

TAX INCENTIVES AND RESPONSIBLE TECHNOLOGICAL INNOVATION IN CHINA'S NEW ENERGY VEHICLE INDUSTRY: EVIDENCE FROM NIO

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Abstract: *This study presents an exploratory, qualitative single-case analysis examining the critical relationship between fiscal incentives and technological innovation within China's new energy vehicle (NEV) industry, focusing on NIO Inc. as the primary subject of analysis. Grounded in theories of technology governance and public value creation, the research systematically maps public policy documents, academic literature, and audited financial disclosures spanning the 2021–2024 period. Specifically, the evaluative framework assesses the integration of three core policy instruments: purchase tax exemptions, research and development (R&D) subsidies, and strategic fiscal guidance. To ground this empirical inquiry, NIO's longitudinal trends in vehicle deliveries, corporate revenues, R&D expenditures, vehicle margins, and net losses are analysed in tandem with shifting regulatory phases. The findings demonstrate that while these fiscal incentives effectively mitigate capital burdens and catalyse market demand, their long-term efficacy remains highly contingent upon institutional policy integrity which defined by transparent eligibility criteria and structural predictability, coupled with robust internal strategic management. Therefore, this study contends that future fiscal evaluations must surpass volume-centric sales metrics to rigorously assess substantive green innovation quality and mitigate the risks of structural policy dependency. To generalize and expand upon these interpretive insights, the study concludes by proposing a comparative, multi-firm framework for subsequent research.*

Keywords: *Tax incentives; Responsible technological innovation; New energy vehicles; NIO; Policy integrity; Sustainable industrial transformation*

Introduction

Technological disruption is reshaping transportation, energy systems and industrial policy. In China, the new energy vehicle (NEV) industry has been promoted through industrial policy, fiscal incentives, consumer purchase support and innovation-oriented regulation. The New Energy Vehicle Industry Development Plan (2021–2035) emphasises high-quality industrial development, infrastructure improvement, core technological capability and sustainable transformation of the NEV sector (State Council of the People's Republic of China, 2020). Smart electric vehicles, battery swapping, digital mobility services and low-carbon infrastructure are not only commercial technologies; they also affect affordability, consumer safety, energy transition and environmental welfare. Green innovation is also closely linked to environmental goals such as pollution reduction, resource efficiency and climate mitigation (OECD, n.d.). Therefore, the policy instruments used to support this industry should be evaluated not only through enterprise growth, but also through the values they preserve.

From a policy governance perspective, tax incentives can be understood as public instruments that shape the direction of technological innovation. R&D tax incentives reduce the effective cost of firm-level R&D and have become an important policy instrument for encouraging private innovation investment (OECD, 2025). In China's NEV sector, the continuation of vehicle purchase tax relief has also been used to support NEV development and stimulate automobile consumption (State Council of the People's Republic of China, 2023). However, a tax incentive may reduce tax burden while its broader public value depends on whether firms convert policy benefits into responsible innovation, cleaner technology, consumer benefits and long-term sustainability rather than short-term expansion only. This issue is especially relevant in the smart electric vehicle sector, where firms face high R&D intensity, heavy infrastructure investment, intense price competition and long periods of financial pressure.

NIO provides a useful case for this analysis. Founded in November 2014, NIO positions itself as a global smart electric vehicle company and designs, develops, manufactures and sells smart electric vehicles, while also emphasizing user experience, premium smart EV products and next-generation core technologies (NIO Inc., 2025a). NIO has also invested heavily in vehicle technology, battery swapping, user services and power infrastructure. Its public disclosures show rapid delivery and revenue growth between 2021 and 2024, but they also show persistent net losses and high R&D expenditure. For example, NIO reported total revenues of RMB65.73 billion, R&D expenses of RMB13.04 billion, a vehicle margin of 12.3% and a net loss of RMB22.40 billion for the full year of 2024 (NIO Inc., 2025b). This combination makes NIO an information-rich case for examining whether tax incentives merely ease short-term pressure or support a more sustainable innovation trajectory.

Despite the expanding body of literature on the macro-level efficacy of green industrial policies, a critical research gap persists regarding how individual growth-stage enterprises translate public incentives into value-preserving, responsible innovation under conditions of severe financial pressure. Prior studies predominantly utilize large panel datasets to measure quantitative innovation outputs, such as patent counts, thereby frequently overlooking the qualitative, human-centered mechanisms of technology governance. Furthermore, existing scholarship limited addresses the operational contradictions that emerge when macro-level policy success coexists with acute micro-level corporate profitability struggles. This study addresses these theoretical and empirical gaps by evaluating how public fiscal instruments

interact with firm-level constraints within an environment characterized by rapid technological disruption. Responding to this, the main aim to answer three research questions. First, how do tax incentive policies influence the cost, innovation and market channels of a smart NEV enterprise? Second, how does NIO's case illustrate the relationship between policy support and enterprise-level green technological innovation? Third, how can tax incentives be designed and implemented in a more ethical, integrity-based and value-preserving way?

This study makes three contributions. First, it provides a firm-level case analysis of how tax incentives influence green innovation in China's NEV industry. Second, it highlights that tax incentives should be assessed through both short-term market effects and long-term sustainability values. Third, it proposes a policy integrity and human-centred innovation perspective by linking stability, transparency, consumer welfare, environmental value and performance-oriented evaluation to the effectiveness of fiscal incentives. This framing connects enterprise-level evidence with broader debates on responsible technological innovation and value-preserving public policy. Since monitoring and evaluation are important for ensuring the transparency, accountability and effectiveness of R&D tax incentives, policy integrity should be treated as a central condition for responsible fiscal governance (OECD, 2025). Accordingly, the study is not positioned merely as a study of corporate tax relief. It is positioned as a policy-and-practice study of how public incentives can guide technology-driven industries toward responsible innovation, transparent governance and value-preserving sustainability outcomes.

Literature Review and Conceptual Background

Tax Incentives, Market Failure and Innovation Externalities

Tax incentives are widely used to encourage private investment in R&D and innovation. The economic rationale is grounded in market failure and innovation externalities: R&D creates knowledge spillovers and social benefits that individual firms cannot fully appropriate. Without policy intervention, firms may underinvest in innovation relative to the social optimum. Classic evidence suggests that R&D tax incentives can raise business R&D, although the magnitude of the effect depends on policy design, firm characteristics and the stability of the incentive regime (Bloom, Griffith, & Van Reenen, 2002; Hall & Van Reenen, 2000).

Innovation-policy research also shows that governments need a portfolio of instruments rather than a single tax measure. Bloom, Van Reenen and Williams (2019) argue that innovation policy should combine fiscal incentives with competition, skilled labour, research institutions and diffusion mechanisms. Public support can influence firm innovation, but the effect is conditional on absorptive capacity, implementation quality and the ability of firms to commercialise R&D outputs (Howell, 2017; Kleer, 2010; Lerner, 1999).

Green Innovation and Sustainable Industrial Policy

Green innovation differs from ordinary innovation because it produces both private benefits and public environmental benefits. The eco-innovation literature argues that environmental and energy-related innovation can support economic competitiveness while reducing environmental harm (Rennings, 2000). The Porter hypothesis further suggests that well-designed environmental policy can encourage innovation and improve competitive

performance, although the outcome depends on policy design and firm response (Porter & van der Linde, 1995).

In energy and low-carbon industries, policy incentives may direct technological change toward cleaner technologies. Acemoglu, Aghion, Bursztyn and Hemous (2012) show that directed technical change can require policy intervention when clean technologies are initially disadvantaged. Popp (2002) similarly demonstrates that prices and policy signals can induce energy-saving innovation. These studies support the view that tax incentives and fiscal support can influence not only short-term firm behaviour but also the direction of technological development.

Tax Incentives in the New Energy Vehicle Industry

China's NEV policy system combines demand-side and supply-side instruments. Demand-side policies such as purchase tax exemptions reduce the purchase cost for consumers and support market expansion. In 2023, Chinese authorities announced that NEVs purchased in 2024 and 2025 would be exempt from vehicle purchase tax up to RMB30,000 per passenger vehicle, while NEVs purchased in 2026 and 2027 would receive a half reduction capped at RMB15,000 per passenger vehicle (State Council of the People's Republic of China, 2023). This staged arrangement shows a gradual shift from strong market support to more disciplined and targeted policy support.

Supply-side tax instruments, especially R&D-related tax incentives, are designed to support technological development. They can release internal funds, lower the user cost of R&D and encourage enterprises to maintain long-term innovation activities. Empirical evidence from Chinese listed NEV enterprises suggests that financial subsidies and tax incentives can promote innovation efficiency, although the effect varies by ownership type, financing constraints and market environment (Qian, 2023). Yang, Yuan and Xing (2023) also show that fiscal and taxation policies are relevant to the technological innovation of China's NEV industry when innovation is measured through R&D investment, fixed assets, intangible assets and patent activity.

Responsible and Human-Centred Technological Innovation

Responsible innovation literature argues that technological development should be anticipatory, inclusive, reflective and responsive to social values (Owen, Macnaghten, & Stilgoe, 2012; Stilgoe, Owen, & Macnaghten, 2013). This perspective is useful for the NEV industry because smart electric vehicles combine digital technology, energy transition, consumer safety, infrastructure investment and environmental policy. Public incentives should therefore guide not only the quantity of innovation, but also the quality and direction of innovation.

A human-centred approach means that policy evaluation should consider consumers, communities and environmental stakeholders, not only enterprise-level financial outcomes. In the context of NEVs, human-centred green innovation includes affordability, safer and cleaner mobility, reliable charging or swapping infrastructure, lower-emission transportation and responsible use of public fiscal resources. Tax incentives preserve values only when they support these broader outcomes.

Policy Integrity and Sustainable Development

For tax incentives to support sustainable development, policy design must preserve integrity. In this study, policy integrity refers to transparency, consistency, clear eligibility criteria, accountable implementation, fair access and regular evaluation of policy outcomes. This concept links the tax-policy discussion to ethical and integrity-based research because public fiscal resources should be used in ways that are justifiable, monitorable and aligned with public value.

Based on these streams of literature, this study views tax incentives as integrity-based policy instruments that influence green technological innovation through demand stimulation, R&D cost reduction and value-oriented governance. This perspective is important for preserving values in the era of technological disruption. Public incentives in technology-driven industries can produce short-term expansion without long-term value creation if they are not linked to accountable innovation outcomes.

Table 1: Analytical Framework for the Case Study

Policy instrument	Primary channel	Expected response	Key Risk	Supporting References
Purchase tax exemption or reduction	Consumer affordability and market demand	Sales expansion, stronger brand reach and market share growth	Demand volatility and short-term consumption without lasting public value.	State Council of the People's Republic of China (2023)
R&D super deduction and innovation tax support	Lower effective cost of green R&D	Sustained technology investment, product upgrading and cleaner mobility solutions	Symbolic R&D reporting, limited cash-flow effect for loss-making firms or weak innovation accountability	OECD (2026); Qian (2023); Yang, Yuan, and Xing (2023)
Fiscal support and industry guidance	Infrastructure and market ecosystem support	Expansion of service networks, battery swapping and power solutions	Policy dependence, regional implementation differences or inefficient use of public resources	Bloom, Van Reenen, and Williams (2019); Howell (2017); Mazzucato (2013)
Policy monitoring and evaluation	Governance, transparency and accountability	Better compliance planning, responsible resource allocation and value-preserving policy impact	Administrative burden, uncertain eligibility or weak performance evaluation	Stilgoe, Owen, and Macnaghten (2013); von Schomberg (2013)

Source: Author's synthesis based on the listed literature and policy documents.

Methodology

This study adopts a qualitative single-case study design. A case study is appropriate when research seeks to understand a contemporary phenomenon in its real-life context, especially when policy, strategy and organizational behavior are closely connected (Yin, 2018). NIO was selected as an illustrative and information-rich case rather than a statistically representative case. The selection is justified by four reasons: NIO has public financial disclosures; it is innovation-intensive; it has a distinctive battery-swapping and power-service ecosystem; and it faces the financial pressure typical of many technology-driven growth firms.

The data sources are policy documents and official information on China's NEV tax incentives; NIO's public financial disclosures, including full-year financial results from 2021 to 2024; and academic literature on tax incentives, green innovation, NEV innovation and policy effectiveness. The analysis follows a mechanism-based structure. Policy instruments are linked to cost, innovation and market channels, and these channels are then interpreted in relation to NIO's disclosed financial and operating indicators.

To ensure analytical rigor and internal reliability within this qualitative case design, the study utilizes qualitative content analysis and systematic data triangulation. The research process was structured across three sequential phases. First, explicit policy instruments and operational criteria were extracted from Chinese ministry directives and established literature. Second, these policy mandates were mapped against specific corporate response channels, categorized by market expansion, innovation quality, and cost mitigation. Third, to achieve robust triangulation and mitigate secondary-source bias, these qualitative policy mappings were cross-verified against four years (2021–2024) of audited financial disclosures and operational delivery matrices from NIO Inc. This continuous pattern-matching technique balances the public policy narrative against verified corporate outcomes, allowing empirical conclusions to be derived inductively while minimizing the risk of unsupported causal assumptions. Through this interpretive framework, the relationship between state-level fiscal support and the co-occurrence of responsible innovation, market growth, and persistent financial pressure is rigorously evaluated.

A necessary methodological qualification must be articulated regarding the scope of this empirical analysis. This study does not attempt to precisely quantify the exact monetary value of the fiscal benefits captured by NIO Inc., as company-level tax savings derived from individual policy instruments are not uniformly disclosed in a standardized, disaggregated format. Rather than relying on speculative numerical estimations of firm-specific tax relief, this research utilizes publicly accessible, verified disclosures to construct a rigorous qualitative case discussion as an approach highly appropriate for an exploratory institutional analysis. The structural analysis is guided by a value-oriented conceptual framework. The fiscal incentives are systematically evaluated in relation to their market impact, green innovation quality, institutional policy integrity, and long-term sustainability outcomes. By grounding the case study within these dimensions, the analysis effectively bridges macro-level fiscal policy execution with broader theoretical questions surrounding responsible technological innovation, public accountability, and sustainable industrial development.

Findings And Discussion

Demand-Side Purchase Tax Incentives and Market Expansion

Purchase tax relief directly affects consumers by lowering the total cost of buying an NEV. This channel is particularly important in a competitive market where consumers compare NEVs not only with other electric vehicles but also with internal-combustion vehicles and hybrid alternatives. For firms such as NIO, purchase tax incentives can support demand by improving affordability and reducing psychological price resistance.

Table 2: NIO Operating and Financial Indicators, 2021-2024

Year	Vehicle deliveries	Total revenues (RMB billion)	R&D expenses (RMB billion)	Vehicle margin	Net loss (RMB billion)
2021	91,429	36.14	4.59	20.1%	4.02
2022	122,486	49.27	10.84	13.7%	14.44
2023	160,038	55.62	13.43	9.5%	20.72
2024	221,970	65.73	13.04	12.3%	22.40

Source: Compiled from NIO Inc. (2022, 2023, 2024, 2025a).

As illustrated in Table 2, NIO's annual vehicle deliveries expanded from 91,429 units in 2021 to 221,970 units in 2024 which showing a growth trend that closely coincides with the active implementation of consumer purchase tax exemptions. Parallel to this volume expansion, the firm's total revenues increased from RMB 36.14 billion to RMB 65.73 billion, signalling a substantial scaling of market share. However, this positive demand-side association does not imply a direct causal link to commercial viability. Concurrently, NIO's net losses widened significantly from RMB 4.02 billion to RMB 22.40 billion over the same period. This stark divergence demonstrates that while policy-supported demand stimulation is necessary for market expansion, it remains insufficient for ensuring corporate profitability

In high-technology manufacturing, sales growth must be accompanied by cost control, product mix optimization, platform efficiency and better utilisation of service infrastructure. Demand-side incentives may also create adjustment risk. When consumers expect incentives to continue, any reduction may delay purchases, shift demand across periods or increase pressure on firms to compensate through discounts. The 2024-2027 staged arrangement in China reduces this risk by giving firms and consumers a clearer transition path, but it still requires firms to prepare for a post-incentive market.

R&D Tax Incentives and Green Technological Innovation

R&D tax incentives are intended to encourage long-term innovation by reducing the effective cost of eligible R&D expenditure. For an innovation-intensive company such as NIO, this channel is highly relevant. NIO's R&D expenses increased from RMB4.59 billion in 2021 to RMB10.84 billion in 2022 and RMB13.43 billion in 2023, before remaining high at RMB13.04 billion in 2024. This trend indicates that technology investment remained central to NIO's development strategy even under profitability pressure.

At the same time, the case also shows an important limitation. If an enterprise remains loss-making, the immediate cash-flow benefit of income-tax-based R&D deductions may be limited

compared with direct grants or demand-side incentives. This does not make R&D tax incentives irrelevant, but it means that policymakers should understand timing effects. For firms in growth stages, tax incentives may work better when combined with carry-forward provisions, direct innovation grants, green financing and infrastructure support.

From a sustainability perspective, R&D tax incentives are most valuable when they support substantive innovation rather than symbolic or compliance-driven R&D reporting. For NIO, substantive innovation may be reflected in product technology, battery swapping, software-enabled services, safety improvement and user ecosystem development. The policy challenge is to ensure that eligible R&D definitions encourage genuine green technological progress and broader public value, not merely accounting classification.

Cost Structure, Profitability and Operational Pressure

The original policy logic assumes that tax incentives reduce cost pressure and allow firms to allocate more resources to innovation and expansion. The case partly supports this logic, but it also shows that cost pressure remains severe. NIO's vehicle margin declined from 20.1% in 2021 to 13.7% in 2022 and 9.5% in 2023, before recovering to 12.3% in 2024. This pattern suggests that scale expansion, product transition and market competition can erode margins even when policy support is available.

Tax incentives can soften pressure, but they cannot replace operational discipline. For policy to generate sustainable impact, firms must convert tax-related savings or cost relief into stronger production efficiency, better supply-chain management, platform standardization and more effective R&D project selection. Otherwise, policy support may expand scale without solving the underlying profitability challenge. The NIO case therefore supports a cautious interpretation of fiscal policy effectiveness. Tax incentives can be enabling mechanisms, but they are not automatic performance drivers. Their value depends on whether they help firms build durable technological capability and operational efficiency.

Policy Risks and Implementation Problems

Four distinct institutional risks emerge from this case analysis. First, policy retreat risk presents a significant challenge where the structural trends of China's purchase tax arrangements indicates a phased reduction after 2025. While a staged reduction is imperative for long-term fiscal sustainability, it introduces the potential for acute demand fluctuations if market actors have grown structurally habituated to robust state support. Second, central-local coordination remains highly critical. Because NEV firms operate across diverse regional jurisdictions, discrepancies in local administrative support, localized interpretations of eligibility criteria, and varying implementation speeds introduce significant compliance and strategic planning uncertainties. Third, administrative compliance frictions can diminish the net economic utility of tax incentives, as enterprises must meticulously isolate eligible R&D expenditures, maintain exhaustive documentation, and navigate auditing oversight—processes that demand substantial corporate financial and legal resources. Fourth, structural policy dependency risks compromising long-term corporate resilience; over-reliance on fiscal relief may inadvertently disincentive or delay critical internal advancements in cost efficiency, product competitiveness, and standalone cash-flow management.

Ultimately, these institutional risks do not imply that fiscal incentives are inherently ineffective; rather, they highlight that the ultimate utility of such instruments is fundamentally contingent upon implementation quality. To mitigate these vulnerabilities and optimize public expenditures, tax incentives must possess four core attributes. They must be sufficiently stable to facilitate long-term corporate planning, precisely targeted to advance strategic public priorities, transparent enough to preserve market fairness, and structurally accountable to ensure that public capital yields substantive, responsible technological innovation and broader public value.

Implications

Policy Implications

First, policymakers should maintain policy stability while designing a clear transition path. Sudden policy changes can disturb firm investment plans and consumer expectations. A staged and publicly communicated adjustment, such as the 2024-2027 purchase tax arrangement, is preferable to abrupt withdrawal.

Second, tax incentives should be connected to measurable innovation outcomes. R&D tax support should encourage substantive green technology development, not only higher reported R&D expenditure. Policy evaluation can include indicators such as product efficiency, battery safety, power-system improvement, patent quality, commercialization of new technology and environmental contribution.

Third, central and local implementation should be coordinated. A unified information platform for NEV tax incentives, eligibility interpretation and application procedures would reduce uncertainty and compliance costs. It would also improve policy integrity by making implementation more transparent and consistent.

Fourth, support should consider the financial condition of innovation-driven firms. Loss-making technology firms may not fully benefit from income-tax-based incentives in the short term. Therefore, tax incentives should be combined with other instruments, such as direct R&D grants, green finance, infrastructure support and procurement mechanisms, while avoiding inefficient over-subsidization.

Managerial Implications

For NEV enterprises, tax incentives should be treated as strategic resources rather than guaranteed income. Firms need to build internal systems to identify eligible tax benefits, maintain documentation, evaluate R&D projects and measure the conversion of policy support into innovation outcomes. A professional tax compliance system can reduce administrative risk and improve the accuracy of incentive claims. NIO and similar firms should also reduce excessive reliance on policy support by strengthening cost management, improving product-market fit, optimizing service network utilisation and accelerating the commercialization of R&D outputs. In the long run, sustainable competitiveness must come from technology, brand, user experience, operational efficiency and financial discipline.

Value-Preserving Policy Implications

The value-preserving dimension of NEV tax incentives should be placed at the center of policy evaluation. Tax incentives do not only affect enterprises; they also influence consumer affordability, low-carbon mobility, environmental quality, technological safety and the direction of industrial transformation. A responsible policy approach should therefore evaluate whether incentives benefit society through cleaner transportation, safer technologies, better infrastructure, fairer access and more responsible market development.

This perspective strengthens the policy relevance of the article. Strong policy impact is not measured only by enterprise expansion. It also requires integrity, fairness, transparency, accountability and a clear connection between public incentives and sustainability outcomes.

Technology Governance and Public Value

Green technological innovation should be evaluated as a matter of technology governance and public value, not only as a matter of enterprise performance. Tax incentives may accelerate technological adoption, but they should also preserve values such as transparency, fairness, accountability, environmental responsibility and consumer welfare.

The case of NIO shows that technological innovation is not value-neutral. Battery swapping, smart electric vehicles and digital mobility ecosystems require large-scale public and private investment. Therefore, policy support should be evaluated through an integrity-based lens that asks whether public resources are converted into sustainable technology capability and social benefit.

Contribution to Research Impact and Practice

This case study contributes to research impact by translating a fiscal policy issue into practical implications for green technological innovation. For policymakers, the analysis suggests that tax incentives should be evaluated through a balanced framework covering fiscal cost, enterprise innovation behavior, market development, implementation integrity and sustainability outcomes. For enterprises, the study shows that policy support should be converted into operational efficiency, R&D commercialization and long-term competitiveness rather than treated as a substitute for strategic discipline.

The study also has practical relevance for future empirical research. A larger study could compare several NEV firms, measure the relationship between tax incentives and innovation outputs, or examine whether different types of incentives produce different effects on R&D intensity, patent quality, delivery growth and profitability. Such evidence would help move policy discussion from general support for green industries to more precise, evidence-based and accountable policy design.

Conclusion

By evaluating the operational trajectory of NIO Inc. through publicly available disclosures, this study demonstrates that tax incentives function as enabling mechanisms rather than definitive performance drivers. Consequently, the primary academic contribution of this work lies in the formulation of a comprehensive policy-integrity framework designed to evaluate public fiscal support based on long-term technological safety, governance transparency, and environmental accountability, rather than raw sales metrics. While the inherent focus on a single enterprise

limits statistical generalizability, this interpretive approach provides a transferable conceptual model for future researchers seeking to transition from volume-centric innovation metrics toward value-preserving technology governance

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References

- Acemoglu, D., Aghion, P., Bursztyn, L., & Hemous, D. (2012). The environment and directed technical change. *American Economic Review*, 102(1), 131–166. <https://doi.org/10.1257/aer.102.1.131>
- Bloom, N., Griffith, R., & Van Reenen, J. (2002). Do R&D tax credits work? Evidence from a panel of countries 1979–1997. *Journal of Public Economics*, 85(1), 1–31. [https://doi.org/10.1016/S0047-2727\(01\)00086-X](https://doi.org/10.1016/S0047-2727(01)00086-X)
- Bloom, N., Van Reenen, J., & Williams, H. (2019). A toolkit of policies to promote innovation. *Journal of Economic Perspectives*, 33(3), 163–184. <https://doi.org/10.1257/jep.33.3.163>
- Hall, B. H., & Van Reenen, J. (2000). How effective are fiscal incentives for R&D? A review of the evidence. *Research Policy*, 29(4–5), 449–469. [https://doi.org/10.1016/S0048-7333\(99\)00085-2](https://doi.org/10.1016/S0048-7333(99)00085-2)
- Horbach, J. (2008). Determinants of environmental innovation: New evidence from German panel data sources. *Research Policy*, 37(1), 163–173. <https://doi.org/10.1016/j.respol.2007.08.006>
- Howell, S. T. (2017). Financing innovation: Evidence from R&D grants. *American Economic Review*, 107(4), 1136–1164. <https://doi.org/10.1257/aer.20150808>
- Jaffe, A. B., & Palmer, K. (1997). Environmental regulation and innovation: A panel data study. *Review of Economics and Statistics*, 79(4), 610–619. <https://doi.org/10.1162/003465397557196>
- Kleer, R. (2010). Government R&D subsidies as a signal for private investors. *Research Policy*, 39(10), 1361–1374. <https://doi.org/10.1016/j.respol.2010.08.001>
- Lerner, J. (1999). The government as venture capitalist: The long-run impact of the SBIR program. *Journal of Business*, 72(3), 285–318. <https://doi.org/10.1086/209616>
- Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press.
- NIO Inc. (2022). NIO Inc. reports unaudited fourth quarter and full year 2021 financial results. <https://ir.nio.com/news-events/news-releases/news-release-details/nio-inc-reports-unaudited-fourth-quarter-and-full-2/>
- NIO Inc. (2023). NIO Inc. reports unaudited fourth quarter and full year 2022 financial results. <https://ir.nio.com/news-events/news-releases/news-release-details/nio-inc-reports-unaudited-fourth-quarter-and-full-3/>
- NIO Inc. (2024). NIO Inc. reports unaudited fourth quarter and full year 2023 financial results. <https://ir.nio.com/news-releases/news-release-details/nio-inc-reports-unaudited-fourth-quarter-and-full-year-2023/>
- NIO Inc. (2025a). NIO Inc. reports unaudited fourth quarter and full year 2024 financial results. U.S. Securities and Exchange Commission. https://www.sec.gov/Archives/edgar/data/1736541/000110465925026395/tm259987d1_ex99-1.htm
- NIO Inc. (2025b). NIO Inc. files its 2024 annual report on Form 20-F. <https://ir.nio.com/news-releases/news-release-details/nio-inc-files-its-2024-annual-report-form-20-f/>
- OECD. (n.d.). Green technology and innovation. Organisation for Economic Co-operation and Development. Retrieved June 17, 2026, from <https://www.oecd.org/en/topics/policy-issues/green-technology-and-innovation.html>
- OECD. (2025, April 22). R&D tax incentives continue to outpace other forms of government support for R&D in most countries. Organisation for Economic Co-operation and Development. <https://www.oecd.org/en/data/insights/statistical-releases/2025/04/rd-tax->

- incentives-continue-to-outpace-other-forms-of-government-support-for-rd-in-most-countries.html
- OECD. (2026). R&D tax incentives. Organisation for Economic Co-operation and Development. <https://www.oecd.org/en/topics/sub-issues/rd-tax-incentives.html>
- Owen, R., Macnaghten, P., & Stilgoe, J. (2012). Responsible research and innovation: From science in society to science for society, with society. *Science and Public Policy*, 39(6), 751–760. <https://doi.org/10.1093/scipol/scs093>
- Popp, D. (2002). Induced innovation and energy prices. *American Economic Review*, 92(1), 160–180. <https://doi.org/10.1257/000282802760015658>
- Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives*, 9(4), 97–118. <https://doi.org/10.1257/jep.9.4.97>
- Qian, B. (2023). Financial subsidies, tax incentives, and new energy vehicle enterprises' innovation efficiency: Evidence from Chinese listed enterprises. *PLOS ONE*, 18(10), e0293117. <https://doi.org/10.1371/journal.pone.0293117>
- Rennings, K. (2000). Redefining innovation - eco-innovation research and the contribution from ecological economics. *Ecological Economics*, 32(2), 319–332. [https://doi.org/10.1016/S0921-8009\(99\)00112-3](https://doi.org/10.1016/S0921-8009(99)00112-3)
- State Council of the People's Republic of China. (2020, November 2). New development plan for NEVs unveiled. https://english.www.gov.cn/policies/latestreleases/202011/02/content_WS5f9ff225c6d0f7257693ece2.html
- State Council of the People's Republic of China. (2023). China extends preferential purchase tax policy for NEVs. https://english.www.gov.cn/news/202306/21/content_WS64929394c6d0868f4e8dd11c.html
- Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. *Research Policy*, 42(9), 1568–1580. <https://doi.org/10.1016/j.respol.2013.05.008>
- von Schomberg, R. (2013). A vision of responsible research and innovation. In R. Owen, J. Bessant, & M. Heintz (Eds.), *Responsible innovation: Managing the responsible emergence of science and innovation in society* (pp. 51–74). Wiley.
- Yang, T., Yuan, Z., & Xing, C. (2023). Research on China's fiscal and taxation policy of new energy vehicle industry technological innovation. *Economic Research-Ekonomika Istraživanja*, 36(2), 2108100. <https://doi.org/10.1080/1331677X.2022.2108100>
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE.