

Analysis of the Impact of Green Economic Policies on the Sharing Economy and the Synergistic Mechanism of Business Analysis

Yiheng Nie *

Institute of Finance and Taxation, Jiangxi University of Finance and Economics, Nanchang, China

* Corresponding Author Email: nyh0908rr@outlook.com

Abstract. Against the backdrop of an accelerating global green transition, green regulations such as the EU carbon border adjustment mechanism and China's "dual carbon" policies are gradually being implemented, presenting the sharing economy with dual challenges of resource efficiency and regulatory compliance. This study explores how green economic policies influence the construction of sharing economy business models and analyzes the critical role of business data in policy adaptation. By incorporating economic theories such as externalities and information asymmetry, and integrating case studies, this paper constructs a theoretical framework linking "policy-business analytics-sustainable performance." Through case studies and data analysis, it reveals collaborative pathways among multiple stakeholders in the green transition. Findings indicate that green economic policies drive the low-carbon transformation of the sharing economy through cost pass-through and demand reshaping. Business analytics, leveraging technologies like big data, artificial intelligence, and blockchain, acts as an "enabler" during policy implementation, significantly enhancing platform compliance efficiency and user value. This study provides theoretical support and a practical framework for governments and enterprises to jointly build a low-carbon sharing ecosystem, while offering policy recommendations for subsequent carbon asset financialization and cross-border data collaboration.

Keywords: Green economic policies, sharing economy, carbon emissions regulation, externalities theory, data coordination.

1. Introduction

As global climate change becomes increasingly urgent, governments worldwide are implementing green economic policies to drive low-carbon economic transformation. China has set its "dual carbon" goals—achieving peak carbon emissions by 2030 and carbon neutrality by 2060—and established a "1+N" policy framework [1]. The European Union has implemented the Carbon Border Adjustment Mechanism (CBAM), requiring imported goods to bear carbon emission costs. These policies not only reshape the regulatory environment for business operations but also impose higher demands on models like the sharing economy, which centers on efficient resource allocation. Leveraging digital platforms to enable resource reuse and efficiency gains, the sharing economy's asset-light and highly flexible characteristics present both challenges and new growth opportunities when confronting policy pressures such as carbon footprint disclosure and supply chain greening.

Theoretically, green economic policy interventions possess strong positive externalities, enabling the internalization of environmental costs through Pigouvian tax mechanisms, improvements to the operational mechanism of the Pigouvian tax serve as the microeconomic principle for regulating production choices and leverage levels among enterprises in heavily polluting industries [2]. However, information asymmetry may also lead to inefficient policy implementation. As integrators of multi-party resources, sharing economy platforms generate and utilize vast amounts of real-time data in their operations, providing a data foundation for policy design, evaluation, and optimization. However, existing research predominantly focuses on either policy evaluation or corporate operations, lacking a cross-disciplinary framework integrating policy economics, platform governance, and data analysis. Particularly as people approach 2025, with the further proliferation of artificial intelligence and Internet of Things (IoT) technologies, carbon data tracking and dynamic pricing have become

standard corporate practices, urgently requiring theoretical deepening and practical summarization. This study aims to reveal, through empirical analysis and case studies, how green policies influence the multidimensional structure of the sharing economy and the pivotal role of business analytics in policy adaptation.

Therefore, grounded in externalities theory, collaborative governance theory, and a data-empowerment perspective, this research systematically examines the impact of green economic policies on the sharing economy's multidimensional structure and the central role of business analytics in policy coordination. The study holds both theoretical and practical significance. Theoretically, it constructs a dynamic analytical framework linking policy instruments and corporate responses. At the practical level, it provides platform enterprises with actionable carbon neutrality service solutions and data analysis methodologies, helping them maintain dual objectives of competitive advantage and social responsibility during green transformation.

This paper will discuss the impact mechanisms of green economic policies on the sharing economy, the synergistic pathways between business analytics and green economic policies, current challenges and response strategies. Drawing on the latest domestic and international policies and corporate cases, it proposes governance recommendations for achieving low-carbon, efficient, and inclusive growth in the sharing economy.

2. Multidimensional Impacts of Green Economic Policies on the Sharing Economy

2.1. Internalization of Externalities and Institutional Incentives

The design and implementation of green economic policies are grounded in the theory of “internalization of externalities” within environmental economics [3]. Resource utilization in the sharing economy—such as transportation vehicles and idle properties—often carries unpriced environmental externalities, particularly carbon emissions. Governments alter the cost-benefit structures of businesses and users through carbon taxes, emissions trading systems, and various subsidy mechanisms, thereby steering their behavior toward greener practices. Concurrently, institutional economics emphasizes the co-evolution of policies and market structures. By 2025, China's national carbon market had extended coverage to platform enterprises in shared mobility and shared accommodation, making carbon quota allocation and trading mechanisms critical factors that platforms must incorporate into their strategic planning.

As is well known, the “definition of property rights” condition in Coase's theorem is in fact the key method for resolving externalities such as air pollution. According to the Coase Theorem, it transforms public externalities into private externalities, thereby creating protected, tradable private property rights, markets can autonomously resolve externalities when property rights are clearly defined and transaction costs are low [4]. Sharing economy platforms have significantly reduced the transaction costs of carbon quota transfers through data aggregation and algorithmic matching. By late 2024, Didi Chuxing partnered with the Tianjin Carbon Exchange to pilot converting individual drivers' carbon reductions into tradable quotas, establishing an initial “reduction-trading-incentive” closed loop. This not only boosts driver engagement in green transportation but also creates new carbon asset revenue streams for the platform.

2.2. Structural Transformation and Cost Reconfiguration on the Supply Side

Green economy policies have significantly driven shared platforms toward asset renewal and energy transition. Carbon quota constraints and clean equipment subsidies have become critical variables in platform decision-making. Meituan began to implement the "Fossil Fuel Vehicle Phase-out Plan" in 2023. By 2025, the platform had completed the replacement of most of its vehicles with electric ones in the majority of cities. This move responded to the environmental access policies of multiple cities. At the same time, through business analysis, the platform found that the single

operation and maintenance cost of electric vehicles was more than 30% lower than that of fossil fuel vehicles. In the long term, electric vehicles have better economic performance.

Enterprises can also use pricing strategies to transfer some compliance costs. They can also utilize user behavior data to minimize market impact. Didi fully implemented the "Green Mileage Pricing" in 2025. The platform combined reinforcement learning algorithms to dynamically adjust the levels of subsidies and surcharges. This made price changes more acceptable to users and better adapted to regional policy differences. Data shows that this strategy reduced the platform's overall carbon intensity by 18%. At the same time, the user churn rate was kept within 3%. This result demonstrates the key role of business analysis in balancing environmental protection and growth goals [5].

2.3. Green Preferences and Signaling Effects Resulting from Demand-Side Behavioral Reshaping

Policy tools like carbon credits and green labels influence consumption decisions by shaping user preferences and providing explicit signals, grounded in behavioral economics' "nudge theory." Xianyu's "Carbon Credit" system not only provides users with immediate positive feedback for eco-friendly actions but also enhances retention and repurchase rates through a points redemption mechanism. By 2025, the platform further introduced "carbon credit monetization," allowing users to redeem credits for green financial products or offset carbon taxes, thereby establishing the concept of personal carbon assets.

Business analysis also plays a core role in user segmentation and precise intervention. For instance, Hellobike collects various types of data, including travel frequency, model selection, and carbon credit usage. Hellobike uses these data to build a user green index. For users with a high green index, the platform will prioritize recommending battery swap packages and deep emission reduction activities. This approach not only enhances user satisfaction but also effectively strengthens the brand's green image, achieving a virtuous cycle between the economy and carbon.

2.4. Collaborative Networks and Data Monetization

Green economy policies have spurred cross-departmental data collaboration and also promoted ecological co-construction. Moreover, platforms can rely on data interconnection and algorithm optimization to enhance system efficiency. In 2025, China Southern Power Grid and several shared mobility enterprises jointly established the "Electric Mobility Green Alliance". They optimized the layout of urban charging networks through data sharing, which increased the average utilization rate of charging piles by 25% and reduced peak waiting times by 40%.

During this process, business analysis provided crucial data integration and identification capabilities. For instance, Xianyu, based on Internet of Things data, implemented carbon tracking for the circulation of second-hand goods and also facilitated the realization of carbon visualization. This enabled users to clearly perceive the environmental contributions of their transactions. By 2025, the platform's carbon reduction algorithm could estimate the carbon reduction of each transaction in real time and display it, with a cumulative reduction of over 800,000 tons of carbon throughout the year.

3. Synergistic Mechanisms Between Business Analytics and Green Economy Policies

3.1. Goal Alignment: Achieving Both Emissions Reduction and Growth

Green economic policies and corporate business objectives influence each other, with significant potential for synergy between them. Business analytics uses data-driven decision-making to help companies identify opportunities within policy frameworks. For instance, leveraging subsidy mechanisms to reduce the cost of vehicle electrification, or generating additional revenue through carbon market trading. Uber's global "Zero Emissions Initiative" centers on a reinforcement learning-based dynamic dispatch system. This system prioritizes assigning orders to electric vehicle drivers

while integrating a carbon credit incentive program to boost driver participation. By 2025, this strategy had been rolled out across 20 major cities worldwide. Electric vehicle orders averaged 45% of total rides, exceeding 60% in some cities.

Similarly, Meituan leverages AI to forecast regional order demand, optimizing e-bike dispatch and energy storage management. By 2025, this approach achieved over 120,000 tons of carbon reduction while reducing operational costs by 10%. This demonstrates that green transformation need not sacrifice efficiency; instead, it can drive cost reduction and efficiency gains through refined operations.

3.2. Data Synergy: From Basic Sharing to Value Co-creation

Data synergy mechanisms can be categorized into foundational and value-added layers. At the foundational level, governments open environmental data—such as meteorological, traffic, and air quality information—empowering enterprises to optimize services. AutoNavi collaborated with the Ministry of Ecology and Environment to integrate real-time carbon emission intensity data, adding a “low-carbon route” option in navigation. By 2025, this feature had cumulatively guided over 300 million low-carbon trips [6].

At the value-added layer, anonymized behavioral data from platforms informs government planning and policy evaluation. For instance, Didi provided commuting heatmaps to the Ministry of Housing and Urban-Rural Development, supporting urban bike lane and bus lane planning. By 2025, Beijing added 15 new community micro-circulation bus routes based on platform data, boosting commuting efficiency by over 15%. Ant Chain collaborates with multiple platforms to build a “Green Consortium Chain,” enabling trusted cross-platform sharing of carbon data. This prevents data monopolization and misuse while facilitating precise and efficient carbon accounting. Blockchain and privacy computing technologies serve as critical safeguards for data collaboration. The integration of big data analytics and blockchain technology in the digital economy offers transformative opportunities for advancing low-carbon urban development. Even now, the impact of these technologies remains limited [7].

3.3. Process Synergy: Embedding Data Analysis Throughout the Policy Lifecycle

Business analytics can be integrated throughout the policy lifecycle to enhance responsiveness. Before policy formulation, platforms can conduct scenario simulations to analyze potential impacts. For instance, a car-sharing company used Monte Carlo simulations to evaluate changes in user orders and platform revenue under different carbon tax rates, providing evidence for policy formulation.

During the intermediate phase, platforms dynamically adjust operational strategies by establishing real-time carbon efficiency monitoring and early warning systems. Didi’s “Green Order Identification System” identifies high-carbon-emission orders and automatically switches them to hybrid or electric vehicle services, projecting annual carbon reductions of approximately 5,000 tons by 2025.

In post-implementation evaluation, carbon audits and attribution analysis help governments and platforms jointly optimize policies. Xianyu releases quarterly carbon reduction reports, using regression analysis and causal inference to assess the actual emission reduction effects of various green initiatives, providing solid evidence for policy iteration.

4. Challenges and Countermeasures

4.1. Core Challenges

Currently, the sharing economy faces multiple structural challenges in achieving carbon neutrality goals. First, data fragmentation and inconsistent standards are particularly prominent. Government environmental monitoring data and platform operational data exhibit significant discrepancies in statistical definitions, collection frequencies, storage formats, and access permissions, creating “data silos.” For instance, government carbon accounting primarily operates at regional and sectoral levels, while platform enterprises require precision down to the order and user tiers, making effective data

integration and application difficult. Although some local pilot programs have introduced data middleware systems since 2025 to bridge government and commercial data chains, cross-provincial and cross-platform scenarios still face dual technical and institutional barriers to carbon data mutual recognition, verification, and collaborative use due to the lack of a unified data governance framework and compliant transfer mechanisms.

Second, algorithmic ethics and green equity issues are emerging. Platform companies guide low-carbon consumption through mechanisms like dynamic pricing and priority order dispatch, which may objectively create “green discrimination.” For instance, users with high carbon credits may receive greater discounts and priority services, while low-income groups, unable to afford premium green services, could be gradually excluded from the low-carbon market. If platforms excessively pursue carbon efficiency at the expense of inclusivity, it will not only exacerbate service segmentation and social division but may also violate the fundamental principle of a “just transition,” undermining public acceptance of carbon neutrality strategies.

Third, conflicts in international mechanisms pose severe challenges for Chinese sharing economy enterprises expanding overseas. International rules like the EU Carbon Border Adjustment Mechanism (CBAM) require imported goods to bear carbon costs equivalent to those of EU enterprises. However, China's national carbon market remains in its early stages, with its carbon pricing mechanisms, coverage scope, and accounting standards not yet fully aligned with international standards. Many export-oriented shared manufacturing enterprises and logistics platforms face duplicate accounting and double carbon cost pressures. Simultaneously, they must navigate emerging trade barriers like international carbon tariffs and green supply chain traceability, leading to significantly increased compliance costs and constrained international competitiveness [8].

4.2. Policy Recommendations

To systematically address these challenges, a multi-tiered, multi-stakeholder governance system must be established. Government departments should spearhead the development of a national “green data platform,” integrating data resources from environmental protection, transportation, energy, and other sectors. This initiative should clarify data ownership, usage rights, and security boundaries while promoting unified standards for carbon data formats, interfaces, and certification. By 2025, Shenzhen has pioneered breakthroughs in government-enterprise data collaboration. Leveraging its government cloud platform, it has integrated real-time carbon data from multiple transportation and logistics enterprises, enabling city-level carbon emission simulations and policy sandbox testing. This model is ready for nationwide replication.

At the enterprise level, accelerated development of lightweight, low-cost digital carbon management tools is essential to help Small and Medium-sized Enterprises (SMEs) overcome carbon accounting challenges. Alibaba Cloud's “Carbon Eye” platform integrates IoT monitoring, AI-powered accounting, and blockchain-based evidence storage. It provides over 50,000 SMEs with one-stop services for carbon inventory, emissions reduction optimization, and green electricity trading, significantly lowering technical and financial barriers to corporate carbon management.

Internationally, China should proactively integrate into global environmental governance systems by actively participating in establishing carbon accounting standards, data certification mechanisms, and green mutual recognition protocols. Regarding the mixed effects accompanying economic globalization, it induces ecological degradation shocks in the absence of ecological innovation interaction terms, while interaction terms yield ecological conservation shocks [9,10]. In recent years, China has co-initiated the “Digital Green Standards Initiative” with the United Nations Environment Programme (UNEP) and the International Organization for Standardization (ISO), promoting the establishment of carbon footprint assessment models covering typical sharing economy sectors. It is reported that the first global carbon accounting framework for the sharing economy is expected to be officially released in 2026. China should actively contribute its domestic practices to foster more inclusive and equitable international rules, helping enterprises smoothly navigate international carbon constraints.

5. Conclusion

This study systematically analyzes the multidimensional impacts of green economy policies on the sharing economy and the synergistic role of business analytics within this framework. Findings indicate that green economy policies effectively promote the low-carbon transformation of the sharing economy by altering cost structures, guiding user preferences, and fostering cross-sectoral collaboration. Simultaneously, promote optimized choices through policy recommendations such as clean technology development, green financial instruments, energy transition incentives, and sustainable industrial restructuring. As a key enabling tool, business analytics facilitates growth through compliance and enhances efficiency in emissions reduction via three mechanisms: goal alignment, data integration, and process optimization.

Theoretically, this paper integrates economic theory with business analytics to construct a “policy-data-behavior” interactive framework, offering new perspectives for green digital governance research. Practically, it recommends governments establish “policy-technology” sandbox mechanisms to encourage platforms to innovate data applications and emission reduction strategies in secure environments. Platform enterprises should incorporate carbon efficiency into core Key Performance Indicator (KPI) systems to unify commercial and social value.

With rapid advancements in social technologies and the further maturation of AI, IoT, and blockchain, innovations like carbon asset pricing in the sharing economy, dynamic carbon footprint tracking, and personal carbon accounts will accelerate implementation. Future research should focus on frontier topics such as carbon data monetization and cross-border green certification collaboration, delivering more inclusive and actionable digital solutions for global sustainable development.

References

- [1] Xiao W J. The Impact of Pilot Policies for Carbon Emission Trading on Corporate Digital Transformation. Master's thesis, Dongbei University of Finance and Economics, 2023.
- [2] Ni Zhiliang, Qin Ziwen, Wang Lei. Environmental Protection Fee-to-Tax Reform and Corporate Leverage in Heavy Polluting Industries: An Empirical Study Based on the Pigouvian Tax Micro Model. *Social Science Research*, 2023, (05): 74-84.
- [3] Sepide Mehrabi, Cynthia Giagnocavo. Business models and strategies for the internalization of externalities in agri-food value chains. *Agricultural and Food Economics*, 2024, 12 (1): 46-46.
- [4] Sheng Hong. A New Understanding of Coase Theorem and Emission Rights Trading of All People. *Man and the Economy*, 2025, 10 (2): 75-100.
- [5] Dai Qiwen, Hao Wenjie, Cheng Zhongbin, Yue Wenzhe. Have Environmental Regulation Policies Driven the Real Economy Toward “De-industrialization”?—A Quasi-Natural Experiment Based on China's Carbon Emission Trading Pilot Programs. *Acta Scientiae Naturae Sinica*, 2024, 39 (06): 1320-1340.
- [6] Yue Li, Guofu Li, Anfeng Xu, Fengmin Yao. Research on the collaborative mechanism of a data trading market based on a four-party evolutionary game in the context of digital intelligence. *Socio-Economic Planning Sciences*, 2025, 100: 102238-102238.
- [7] Rongyu Pei, Meiqi Chen, Ziyang Liu. Identifying Key Digital Enablers for Urban Carbon Reduction: A Strategy-Focused Study of AI, Big Data, and Blockchain Technologies. *Systems*, 2025, 13 (8): 646-646.
- [8] Shiyu Wang, Changshuo Gong, Keren He, Ruiming Xiao, Xiaobin Dong, Ting Pan, Xue Chao Wang. The potential impacts of Carbon Border Adjustment Mechanism (CBAM) on China's high-carbon industries. *Energy*, 2025, 333: 137315-137315.
- [9] Ahmad Munir, Wu Yiyun. Combined role of green productivity growth, economic globalization, and eco-innovation in achieving ecological sustainability for OECD economies. *Journal of Environmental Management*, 2022, 302 (PA): 113980-113980.
- [10] Sanjeet Singh, Pooja Bansal, Rami Owais, Mohd Shukri Ab Yajid, Sireesha Nanduri, Sandeep Sharma, Jibitesh Kumar Panda. Balancing growth and green the impact of economic growth financial development technological innovation and economic complexity on carbon neutrality in P5 Plus 1 nations. *Discover Sustainability*, 2025, 6 (1): 858-858.