



Advancing Green Transportation through Subnational Diplomacy: West Java–Chungcheongnam-do Cooperation in e-BRT and EV Infrastructure Development

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ABSTRACT

The challenges of urban carbon emissions and air pollution are growing, and the need for sustainable transport is becoming more pressing on a global scale, especially in developing countries, where implementation is often hampered by the lack of infrastructure and institutional capacity, and lack of policy coordination. The cooperation of West Java Province, Indonesia, and Chungcheongnam-do, South Korea, is relevant in this context because it is an example of subnational actors solving these problems with cross-border collaboration. In this study, secondary data analysis techniques based on a qualitative descriptive analytic approach is used, which is data obtained from official documents, institutional reports, and scientific literature. The results demonstrate that the cooperation has been moving toward tangible results in the form of policy implementation, such as the development of EV charging stations and electric bus rapid transit (e-BRT) in Bandung, and the Joint Working Group Meeting (JWGM) serves as a regular coordination forum that strengthens technical dialogue and operational alignment. The dynamics suggest subnational cooperation is not only a pathway to policy diffusion but also a way of creating capacity for policy implementation through the technical coordination of policy implementation across the subnational lines.

Kata Kunci

Transportasi hijau,
Infrastruktur
kendaraan listrik (EV),
Jawa Barat,
Chungcheongnam-do,
Keberlanjutan
perkotaan

ABSTRAK

Peningkatan emisi karbon dan polusi udara di kawasan perkotaan menuntut pengembangan transportasi berkelanjutan, namun implementasinya di wilayah berkembang sering terkendala keterbatasan infrastruktur, kapasitas kelembagaan, dan koordinasi kebijakan. Dalam konteks ini, kerja sama antara Pemerintah Provinsi Jawa Barat dan Chungcheongnam-do, Korea Selatan, menjadi relevan untuk dikaji sebagai upaya aktor subnasional dalam merespons tantangan tersebut. Penelitian ini menggunakan pendekatan kualitatif dengan metode deskriptif-analitis berbasis data sekunder dari dokumen resmi, laporan institusi, dan literatur akademik. Hasil penelitian menunjukkan bahwa kerja sama telah bergerak menuju implementasi kebijakan konkret melalui pengembangan e-BRT dan infrastruktur pengisian daya kendaraan listrik di Kota Bandung, dengan Joint Working Group Meeting (JWGM) berperan sebagai forum koordinasi teknis yang memfasilitasi pertukaran pengetahuan dan penyesuaian operasional. Temuan ini menunjukkan bahwa kerja sama subnasional tidak hanya berfungsi sebagai difusi kebijakan, tetapi juga sebagai mekanisme pembentukan kapasitas implementasi melalui koordinasi teknis lintas negara.

INTRODUCTION

Urban transportation systems are undergoing a transformation and it has emerged as one of the most critical challenges in the sustainable development agenda, especially in areas at high urbanization rates. Transportation plays a key role in the economy and is crucial to the mobility of citizens, but it is also a significant contributor to carbon emissions and air quality problems. These pressures are compounded in the context of developing countries, as a consequence of private vehicle use increasing much faster than the quality and coverage of adequate public transport (Kern & Bulkeley, 2021). As a result, major cities are in a situation where mobility demand keeps rising and environmental and infrastructural capacities cannot keep up.

This is especially true in metropolitan areas in Indonesia, such as West Java, which is highly populated and mobile. As an economic, educational and tourism hub, Greater Bandung embodies all these issues in the form of chronic traffic jams, excessive emissions and polluted air quality. These conditions not only impact on the environmental but also have economic impacts, including time and transport inefficiency and social impacts on people's lives. Thus, today the transportation problem in West Java can no longer be treated as a problem of the sector, but can be seen as a structural problem related with the orientation of regional development.

To address these challenges, the idea of green transportation has been developed, which focuses on reducing emission with low carbon technology, optimizing the use of energy and synergy between transportation systems and renewable energies. The introduction of green transport in developing countries is not so straightforward as the introduction of green EV technology. The shift to become a low carbon transport sector is thus a multi-faceted process that needs the coordination of actors and sectors (Kern & Bulkeley, 2021; Lee & Koski, 2022).

International cooperation is therefore a policy levers to fill skills gaps among local government. In addition to financial assistance, this cooperation serves as a means of technology transfer, knowledge exchange on policies, as well as technical and institutional capacity building. Remarkably, nation-states are no longer the only ones that dominate the dynamics of international cooperation in transportation and environmental issues. The expansion of subnational governments' role in establishing cross-border relations to address development needs that are immediate and context-specific, is growing (Acuto, 2013; van der Pluijm & Melissen, 2021).

This is where the cooperation between the Government of West Java Province and Chungcheongnam-do, South Korea comes into play. The cooperation is aimed at the development of electric bus systems and solar-powered EV charging stations in Bandung. But the cooperation is not just a technological undertaking, it is also a more extensive endeavour in policy alignment, technical exchange and developing institutional mechanisms for the sustainable implementation of programmes. It is therefore an empirical example of how global agendas like sustainable urban development and climate action get embodied in meaningful policies at the local level, in the process of which, these agendas are connected across the border.

Looking from the academic side, the literature analysis reveals that academic research on green transportation has moved from a mere technical nature to a governance and policy perspective. In addition to emission reduction potential, research has also pointed to the need for the appropriate regulation, infrastructure, and institutional capacity to explain the success of implementation. However, most studies continue to be conducted in developed country settings or between two or more states, with little to offer explanation of the nature of these processes at the subnational level, especially in developing countries (Acuto et al., 2024).

This gap is demonstrated by the low number of researches that correlate paradiplomacy and sustainable transportation problems in Indonesia. The current studies tend to focus on economic and investment aspects of paradiplomacy, and the aspects of environment and energy transition are less

explored (Putri, 2022; Nadya et al., 2023). Rather, it is essential that green transportation problems are addressed by the very bottom line actors who are engaged in the implementation of the policies.

In this context, this article proposes to interpret the partnership of West Java-Chungcheongnam-do not only as a technical project, but also as a practice of diplomacy of subnational level, which seeks to tackle local capacity constraints by establishing collaboration mechanisms across the borders. The analysis is centred on the design, implementation and institutionalisation of this cooperation, related to the theme of green transportation, and its contribution to the transition towards low-emission transportation systems at the regional level.

The need for this research is given by the need to better understand the concrete policies and actual impacts of subnational cooperation, especially in developing countries with limited resources, technical capacity and support from infrastructure. If countries don't have this understanding, then cooperation can be symbolic or short-term, unsustainable projects. Thus, studying the mechanisms of implementation is of importance to understand the effectiveness of cooperation for the transformation of green transportation.

In addition, the article also situates this research in the changing trend in international relations practices, wherein subnational actors are not only implementers of policies but also actors influencing the implementation of the global agenda at the local level. The theme is motivated by the necessity to link the theory of international relations and technical policy on the ground.

The novelty of this article is an effort to bring together the technical analysis of the green transport sector with international relation theories such as paradiplomacy and subnational transgovernmentalism in one empirical case study in Indonesia. The article presents the use of cross-border technocratic coordination as an important aspect linking subnational cooperation and operational, measurable and sustainability oriented policies, a combination of practical and conceptual way in which previous studies usually do not look at. It thus fills a gap in the literature, and provides an analytical perspective that brings together governance, technology, and diplomacy in a more integrated way.

CONCEPTUAL FRAMEWORK

Paradiplomacy

The notion of paradiplomacy is introduced to explore the role of subnational governments as relocally autonomous agents in international relations engaged in foreign activities (Kuznetsov, 2015; Tavares, 2016). The rise of paradiplomacy is inextricably linked to the growing complexity of global issues that are no longer comprehensible or manageable by the conventional diplomatic process between states. Subnational actors like provincial and municipal governments are becoming more active and involved in international contacts and negotiations with foreign partners in search of strategic benefits, such as technology transfer, strengthening of institutional capacity and making development policy more legitimate (Acuto, 2013; van der Pluijm & Melissen, 2021).

Paradiplomacy emerges out of the requirement of regions to access resources, opportunities and international networks that are not always available through the central governments (Kuznetsov, 2015; Michelmann, 2010). In this sense, paradiplomacy should not be considered as 'outsider diplomacy' that is done by the local level governments, but as an 'outsider diplomacy of development' linking local interests with global agendas. In practice, paradiplomacy tends to be more pragmatic and results-oriented, with a view to technical programs and policies that could have a tangible impact on regional development, and not only the politics of image building (Tavares, 2016).

Paradiplomacy enables local governments to establish direct international relations in order to access resources, technology, and knowledge needed to address local challenges. In issues such as climate change and sustainable transportation, local governments are often at the forefront of policy

implementation while also being the actors most directly affected by the success or failure of such policies. Therefore, the active involvement of local governments in international cooperation becomes a crucial element in the effectiveness of global climate governance, including through city networks and intergovernmental collaboration among subnational entities (Gordon & Johnson, 2021; Kern & Bulkeley, 2021).

In the context of climate change and sustainable urban development, paradiplomacy becomes increasingly relevant as local governments are on the front line of implementing environmental policies, including the transformation of transportation systems (Kern & Bulkeley, 2021). Cross-border cooperation between regions can serve as an important instrument to accelerate the adoption of low-emission technologies and strengthen supporting policies. In the case of cooperation between West Java and Chungcheongnam-do, paradiplomacy is reflected through the direct involvement of subnational governments in developing green transportation, such as the construction of electric bus infrastructure and solar-based charging stations, which are designed through technical planning and institutional capacity building.

In this study, the concept of paradiplomacy is used as an analytical tool to examine the roles, interests, and strategies of the West Java Provincial Government as a subnational actor in engaging in international cooperation in the field of green transportation.

Subnational Transgovernmentalism

The concept of subnational transgovernmentalism is used to explain patterns of cross-border cooperation carried out by local government institutions through technocratic networks that are direct, flexible, and problem-solving oriented. This approach is rooted in the idea of transgovernmental networks, which emphasizes that governmental institutions across countries can build horizontal relationships to exchange regulations, technical standards, and policy practices without being fully dependent on formal nation-state diplomatic channels (Slaughter, 2017).

The theory of subnational transgovernmentalism suggests that subnational actors do not have only to rely on governmental policies but also act as the main actors that create cross-border ties through recurrent and well-established mechanisms of technical coordination (Gordon & Johnson, 2021). In this regard, the theory allows for developing the network that brings together actors of different regions who would be able to exchange knowledge, transfer policies and develop new solutions based on the experience they already have. The issue of clean transportation needs not only political will but also regulatory coordination, preparedness, and sustainable maintenance of the system (Kern & Bulkeley, 2021).

Concerning the relationship between West Java and Chungcheongnam-do, subnational transgovernmentalism finds its realization in the Joint Working Group Meeting (JWGM), a technical forum that plays the role of the coordinating platform where actors make evaluations and decisions. Thus, not only physical construction of the charging stations but also institutional measures such as strategic planning, charging technology, battery safety, and the life cycle of batteries are discussed there. Moreover, the involvement of South Korean organizations like Chungnam Center for Creative Economy and Innovation and Korea Testing Laboratory illustrates how the development of cross-border relations helps implement innovations of both a technical and regulatory character.

Thus, this study uses the concept of subnational transgovernmentalism as its primary theoretical foundation to explore the mechanisms of technical coordination and knowledge exchange.

Sustainable Green Transportation

Green transportation can be understood as attempts at creating an eco-friendly transport system through reduced emissions, increased energy efficiency, and adopting low-carbon technology (Kern & Bulkeley, 2021). The scope of sustainable green transport not only includes the use of electric cars but

also building the necessary infrastructures, integrating transport systems, and adopting governance systems aimed at protecting sustainability. Sustainable green transport has arisen in the face of urban pollution, increased carbon emissions, and global demands for promoting sustainable development (Lee & Koski, 2022).

In the cooperation between West Java and Chungcheongnam-do, sustainable green transportation is reflected in the development of electric bus systems and the construction of solar-powered charging stations in Bandung, aimed at reducing dependence on fossil fuels and accelerating the transition to clean energy. The implementation of green transportation in this context also demonstrates that low-emission mobility cannot be separated from strengthening institutional capacity, operational planning, and cross-sector policy coordination (Gordon & Johnson, 2021).

Green transportation is directly linked to global agendas, particularly Sustainable Development Goal (SDG) 11 on sustainable cities and communities and SDG 13 on climate action. Therefore, in this study, the concept of sustainable green transportation is used as an evaluative framework to assess the extent to which subnational cooperation contributes to emission reduction, energy efficiency, and the sustainability of urban transportation systems.

These three constructs can be considered interconnected parts forming a complete analytical approach. The concept of paradiplomacy is used in order to define the forces driving the involvement of subnational governments into cross-border activity and attempts to develop local conditions via utilization of external factors such as resources, technology, and information. At the same time, subnational transgovernmentalism helps to explain the actual processes taking place during such cooperation in the forms of technocratic coordination, knowledge exchange, and interaction between institutions, performed consistently by subnational governments.

At the same time, the construct of sustainable green transportation serves as an evaluative component for measuring the effects that result from the aforementioned cooperation, namely the degree of reduction of emissions, energy efficiency, and sustainability in general of the transportation system being developed.

RESEARCH METHODOLOGY

In terms of methodology, this study uses a qualitative approach in combination with the descriptive-analytical method for examining the paradiplomatic practices of the West Java Provincial Government in their cooperation with Chungcheongnam-do for the promotion of sustainable green transportation. In this regard, the unit of analysis is the institutional interaction along with the mechanisms of subnational cooperation used as indicators of paradiplomacy practices; the study context is West Java–Chungcheongnam-do, the empirical site being Bandung within the period 2020–2024. For data collection, a literature review was conducted on relevant government official documents (publications by the West Java Department of Transportation), cooperation reports, institutional news, media publications on national level, and scientific journal articles available in official regional government websites, media websites, and academic databases (Google Scholar). Search terms used during the process include “paradiplomacy West Java,” “cooperation West Java–Chungcheongnam-do,” “green transportation in Indonesia,” “electric buses in Indonesia,” and “Bandung EV charging infrastructure.” For data analysis, the stages involved include source selection, thematic coding (types of cooperation, mechanisms of coordination, and implementation outcomes), and interpretations based on paradiplomacy theory and subnational transgovernmentalism to explain the interactions between the actors involved and the processes of cooperation. Data validity was maintained by source triangulation to verify the information gathered from government documents, institutional reports, and media publications. Additionally, policy data was compared with implementation outcomes in order to ensure consistency of the analysis.

RESULTS AND DISCUSSIONS

Implementation of West Java–Chungcheongnam-do Cooperation in Green Transportation

Apart from its interpretation as paradiplomacy and subnational transgovernmentalism, it is interesting to note that the collaboration between West Java and Chungcheongnam-do is an embodiment of another characteristic feature of current international relations – technical diplomacy. Indeed, for such complicated issues as climate change and energy transition, intergovernmental relations between countries are no longer defined exclusively by intergovernmental talks, but also involve technocrats, who manage to organize processes effectively on a constant basis. It seems like such a trend reinforces the hypothesis that today, global governance takes place due to cross-institutional networks which make it possible to establish flexible flows of standards, regulations, and policy-making techniques beyond nation-state diplomacy (Slaughter, 2017). Therefore, it seems reasonable to say that the collaboration discussed above can be viewed as the enhancement of mechanisms of cross-border technical cooperation which make it possible to connect normative initiatives, such as those concerning sustainable development and reduction of emissions, with practical demands. Thus, it implies the adjustment of design systems, safety procedures, and the readiness to maintain infrastructure.

In terms of the cooperation between the West Java Provincial Government and Chungcheongnam-do, the aspect of increasing the role of technical cooperation becomes especially pronounced in the process of implementing subnational cross-border relations. In such a way, the cooperation not only entails formal aspects of the agreement between the regional governments, but also demonstrates a pattern of interactions between policies developing in the direction of technical cooperation. Since the problems related to green transportation become increasingly complicated, technical cooperation becomes a necessary part of the cooperation process which requires the involvement of bureaucrats who have certain technical expertise. This point supports the idea that subnational relations are determined by both political concerns and institutional ability to manage the technical aspects of public policy (Gordon & Johnson, 2021; Kern & Bulkeley, 2021). From this standpoint, the cooperation can be viewed as an illustration of how technical cooperation helps achieve certain coordination of knowledge and policy-making, as well as enhance institutional capacities of the actors involved from various countries.

The form of technical coordination in the case of this cooperation is also demonstrated by its creation of applicable policy-based capacity. The technical information exchanged will be translated from an abstract state to one where it can be utilized for decision-making as technical simulation models, efficiency calculations and system planning documents. Technical coordination provides a critical mechanism at this stage because the transition to green transportation fundamentally requires both technical certainty and operational readiness not simply political commitment. At this time technical coordination serves as an enabling pathway which allows for standardization of the adjustments required to align the parties' respective capacities for implementing their responsibilities toward cooperation thereby making the feasibility of cooperative efforts easier to achieve. These characteristics are supported by prior research indicating that City Networks and Intergovernmental Cooperation function as knowledge brokers and as catalysts for Climate Policy Adoption via orchestration, learning and capacity development (Kern & Bulkeley, 2018; Gordon & Johnson, 2020). Therefore, technical coordination is not simply a supportive component of cooperation but a fundamental tool that allows cooperative effort to be converted into actualized, long-term programming.

Technical institutions from South Korea also participate in this cooperation, further adding to the technocratic nature of the cross-border networks. Support from institutions like Chungnam Center for Creative Economy and Innovation (CCEI) and Korea Testing Laboratory (KTL) indicates that interregional relations not only serves as a policy exchange platform, but also a technology transfer and technical standardisation platform. The existence of these institutions is a sign that for green

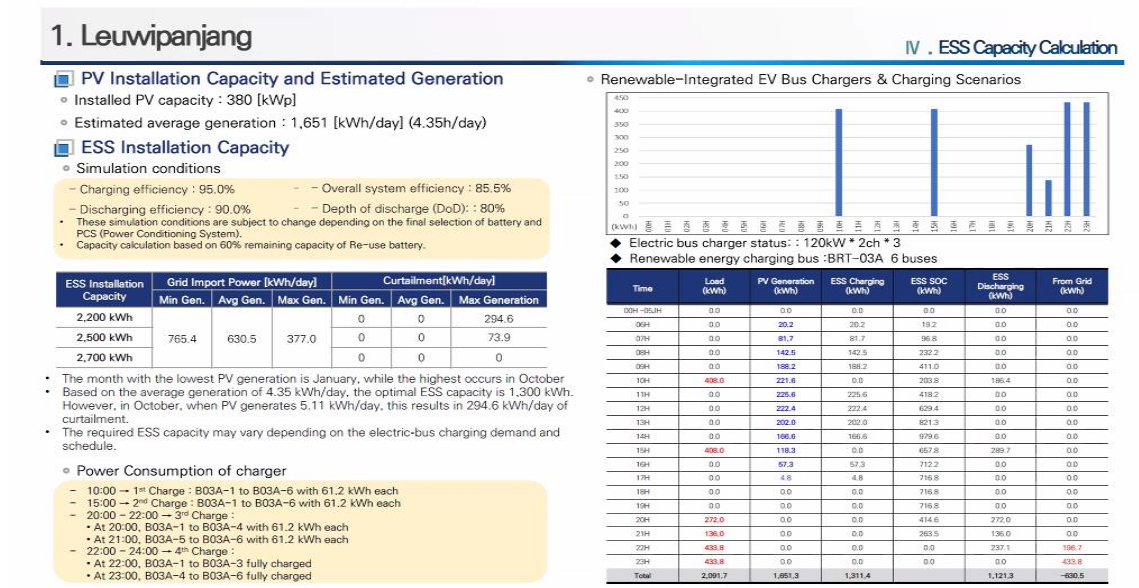
transportation cooperation actors are necessary who can take policy into procedures, safety, and applicable calculation models. Cross-border technical cooperation is not just an act of communication between local governments; at this stage it becomes a form of governance across borders that influences the way in which policy is implemented at the local level. It also demonstrates the value of technocratic networks for enhancing local government capacity to develop evidence-based policies, particularly in areas of public safety and cost efficiency, and operational sustainability.

Another key issue is the role of technical coordination mechanisms as additional opportunities for subnational actors to develop their negotiating power. The cooperation is based on a technical agenda, but the decisions made within the cooperation have policy implications, including development agenda, technological standards, governance and infrastructure maintenance models for operations, etc. It is therefore not possible to divorce technical coordination from the public policy aspects, because this has an impact on the implementation and sustainability of programs at the local level. In this sense technocratic fora like Joint Working Group Meetings (JWGM) can be seen not just as a place where knowledge is transferred but as a place where the interests and policy preferences of both parties are aligned with a standard alignment and a shared understanding of operation (Slaughter, 2017; van der Pluijm & Melissen, 2021).

This technocratic cooperation must be considered with some scepticism however, since the transfer of knowledge and technologies is not always in an even relationship. Where technical standards, testing systems and operational designs are highly reliant on outside partners there is the potential risk of dependency which restricts local adaptation. This is a typical case where the capacity-building process in international relations can lead to capacity gaps, particularly when institutional capacity-building is not parallelly implemented through human resources training, regulations and maintenance programs (Slaughter, 2017). Therefore, technocratic cooperation should not only aim for short-term project success but also for capacity-building agendas that strengthen regional autonomy in managing green transportation systems sustainably. This strategy is important to ensure that cooperation becomes a two-way learning process rather than a one-directional technology transfer.

Based on these dynamics, technical coordination mechanisms help explain why the West Java–Chungcheongnam-do cooperation has been directed toward concrete programs such as solar-powered charging stations and the development of e-BRT systems. Through structured technical coordination, this cooperation also demonstrates how subnational actors can build institutional capacity to manage energy transition agendas while accelerating the adoption of low-emission policy and technological innovations. In this context, cross-border technical coordination not only expands the role of local governments as actors in international relations but also strengthens the contribution of city networks to climate action and sustainable development agendas, particularly through institutionalized and program-based cooperation (Acuto et al., 2024; Gordon & Johnson, 2021). Thus, this cooperation shows that subnational diplomacy can move beyond political symbolism toward more substantive cross-border governance practices, where technical coordination not only supports implementation but also shapes institutional capacity that determines policy sustainability at the regional level.

Figure 1. Calculation of ESS Capacity and Electric Bus Charging Scenarios Integrated with Renewable Energy at Leuwi Panjang Terminal



Source: Bandung TOD Concept Plan (2024)

Along with the physical infrastructure outputs, the implementation of this cooperation also serves as an example of strengthened institutional dimensions, with more structured coordination mechanisms. Regular forums like the Joint Working Group Meeting (JWGM) becomes important to ensure continuity and technical and institutional synchronization among the involved parties. The JWGM forum shows that implementation does not proceed separately within each region but through recurring coordination patterns that allow evaluation, target updating, and the formulation of follow-up actions. At this point, cooperation not only produces infrastructure outputs but also establishes relatively stable and problem-solving-oriented technical cooperation patterns.

The implementation outcomes are also reflected in the involvement of technical institutions that strengthen regional capacity in designing and implementing programs. The support of institutions such as CCEI and KTL indicates that cooperation is directed not only toward general policy exchange but also toward detailed technical aspects, including standardization, testing, and operational capacity building. In this context, interregional cooperation serves as a channel for knowledge and technology transfer that accelerates regional readiness to adopt green transportation innovations.

The implementation-oriented nature of this cooperation is further evident from the use of technical simulations as a basis for policy consideration. Data presented in the JWGM shows that e-BRT system planning does not only emphasize technology adoption but also considers energy efficiency, operational effectiveness, and projected economic benefits. The simulation results at the terminals in Leuwi Panjang and Cicaheum yield charging efficiency of 95% and the cost reduction can be up to IDR 12,8 billion per year by running 50 electric buses. The results highlight the technical and economic feasibility of the systems and the direction of cooperation that will lead to a more sustainable programme.

This cooperation occurs at the same time, while the development of electric vehicle policies and infrastructure in Indonesia is underway. Increased charging infrastructure is one of the essential prerequisites to help increase EV uptake, including enabling optimal electric bus operations. From this

perspective, the adoption of the solar powered EVs charging infrastructure can be interpreted as an initiative to enhance the regional infrastructure readiness and promote the national EV ecosystem.

Table 1. Targets and Realization of EV Charging Infrastructure (SPKLU) in Indonesia (2024–2025)

EV Infrastructure Indicator	Year	Number	Unit	Description
National SPKLU target	2025	6.318	units	Target for SPKLU development in the EV ecosystem roadmap
SPKLU realization	2024	3.202	units	Number of installed SPKLU
SPKLU locations	2024	2.180	locations	Distribution of installed SPKLU locations

Source: International Trade Administration (2023)

More broadly, the implementation of e-BRT and solar-based EV charging infrastructure shows that this cooperation is not only focused on the transportation sector but also represents a pattern of subnational engagement in responding to global agendas. Local governments act as actors that build cross-border relations to strengthen local capacity in addressing climate change through energy transition policies. The strengthening of coordination mechanisms such as JWGM indicates that interregional relations are moving toward more institutionalized forms of cooperation through recurring technical agendas, knowledge exchange, and program alignment.

Overall, the empirical findings show that the implementation of West Java–Chungcheongnam-do cooperation encompasses three interconnected dimensions: technological implementation (e-BRT and charging stations), institutional strengthening (coordination mechanisms and regular meetings), and sustainability orientation (energy efficiency and economic benefits), all of which reinforce the long-term sustainability of the program.

Paradiplomacy and Subnational Transgovernmentalism in Green Transportation Cooperation

Rather than being understood merely as a technical transportation project, the empirical findings above show that the cooperation between West Java and Chungcheongnam-do constitutes a form of international interaction that can be analyzed through the frameworks of paradiplomacy and subnational transgovernmentalism. This cooperation demonstrates that local governments are not only implementers of central government policies but also act as international relations actors actively responding to global issues, particularly climate change and the energy transition agenda. In contemporary international relations, the involvement of subnational actors is increasingly relevant, as cross-border issues require responses that are close to the arena of policy implementation, namely at the local level (van der Pluijm & Melissen, 2021). This is reflected in green transportation cooperation developed through strengthening the e-BRT system and the construction of renewable energy-based charging infrastructure, which not only focuses on physical development outputs but also encompasses institutional dimensions and technical diplomacy that require sustained cross-border coordination.

The relationship between West Java and Chungcheongnam-do is one of the examples of subnational actors who attempt to realize the development interests of the region through the utilization of technology, network and cross border cooperation (Tavares, 2016; Kuznetsov, 2015). The essence

of paradiplomacy is that regions have to seek resources, opportunities, and policy legitimacy that is not always available from the central government (Michelmann, 2010). Green transportation cooperation in this instance is interpreted as a regional development policy based on international relations cooperation which is used to improve the capacity of the local community to deal with the challenges of climate change and to speed up the modernization of low-emission public transportation. An emphasis on cooperation's direction towards specific program outcomes reflects the pragmatic and results-oriented nature of paradiplomacy, in which subnational external relations are seen as a way to satisfy public service and sustainable development requirements with greater measurable results (Kuznetsov, 2015).

In addition to the development dimension, the cooperation also has a paradiplomacy dimension of legitimacy and reputation. The green transportation agenda is connected to the transition to clean energy and helps establish the credibility and legitimacy of policies in the eyes of the public while also improving local governments' role as regions responsive to climate issues. In global governance, this credibility may turn into an asset to be leveraged to build more partnerships, join networks and find opportunities for technical support and green financing in the future (Acuto et al., 2024). In this way, this cooperation has not only policy outputs, but also empowers local governments as key players in sustainable development based international cooperation.

At the same time, from the subnational transgovernmentalism angle, cooperation accentuates the creation of cross-border networks of technocrats or technical experts between governmental institutions directly, flexibly, and in a problem-solving fashion. The activities of the Joint Working Group Meeting (JWGM) can be seen as an example of this process, as it not only provides a forum for coordination but also serves as a place for harmonisation of technical standards, exchange of regulations and the development of policy solutions between local bureaucracies. This is consistent with the concept of global governance taking place through a transgovernmental network that allows for horizontal governance and supports an intergovernmental framework with avenues for policy learning but without the need to rely solely on formal diplomatic interactions (Slaughter 2017).

Whereas, in matters like climate change and low emission mobility, such mechanisms have been essential, as one needs political will to transition to different forms of energy, but also capacity to plan, standardise and maintain an operational readiness to act. Cooperation at the subnational level is not only a medium of implementation, but also a setting in which policy preferences and operational criteria are directly negotiated between actors at the local level. This process shows that paradiplomacy involves the ability of subnational actors to influence the concrete form of adopted policies.

These mechanisms align with ideas that city networks and intergovernmental working between local governments acts as knowledge brokers and climate policy orchestrators, in helping to disseminate good practice and speed up policy uptake (Gordon & Johnson 2021; Kern & Bulkeley 2021). The JWGM in this context can be seen as an institutionalisation of technical cooperation, as it will enhance the sustainability of the agenda by providing a more measurable way to review and act on the outcomes and decisions made. Accordingly, subnational cooperation is being implemented not only in the form of agreements, but also through technical mechanisms aimed at strengthening institutional capacity and effectively implementing long-term green transportation programmes.

This kind of cooperation also suggests the existence of policy diffusion, and specifically the transfer of technical knowledge and policy practices from the partners of South Korea to West Java. Concretely, the cross-regional learning takes place through the standardization of the safety aspects, operational planning, and technical capacity building, which is seen in the participation of technical institutions like the Chungnam Center for Creative Economy and Innovation (CCEI) and the Korea Testing Laboratory (KTL). At this stage, policy diffusion is not passive copying, but learning processes that are structured and focused on implementation.

The diffusion process, however, is not linear, but is a process of selection and adaptation, taking into account the local condition. This means that local governments do not automatically replicate practices from other partners, but modify them based on local needs and constraints.

In parallel, the technology transfer of such a cooperation shows that policy diffusion can take place in unequal relationships. In the green transportation cooperation, subnational entities in developing countries are more likely to be recipients of innovation and partners from developed countries are more likely to be technology providers, technology standards and technical skills. This situation can lead to capacity imbalances which can have implications on the bargaining position of local governments, particularly if implementation continues to be reliant on external technical assistance. Internationally, this demonstrates that paradiplomacy is not necessarily neutral, and can, in the absence of parallel efforts to build local capacity, re-create dependency dynamics (Slaughter, 2017).

Hence, transfer of knowledge must be considered as a process of capacity negotiation and long-term measures for the reduction of dependency in terms of human resource development, institutional strengthening, and the development of technical standards compatible with local contexts are required (Acuto et al., 2024).

However, the results of this cooperation also show structural issues that can affect the sustainability of the program, including the absence of regulations on battery management and recycling, reliance on foreign technology and technical assistance, and a lack of long-term financing for operations and maintenance. The success of implementation is directly related to the overall structural support that is provided, such as vertical coordination between local and central governments in terms of regulatory and financial support.

Implementation success is closely connected to consistency of regulation, coordination between sectors and financial security in relation to green transportation. As such, synergy with the central government is a necessary precondition for securing more effective subnational cooperation (Kern & Bulkeley, 2021).

Collaboration between West Java and Chungcheongnam-do is an example of subnational diplomacy, which is gradually results-oriented and with an orientation towards sustainable development-related agendas. The partnership shows that local-level technical cooperation, knowledge sharing, and policy innovation can help speed up the shift towards low-emission mobility, while supporting the role of local actors in contributing to climate action (Acuto et al., 2024; Gordon & Johnson, 2021).

In this context, local governments are not only objects of climate policy but also are subjects that help shape the ways in which sustainable development is implemented through cross-border cooperation. Consequently, the concepts of paradiplomacy and technocratic networks in this cooperation convey a message that it is possible to have a strategic contribution from subnational actors in the field of climate governance, as long as cooperation is channeled towards concrete, institutionalized, and sustainable programmes.

CONCLUSION

The collaboration between the West Java Provincial Government and Chungcheongnam-do shows that it is possible to go beyond formal agreement and concrete and measurable policy implementation at the subnational level. Bandung's experience in the development of electric bus systems and the establishment of charging infrastructure using renewable energy demonstrates that it is possible to implement the green transportation agenda as operational practices if coordinated in the right way and regularly. Forums like the Joint Working Group Meeting (JWGM) serve not only as a communicative space, but also as a space where technical issues, working practices, and design of implementation are directly negotiated between the actors of the bureaucracy. Program success is not only dependent on

the availability of technology, however, but on the capacity of local governments to incorporate technical, economic and operational considerations and readiness into policy planning. These interactions also help in building up institutional capacity through transfer of relevant technical knowledge and experience.

On an analytical level, such dynamics indicate that subnational cooperation not only serves as a policy implementation tool, but also as a place for capacity development and contextual policy adjustments. As a result, the relationship between local governments and the actualisation of adopted policy is characterised by its active involvement, including in the technical negotiation processes and through adaptation to local conditions. This places cross-regional cooperation as a tool that can both speed up innovation dissemination and be a pathway to create more implementation-oriented policies. In this context, the article provides insights on the potential to create policy practices that are operational and sustainable by engaging in cross-border interaction at the subnational level, specifically with regard to the development of low-emission transport in developing regions. It also illustrates how subnational cooperation acts not only as a means of policy diffusion, but also as a tool for achieving operational harmonization and increasing the capacity of implementation through technical cooperation.

Nevertheless, there remain a number of challenges to the sustainability of the program as it relates to long-term financing requirements, supporting regulations, and reliance on technology and technical support from external partners. These conditions suggest that their implementation was not possible without broader structural support, involving the synergy of local and central government in guaranteeing stable regulatory and financial frameworks. Capacity and human resource building at local level is crucial for sustainable functioning of green transportation systems and decreasing reliance on external actors. Furthermore, the program needs to be evaluated periodically using technical indicators and environmental indicators in order to prevent the program from remaining at the pilot level and to allow it to be developed in a sustainable way, replicable in other areas of different characteristics.

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