond certification system in the Association of Southeast Asian Nations (ASEAN) and the quota reforms of the International Monetary Fund (IMF) by the Group of 20 (G20), underscore progress in mitigating North-South divides. However, the study also highlights the need for systemic solutions to address persistent challenges, including fragmented standards and technology-driven inequality. The analysis proposes the incorporation of dynamic risk assessment models and

institutional innovations, such as the BRICS local currency settlement platform, to optimise responsibility allocation and reduce financing cycles. The imperative for future cooperation is to prioritise the governance of AI, the transfer of technology that is inclusive, and financial architectures that are geopolitically resilient. The Belt and Road Green Investment Principles, as articulated by China, and initiatives focused on Africa, offer "Eastern solutions" that are inclusive. The synthesis of global and regional policy networks and digital tools, as provided by this research, provides a framework for policymakers to mobilise equitable climate finance, bridge funding gaps, and accelerate the achievement of the Sustainable Development Goals. The insights derived from this research will serve to strengthen multilateral coordination, thereby fostering inclusive growth and advancing global climate action through harmonised standards and technology integration.

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