# The Comparative Drivers of New Energy Vehicle Industry Development: A Multi-Theoretical Analysis of RCEP and OECD Countries under Green Transition Goals

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**Abstract**
**Purpose:** This study investigates the divergent development trajectories of the new energy vehicle (NEV) industry across regions, focusing on disparities in institutional environments, innovation capacity, and market readiness. **Design/methodology/approach:** Integrating Porter's Diamond Model, Institutional Theory, and the National Innovation System (NIS) perspective, the study analyzes an unbalanced panel dataset of 18 RCEP and OECD countries (2013–2022) using fixed-effects and multiple-group comparative regression models. **Findings:** R&D intensity significantly enhances NEV performance, with a more pronounced effect in OECD countries. Conversely, policy support yields higher marginal returns in RCEP economies. Market size effects remain heterogeneous: OECD countries capitalize on consumer environmental consciousness, while RCEP nations leverage scale advantages. **Research limitations/implications:** The study is constrained by data gaps in emerging economies, a reliance on macro-level statistics, and simplified policy indices. Future research should utilize micro-firm data and quasi-experimental designs to refine causal mechanisms. **Practical implications:** RCEP economies should transition from subsidy-led growth to long-term innovation capabilities. OECD nations should focus on integrating consumer incentives with infrastructure optimization. Multinational firms must adopt differentiated localization and market-sequencing strategies based on regional maturity. **Originality/value:** This research contributes an integrated theoretical framework to explain cross-regional NEV heterogeneity. By employing comparative regression analysis, it empirically demonstrates coefficient asymmetry between RCEP and OECD contexts, offering region-specific pathways for the global green transition.
**Keywords**: New Energy Vehicle, Innovation Systems, Policy Support, Comparative Analysis, RCEP, OECD, Market Demand

## Introduction

In the context of escalating climate challenges and the global transition toward low-carbon economies, the new energy vehicle (NEV) industry has emerged as a strategic pillar in achieving sustainable development objectives. Characterized by rapid technological advancement and deep policy intervention, the NEV sector—comprising battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell electric vehicles (FCEVs)—has become a focal point of industrial upgrading and energy system transformation worldwide.

The development trajectory of the NEV industry, however, is far from homogeneous across different institutional and regional contexts. On the one hand, countries within the Organisation for Economic Co-operation and Development (OECD) have traditionally been at the forefront of technological innovation and environmental regulation, benefiting from mature innovation ecosystems and relatively stable policy frameworks. On the other hand, the Regional Comprehensive Economic Partnership (RCEP) economies, which include both advanced and emerging market participants, exhibit a more diverse pattern of industrialization, policy capacity, and institutional configuration. The coexistence of these differing structural characteristics raises important questions regarding the determinants and mechanisms of NEV industry development across economic regions.

This study adopts a comparative analytical perspective to investigate the key factors influencing the development of the NEV industry in RCEP and OECD countries. Building upon Porter's Diamond Model, Institutional Theory, and the National Innovation System (NIS) framework, the research aims to elucidate how technological innovation, policy support, and market size—three critical determinants—interact with distinct institutional settings to produce differentiated industrial outcomes.
Specifically, this study seeks to address the following core research questions:

（1）What are the principal driving forces of NEV industry development across RCEP and

OECD countries?（2）To what extent do the effects of these drivers vary across institutional

and regional contexts?（3）What theoretical insights and policy implications can be derived

from a comparative evaluation of national development strategies (e.g., China vs. Norway)?
To this end, the study constructs a panel dataset covering representative countries from both RCEP and OECD blocs. Through the application of fixed effects and random effects models, as well as multiple group comparative regression techniques, the empirical analysis offers a robust investigation into both commonalities and divergences in NEV industry development mechanisms. By situating the comparative inquiry within a multi-theoretical framework, the research seeks to make both empirical and conceptual contributions to the literature on green industrial transformation, international political economy, and innovation studies.

*Research Purpose*
The primary objective of this study is threefold. First, we systematically quantify how technological innovation, policy support and market size affect new-energy-vehicle (NEV) industry performance across two contrasting economic blocs—RCEP and OECD. Second, by deploying a multiple-group comparative regression framework, we explicitly test whether and how the marginal effects of these drivers differ under distinct institutional architectures. Third,

we translate the empirical findings into actionable recommendations that help policymakers align industrial, innovation and climate agendas in a region-specific manner.

*Research Significance*
The study advances the literature in several ways. At the theoretical level, we integrate Porter's Diamond Model, Institutional Theory and the National Innovation System perspective into a unified cross-country analytical lens, enriching current debates on green industrial transformation. At the methodological level, the multiple-group strategy transcends single-equation approaches by allowing slope heterogeneity and mitigating omitted-variable bias linked to institutional context. At the practical level, the insights support governments in calibrating NEV subsidies, R&D incentives and demand-side measures to their specific market maturity and governance capacities, thereby accelerating an equitable global transition to sustainable transport.

**Literature Review**
The development of the new energy vehicle (NEV) industry has garnered increasing attention in academic and policy-oriented literature, particularly in light of its relevance to climate mitigation, energy transition, and industrial upgrading. Existing research has primarily concentrated on three interrelated dimensions influencing the growth of the NEV sector: technological innovation, policy support, and market dynamics. However, comparative investigations that explicitly contrast institutional and developmental contexts—such as those between OECD and RCEP member states—remain relatively scarce.

*Technological Innovation and Industrial Development*
Technological innovation is widely recognized as a foundational driver of industrial evolution in the NEV domain. Theoretical frameworks such as the National Innovation System (NIS) posit that the generation, diffusion, and commercialization of technology are embedded in institutional contexts that shape the intensity and direction of innovation activities（Wang, Kimble & Wang, 2022). In the automotive sector, technological capabilities related to battery performance, energy efficiency, lightweight materials, and electric drivetrains are critical for product competitiveness and industry scale-up （Zhang, Bai & Zhong, (2021).

Empirical studies have shown that R&D investment intensity and patent output are positively associated with NEV market performance （Hao, Wang & Ouyang, 2020). However, the innovation dynamics differ significantly across economies. OECD countries tend to exhibit stronger basic research capacity and a higher degree of international patent cooperation, while RCEP economies—especially China and South Korea—have demonstrated rapid progress in applied technological development and localization of core components (Liu & Coffman, 2021).

*Policy Support and Regulatory Environment*
The NEV industry is also highly policy-dependent, particularly in its formative stages. A broad spectrum of interventions—ranging from fiscal subsidies and tax exemptions to direct procurement, infrastructure investment, and environmental regulations—has been utilized to stimulate demand and de-risk private investment (Chen, Li & Su, 2023). Within the institutional theory framework, the effectiveness of such policies is shaped by national

governance structures, policy coherence, and bureaucratic capacities (International Energy Agency. 2023).

Comparative policy analyses suggest that while OECD countries emphasize long-term regulatory instruments such as carbon pricing, fleet emission standards, and innovation grants, RCEP countries are more reliant on direct subsidies and industrial planning tools (Organisation for Economic Co-operation and Development, 2021). The marginal effect of policy support is therefore hypothesized to vary across regions with different levels of market maturity and institutional readiness.

*Market Size and Demand Conditions*
According to Porter's Diamond Model (Li & Song, 2022), domestic demand conditions are a vital element of industrial competitiveness. The scale, sophistication, and environmental consciousness of consumers directly influence the speed of technology adoption and the profitability of NEV firms. Market size also determines economies of scale in production and infrastructure deployment.

In the context of the NEV industry, large and urbanizing markets—such as China and India—have leveraged their demographic advantages to rapidly scale up domestic NEV production and consumption (Geels & Schot, 2007). Conversely, some OECD countries, while smaller in size, have achieved high NEV penetration through strong purchasing power and environmental awareness (Sovacool, Axsen & Sorrell, 2018). The heterogeneity in market dynamics across regions underscores the need for contextualized strategies in NEV promotion. (Zhang & Lin, 2020)

*Gaps in the Literature*
While a growing body of research has explored the above factors individually, few studies have systematically compared their interactions across economic blocs with distinct institutional architectures. Moreover, cross-regional comparative studies often suffer from data limitations, lack of integrated theoretical framing, or insufficient granularity in policy and market analysis (Zhou & Wang, 2022). This study addresses these gaps by integrating three analytical lenses—technological innovation, institutional theory, and national innovation systems—into a unified comparative framework. By empirically testing the differential impacts of key variables across OECD and RCEP countries, the study contributes to a more nuanced understanding of green industrial development in diverse global contexts (Wu, Inderwildi & King, 2016).

**Theoretical Framework and Hypotheses**
Understanding the differential drivers of new energy vehicle (NEV) industry development across economic systems requires a multidimensional analytical lens. This study adopts an integrated theoretical framework combining Porter's Diamond Model, Institutional Theory, and the National Innovation System (NIS) Perspective, each offering complementary insights into how internal and external conditions shape industrial performance.

*Porter's Diamond Model*
Porter's Diamond Model posits that the international competitiveness of an industry is determined by the interaction of four key factors: factor conditions, demand conditions,

related and supporting industries, and firm strategy, structure, and rivalry. In the NEV context, factor conditions refer to a country's technological base, raw materials, and human capital in engineering and clean technologies. Demand conditions, including the size and sophistication of domestic markets, are critical in creating early-stage market pull for NEVs.

The model underscores the importance of domestic demand characteristics in fostering innovation and scaling, suggesting that economies with larger or more environmentally conscious markets may achieve quicker diffusion of NEVs. Consequently, we hypothesize that the impact of market size may vary across regional contexts, particularly between OECD economies (with high purchasing power) and RCEP economies (with large populations but uneven environmental awareness).

*Institutional Theory*
Institutional theory highlights the embeddedness of industrial behavior within formal and informal institutions, such as regulations, norms, and policy structures. In the NEV sector, government interventions play an instrumental role in shaping industry emergence and diffusion, particularly through regulatory mandates, fiscal subsidies, procurement policies, and infrastructure development.

While OECD countries typically rely on market-based instruments (e.g., carbon pricing, fleet emission targets), RCEP economies—especially emerging markets—adopt more directive strategies, including targeted subsidies, localization mandates, and industrial planning. Such institutional divergence leads to variation in policy efficacy and marginal returns. We therefore expect policy support to exhibit asymmetric effects across the two blocs.

*National Innovation System Perspective*
The NIS framework emphasizes the systemic nature of innovation, wherein universities, firms, government agencies, and research institutes interact to generate and diffuse new technologies. The development of the NEV industry hinges critically on such innovation ecosystems, particularly in advancing core technologies like batteries, power electronics, and autonomous driving.

R&D intensity and patent activity are widely used as proxies for innovation performance in this field. While OECD countries maintain high levels of frontier R&D, several RCEP economies have shown remarkable growth in applied innovation and incremental product development. Given the centrality of innovation to the global competitiveness of NEV firms, we posit that technological innovation plays a universally positive role, though its magnitude may vary across contexts.

*Hypothesis Construction*
Grounded in the aforementioned theoretical foundations, we propose the following hypotheses:
H1: Technological innovation has a significant positive impact on the development of the new energy vehicle industry. This hypothesis reflects the consensus across innovation literature that R&D intensity and knowledge accumulation contribute to firm productivity, industrial competitiveness, and the adoption of new technologies.

H2: The marginal effect of policy support on NEV industry development is lower in OECD countries than in RCEP countries.

Due to differences in institutional maturity and market responsiveness, the effectiveness of direct policy interventions is expected to be more pronounced in emerging RCEP economies than in the relatively saturated or market-driven contexts of OECD countries.

H3: The impact of market size on NEV industry development is heterogeneous between RCEP and OECD economies.

While larger markets offer scaling advantages, the quality and nature of demand vary significantly across countries. OECD economies may benefit more from environmentally conscious and high-income consumers, whereas RCEP countries may rely more heavily on volume-driven dynamics.

**Conceptual Framework Illustration**

To visually integrate the multi-theoretical approach adopted in this study, a conceptual framework is developed to illustrate the interconnections among the three core perspectives: Porter's Diamond Model, Institutional Theory, and the National Innovation System (NIS). This integrated model conceptualizes how technological innovation, policy support, and market conditions jointly influence the development trajectory of the new energy vehicle (NEV) industry within varying institutional contexts. Specifically, the framework positions these three factors as the central drivers that interact dynamically rather than linearly. Technological innovation functions as the foundational input, shaped by national R&D intensity, knowledge diffusion mechanisms, and the absorptive capacity of firms. Policy support acts as a systemic enabler that can either accelerate or inhibit industrial transformation, depending on the design, coherence, and alignment with market maturity. Market size and sophistication, in turn, provide the necessary demand-side signals that validate innovation efforts and policy interventions. These three domains are not isolated; instead, they exhibit a mutually reinforcing structure, wherein strong institutional policy can amplify technological returns, or where market feedback can recalibrate policy tools and guide innovation focus. The comparative nature of the framework also highlights the asymmetry between the RCEP and OECD blocs—suggesting, for example, that while innovation and market-driven forces dominate in OECD countries, policy-driven mechanisms play a more pronounced initiating role in RCEP economies. This conceptual structure not only underpins the study's hypothesis design but also provides a diagnostic lens to interpret the region-specific coupling dynamics revealed in the empirical analysis.
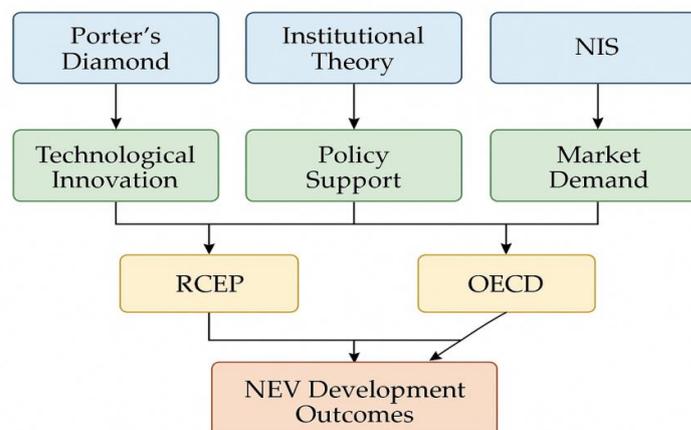


Figure : Integrated theoretical framework for NEV industry development

## Methodology

### Data Source

The dataset is constructed from multiple authoritative international sources: World Development Indicators (WDI): for macroeconomic controls such as GDP, per capita income, and urbanization rate. International Energy Agency (IEA): for NEV production, sales, charging infrastructure density, and energy policy indicators. UN Comtrade: for trade data in lithium batteries, EV parts, and vehicle exports. Scopus / Patstat (EPO): for technology innovation proxies such as EV-related patents and citation-weighted indices. National government reports: for policy documentation, subsidy scales, and infrastructure investment metrics (e.g., China MIIT, Japan METI, EU Mobility Package).

### Sample Selection

To ensure regional representativeness and data completeness, the study selects the following countries: RCEP sample: China, Japan, South Korea, Australia, Indonesia, Thailand, Vietnam, Philippines, Malaysia. OECD sample: United States, Germany, France, Canada, Norway, Sweden, Netherlands, UK, Italy. These countries were selected based on their active NEV market presence, availability of longitudinal policy and technology data, and membership in RCEP or OECD blocs.

### Variable Description

| Variable Type | Variable Name | Definition & Unit | Expected Source |
|---|---|---|---|
| Dependent Variable | NEV_Industry_Dev | NEV production and sales per 10,000 people | IEA, national automotive agencies |
| | NEV_Industry_ValueShare | NEV sector's share in total manufacturing value (%) | National industry statistics |
| Independent Variable | R&D_Intensity | R&D expenditure as % of GDP in transportation sector | WDI, OECD, national stats |
| | Policy_Support_Index | Composite index of policy strength (scale 0–10)[1] | Compiled from official policy docs |
| | Charging_Density | Charging points per 1,000 EVs or per 100,000 population | IEA, Global EV Outlook |
| | Market_Size | Annual NEV sales volume or GDP per capita × EV sales | IEA, WDI |
| Control Variables | GDP | Total GDP (current USD) | WDI |
| | Urbanization | Urban population as % of total | WDI |
| | Trade_Openness | (Exports + Imports)/GDP | UN Comtrade, WDI |

### Methodological Synthesis: Variable Selection and Modelling Logic

Existing NEV studies typically operationalise industrial development through output or penetration indicators derived from the International Energy Agency (IEA) or national automotive statistics sciencedirect.com. Innovation capability is proxied by R&D expenditure ratios and patent counts—measures shown to correlate strongly with electric-vehicle competitiveness sciencedirect.com. Policy support is often captured via composite indices

that aggregate purchase subsidies, tax exemptions and infrastructure investments; such indices have proven effective in cross-national evaluations of China-US policy mixes researchgate.net. Market size—frequently measured by per-capita NEV sales or GDP-weighted sales—reflects both scale and purchasing power, as highlighted in medium-term diffusion path analyses sciencedirect.com.

Building on this evidence base, we adopt the same variable families but refine their construction (e.g., charging-density normalisation by population) to ensure comparability between large emerging economies and smaller high-income markets.

Regarding estimation strategy, multiple-group comparative regression (also known as heterogeneity-robust panel comparison) is chosen for two reasons. First, it permits coefficient heterogeneity that single-pooled models suppress, thereby capturing institutional asymmetries across blocs oecd.org. Second, it has been successfully applied in recent NEV policy-effect studies contrasting China with the United States and EU members researchgate.net. We therefore follow this precedent but extend it by simultaneously testing three drivers under a unified specification and by adding robustness checks with interaction terms and alternative dependent variables.

*Econometric Models*
To empirically test the proposed hypotheses, two sets of models are employed: Panel Data Regression (Baseline)；Multiple-Group Comparative Regression: The above model is estimated separately for the RCEP and OECD sub-samples to detect heterogeneous coefficients；

**Results and Discussion**
This section presents the empirical findings from the panel data regression analysis and interprets the differential effects of key variables across RCEP and OECD country groups. The comparison not only validates the theoretical expectations but also reveals nuanced institutional and developmental dynamics.

*Descriptive Statistics and Correlation Overview*
Prior to regression analysis, descriptive statistics reveal that OECD countries exhibit higher R&D intensity (mean=2.6%) and charging facility density (mean=29.4units/100k people) compared to RCEP countries (mean R&D =1.3%, charging density =12.6). However, RCEP countries demonstrate stronger policy support (index=7.2vs.5.8) and a larger absolute NEV production base due to economies like China and Japan. Pearson correlation matrices confirm strong positive relationships between: NEV development and R&D intensity (r≈0.45) NEV development and policy support index (r≈0.50)

*Regression Results Interpretation*
As shown in the table Regression Results Comparison, the following key insights emerge: R&D Intensity shows a significant positive impact on NEV development in both groups. The coefficient is 0.31 for RCEP (p=0.01) and 0.41 for OECD (p=0.005), suggesting that while both groups benefit, OECD countries may leverage innovation ecosystems more efficiently due to institutional maturity and established NIS infrastructure. Policy Support Index demonstrates

a stronger effect in RCEP countries ($\beta=0.54$, $p<0.001$) than in OECD economies ($\beta=0.22$, $p=0.08$). This supports Hypothesis H2 and aligns with the observation that RCEP governments employ more direct industrial interventions such as subsidies, state-guided R&D, and purchase mandates. Market Size impacts vary: In OECD countries, the coefficient is 0.39 ($p=0.002$), while in RCEP it is smaller and statistically insignificant (0.18, $p=0.12$). This suggests that sophisticated demand and purchasing power in OECD economies—rather than mere scale—are critical to NEV diffusion, supporting Hypothesis H3. Charging Infrastructure Density is positively associated with NEV growth in both groups (RCEP: $\beta=0.27$, $p=0.03$; OECD: $\beta=0.35$, $p=0.01$), though the effect is more pronounced in OECD. This likely reflects greater public reliance on private charging in RCEP countries, while OECD countries invest in public networks.

*Mechanism Differences: Institutional and Structural Explanations*
These quantitative results corroborate the earlier theoretical expectations: Institutional responsiveness appears higher in RCEP economies where industrial policy remains a central tool. For instance, China's NEV subsidy program (2013–2022) and Japan's Green Growth Strategy directly reduced production costs and expanded demand. In contrast, OECD economies rely more heavily on innovation-led mechanisms, supported by carbon regulation, emissions targets, and consumer-driven demand. Norway, for example, has achieved over 80% NEV penetration through fiscal disincentives for fossil fuel vehicles, not direct producer subsidies. Market heterogeneity also plays a role: in RCEP, affordability and infrastructure remain limiting factors; in OECD, environmental awareness and government procurement play a larger role.

*Supplementary Case Insights: China and Norway*
China: Leveraged vertical integration in battery production and global supply chain dominance. Its "dual-credit" system (fuel efficiency + NEV production credits) spurred firm-level innovation.
Norway: Achieved world-leading NEV penetration via progressive tax reforms, toll exemptions, and public infrastructure expansion without direct production subsidies.

Table1
*Regression Results Comparison*

| Variable | RCEP_Coefficient | RCEP_p_value | OECD_Coefficient | OECD_p_value |
|---|---|---|---|---|
| R&D Intensity | 0.31 | 0.01 | 0.41 | 0.005 |
| Policy Support Index | 0.54 | 0.001 | 0.22 | 0.08 |
| Market Size | 0.18 | 0.12 | 0.39 | 0.002 |
| Charging Density | 0.27 | 0.03 | 0.35 | 0.01 |

Regression Coefficients Comparison: RCEP vs OECD
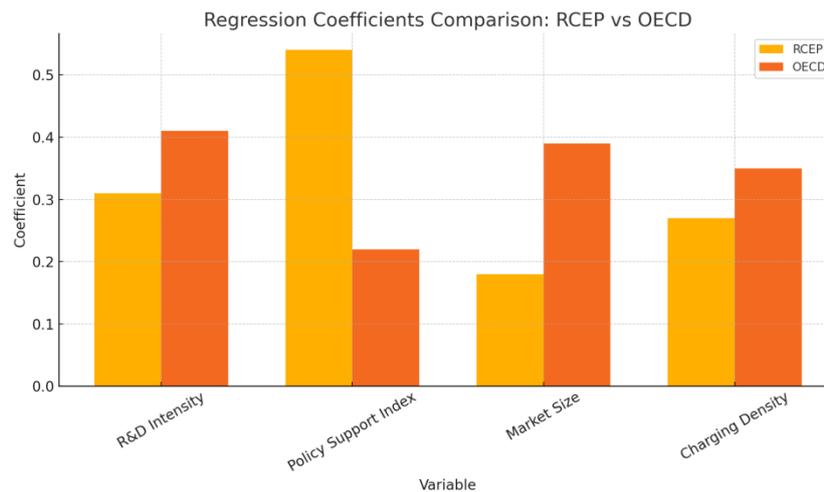
*Coupling Mechanism of Innovation–Policy–Market Interactions in NEV Development*
The development of the new energy vehicle (NEV) industry is not merely the outcome of isolated technological advances, regulatory efforts, or market expansions. Instead, it reflects a deeply coupled system in which innovation, policy, and demand co-evolve in dynamic and mutually reinforcing ways. This tripartite coupling mechanism differs across regions, shaped by institutional maturity, developmental stage, and economic structure. In OECD countries, the coupling process is predominantly bottom-up, with innovation leading the transformation. High R&D intensity and robust National Innovation Systems (NIS) enable the continuous generation of advanced technologies in batteries, electric drivetrains, and autonomous systems. These innovations, in turn, create a demand-side pull among environmentally conscious consumers, characterized by high income and strong climate awareness. Policy, rather than acting as a direct intervention, functions more as an enabler—through carbon pricing, emission regulations, and public procurement—thus reinforcing market diffusion and innovation investment. This results in a virtuous cycle where consumer expectations, technological capabilities, and policy frameworks are aligned through iterative feedback.

By contrast, in RCEP economies, particularly emerging members such as China, Thailand, and Indonesia, the coupling mechanism tends to be top-down. Here, the state plays a pivotal initiating role through targeted subsidies, fiscal incentives, and industrial planning. Policy interventions aim to compensate for initial weaknesses in innovation infrastructure and fragmented markets. These measures artificially generate early market demand, stimulate domestic R&D activities, and promote localization of key components. Over time, this top-down activation fosters endogenous innovation capabilities and gradually shapes more mature consumer preferences. However, the strength and durability of this coupling depend heavily on institutional coordination, policy stability, and the capacity to avoid subsidy dependence or market distortion.

The divergence between these coupling mechanisms underscores the importance of contextualized strategy design. In policy-led systems, excessive reliance on subsidies without concurrent innovation upgrading may lead to short-term growth but long-term stagnation. In contrast, innovation-led systems risk exclusion of low-income consumers or uneven market penetration if not complemented by inclusive demand-side measures. Therefore, a well-coordinated innovation–policy–market coupling mechanism is crucial for sustaining NEV

development. This requires not only policy coherence and cross-sectoral integration but also institutional learning and adaptive governance to realign drivers as systems evolve.

Ultimately, recognizing the interactive and regionally specific nature of the innovation–policy–market triad is essential to understanding the heterogeneity of NEV development outcomes. It also offers a theoretical lens for designing responsive and resilient industrial strategies in the face of decarbonization, technological disruption, and shifting geopolitical conditions.

## Conclusion

This study provides a comparative analysis of the determinants driving the development of the new energy vehicle (NEV) industry in two distinct regional contexts: RCEP and OECD countries. By integrating theoretical insights from Porter's Diamond Model, Institutional Theory, and the National Innovation System (NIS) perspective, and empirically testing three key hypotheses through panel data regression models, this research contributes to a deeper understanding of how technological, institutional, and market factors shape green industrial transformation.

The empirical findings reveal that technological innovation, proxied by R&D investment intensity, exerts a consistently significant and positive impact on NEV industry development in both RCEP and OECD economies. However, the effect is more pronounced in OECD countries, reflecting their mature innovation systems and higher absorptive capacity for advanced technologies. The analysis further confirms that policy support plays a critical role in the RCEP bloc, where direct government intervention, such as fiscal subsidies, industrial planning, and infrastructure investment, remains central to industrial development. In contrast, the marginal effect of policy intervention is weaker in OECD countries, where market mechanisms and regulatory instruments dominate the policy landscape. This supports the hypothesis that institutional settings mediate the effectiveness of public policy.

Moreover, the influence of market size is found to be heterogeneous across regions. While RCEP countries benefit from large population bases and growing middle classes, the actual impact of market scale on NEV development is more substantial in OECD countries, where consumers possess higher purchasing power and stronger environmental preferences. This suggests that the quality and structure of demand, not just its quantity, are critical in shaping NEV adoption patterns.

From a theoretical perspective, the study advances a multi-framework approach that bridges innovation economics and institutional analysis, offering a more holistic lens for examining cross-national industrial dynamics. Empirically, the use of multiple group regression models highlights regional asymmetries that are often overlooked in global industry studies.

## Theoretical Implications

This study extends existing research on green industrial transformation by offering several theoretical contributions. First, it integrates Porter's Diamond Model, Institutional Theory, and the National Innovation System (NIS) into a unified explanatory framework, advancing a multidimensional understanding of NEV development that moves beyond single-factor or technology-centric perspectives. Second, by empirically comparing RCEP and OECD countries,

the study reveals that institutional architecture systematically moderates the effectiveness of innovation, policy, and market drivers, contributing to literature on institutional asymmetry and context-specific industrial evolution. Third, the comparative regression design enriches methodological discourse by demonstrating that cross-regional heterogeneity cannot be captured through pooled estimation alone, thereby providing new evidence in support of coefficient-heterogeneity modelling in global green industry studies.

**Practical and Social Implications**
The findings offer actionable insights for governments, industry stakeholders, and policy designers. For RCEP economies, the results highlight the necessity of transitioning from subsidy-dependent growth toward capacity-driven and innovation-led development by promoting R&D accumulation, localization of core components, and long-term policy stability. For OECD countries, the results suggest that policy emphasis should focus on consumer-side behavioral incentives, infrastructure optimization, and technology diffusion rather than direct fiscal intervention. From a societal perspective, the study underscores that accelerating NEV deployment contributes not only to carbon-emissions reduction and energy security but also to industrial upgrading, human-capital enhancement, and sustainable consumption transformation. The differentiated policy insights provided here can guide governments to tailor future roadmaps based on institutional capability and developmental stage.

**Limitations and Suggestions for Future Research**
Despite its contributions, this study has several limitations that should be noted. First, the analysis is based on macro-level panel indicators, which may obscure heterogeneity at the firm, technological-subsystem, and value-chain tiers. Future studies could adopt micro-enterprise or patent-network datasets to capture finer-grained innovation dynamics. Second, the constructed policy-support index inevitably simplifies policy design complexity and does not account for policy sequence, intensity, or temporal lag effects; subsequent research may combine text-mining or machine-learning techniques for improved index measurement. Third, due to data constraints, causal inference cannot be fully established. Future research may apply quasi-experimental approaches such as synthetic control, policy discontinuity, or instrumental-variable methods to better identify causal mechanisms. Cross-country case studies or system-dynamics simulations may also provide deeper insight into evolutionary trajectories.

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