

# Research on the Path of Green Economic Transformation and Technological Innovation Policy from the Perspective of Corporate Social Responsibility

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## ABSTRACT

Driven by global climate governance and sustainable development goals, corporate social responsibility (CSR) is shifting from passive compliance to proactive innovation, becoming the core engine of green economy transformation. Based on CSR perspective, this study explores the synergy path between technological innovation policy and green economy transformation. By analyzing the mechanism of incentive and constraint policies and international practical experience, this paper reveals the efficiency boundary of policy tools in driving enterprise technological innovation, and puts forward the transformation path of "technology-institution-governance" linkage. The results show that CSR internalizes social responsibility into technological innovation power by reshaping enterprise cost-benefit structure; policy design needs to balance hardness and softness, and stimulate enterprise endogenous transformation willingness through incentive and constraint combination tools; the success of green economy transformation depends on the deep coordination among government, enterprise and society in standard setting, resource sharing and benefit coordination.

## KEYWORDS

Corporate Social Responsibility; Green Economic Transformation; Technological Innovation Policy; Collaborative Governance.

## 1. INTRODUCTION

Global climate change and the intensification of resource and environmental constraints are profoundly reshaping the economic development model. Green economy transformation has become the core strategy of countries to break through ecological bottlenecks and achieve sustainable development, and technological innovation is regarded as the key driving force of this transformation. However, traditional policy tools often rely on administrative instructions and terminal governance, which is difficult to stimulate the endogenous motivation of enterprise initiative innovation [1]. The phenomenon that enterprises passively respond to environmental protection requirements is widespread. There is an obvious fault between technology investment and actual environmental benefit conversion rate. The gap between policy design and enterprise behavior has become a deep contradiction restricting green transformation.

In this context, the evolution of corporate social responsibility provides a new way to solve the above problems. With the deepening of the concept of global sustainable development, corporate social responsibility has shifted from a single dimension of early charitable donation to a strategic choice deeply bound to environmental governance and technological innovation. More and more enterprises realize that fulfilling social responsibility can not only enhance brand reputation, but also open new market space through green technology breakthrough. However, the current policy system has not

fully released the innovation potential of corporate social responsibility: incentive measures mostly stay at the level of short-term subsidies and lack support for long-term transformation of technology; constraint mechanisms tend to be control, ignoring industry differences and enterprise affordability. How to transform social responsibility into lasting power of technological innovation through policy innovation has become a difficult problem to be broken through in theory and practice.

The full text takes "policy effectiveness analysis-transformation path design" as the main line, combines international experience and industrial chain practice, explores differentiated solutions for green economy transformation, and promotes the substantial leap of social responsibility from moral advocacy to economic rationality.

## **2. POLICY NEEDS OF CORPORATE SOCIAL RESPONSIBILITY**

### **2.1. Incentive Policies**

The core goal of incentive policy is to reduce the cost and risk of enterprise technological innovation through positive guidance, transform social responsibility into quantifiable economic benefits, and thus stimulate the endogenous motivation of enterprises to invest in green technology research and development independently. This kind of policy relies on the market mechanism, replaces "compulsory intervention" with "interest induction", constructs a positive cycle through taxation, finance, intellectual property rights and other tools, and urges enterprises to naturally assume environmental responsibilities while pursuing economic interests [2]. From the point of view of action mechanism, incentive policy mainly drives enterprise behavior from three dimensions: first, directly reduce the marginal cost of green technology through tax relief. Second, share the uncertainty risk of technological innovation with special subsidies. The establishment of green technology transformation fund by the government can alleviate the pressure of capital chain caused by long technology cycle and lagging market return. Third, improve the intellectual property protection and trading mechanism and give green technology a higher market premium. Through policies such as patent priority review and technology equity dividends, companies can transform technological advantages into sustainable competitive advantages. The advantage of incentive policies lies in their flexibility and inclusiveness. Compared with rigid constraints, such policies allow enterprises to flexibly choose innovation paths according to their own technological base and market positioning, especially for small and medium-sized enterprises. At the same time, the combination of policy tools can form superposition effect, which can not only relieve short-term capital pressure, but also ensure the stability of long-term technical iteration. However, incentive policies have potential limitations. Excessive reliance on economic compensation may lead to policy arbitrage inertia, focusing resources on short-term projects and ignoring underlying technological breakthroughs [3]. Therefore, policy design needs to strengthen goal orientation, establish dynamic evaluation mechanism, formulate incentive scheme by classification, and introduce third-party verification mechanism to ensure that policy resources are accurately invested in technical fields with social value.

### **2.2. Restrictive Policies**

The core of restrictive policy is to force enterprises to internalize social responsibility into an inevitable choice of technological innovation through rigid requirements of laws and regulations. This kind of policy is guided by "bottom line thinking". By setting environmental standards, market access thresholds and disciplinary mechanisms for violations, enterprises are forced to break through path dependence and turn to green technology research and development [4]. Its essence is to reshape the cost-benefit structure of enterprises through external pressure, so that the marginal cost of polluting technologies is higher than that of clean technologies, thus promoting the natural occurrence of technological substitution. Regulation and standard enforcement are a common restrictive policy. By formulating technical indicators such as industry carbon emission ceiling and pollutant emission

concentration threshold, the environmental protection bottom line that enterprises must abide by is clarified. Policies directly compress the living space of highly polluting technologies, forcing enterprises to invest in clean process transformation or alternative technology research and development. There is also a market access restriction. Measures such as banning the sale of products that do not meet environmental protection standards and restricting financing for high-energy-consuming enterprises squeeze the application scenarios of backward technologies from both ends of the supply chain and capital market, forcing enterprises to rebuild competitiveness through innovation. The advantage of constraint policy lies in its quick effect and wide coverage. For traditional industries with slow technology iteration, rigid constraints can quickly break the vested interest pattern and accelerate the overall technology upgrading of the industry. At the same time, unified policy standards help to form a transparent and fair market environment and avoid the phenomenon of "bad money driving out good money". However, the limitations of restrictive policies are equally significant. Over-reliance on one-size-fits-all standards can inhibit flexibility in innovation, especially for small and medium-sized enterprises, where stringent compliance costs can crowd out R & D resources and delay technology transformation.

### **2.3. International Comparisons of Policy Effectiveness**

The differences in policy effectiveness are rooted in the deep divisions of economic structure, social responsibility cognition and governance system among countries. By comparing policy practices in different regions, we can extract the common rules and adaptation conditions of technological innovation policies under the guidance of corporate social responsibility, and provide a mirror for optimizing localization policy design.

In terms of policy design concept, some developed regions tend to construct a mixed framework of "market-oriented-regulation". It stimulates independent innovation of enterprises through market-oriented tools such as carbon pricing and green finance, and at the same time takes strict ecological compensation laws and regulations as the bottom-line guarantee. Such policies emphasize the economic nature of corporate social responsibility and transform technological innovation into tradable competitive advantage in the market. Other regions rely more on the centralized path of "government-led-industry collaboration", forcing enterprises to share R & D costs and risks through technology roadmap planning and industrial alliance construction. Such models highlight the public nature of social responsibility, but may inhibit the autonomy of enterprises' technological routes. From the perspective of rigid policy implementation, some countries adopt a gradual restraint strategy to reserve a technical buffer period for enterprises by raising environmental standards and penalties in stages. Such policies balance short-term survival and long-term transformation, but they are easy to weaken the implementation of standards due to lobbying by interest groups. On the other hand, shock restraint forces enterprises to make technological transition through surprise law enforcement or high fines. Although it can quickly eliminate backward production capacity, it may lead to large-scale withdrawal of small and medium-sized enterprises and aggravate market monopoly risks.

Excessive emphasis on market incentives may weaken moral constraints on social responsibility, while relying solely on administrative constraints will stifle innovation vitality. Future policy design should be based on the cognitive level of local enterprises' social responsibility, seek a dynamic balance between technological freedom exploration and public interest regulation, and construct an innovation ecosystem of "voluntary participation of enterprises, precise promotion of policies and joint supervision of society".

### **3. PRACTICAL PATH AND POLICY SYNERGY OF GREEN ECONOMY TRANSFORMATION**

#### **3.1. Reconstruction Paths of Industrial Chain based on CSR**

Corporate social responsibility plays an important role in the reconstruction of industrial chain, which is embodied in the reshaping of technical standards, cooperation models and value distribution. By embedding social responsibility into all links of the industrial chain.

The core of upstream restructuring of industrial chain lies in establishing responsibility-oriented supplier screening mechanism. By establishing green raw material procurement standards and carbon footprint traceability systems, suppliers are forced to adopt cleaner production technologies. Key enterprises can open low-carbon process patents to small and medium-sized suppliers through technology sharing platforms to reduce their technological transformation costs. At the same time, supply chain data transparency is realized with the help of blockchain technology to ensure the verifiability of environmental protection commitments. The reconstruction of the middle link needs to break down the technical barriers between enterprises and build an industry-level green technology alliance. Share the cost of tackling common technologies through joint research and development agreements. The key to downstream restructuring is to extend corporate responsibility from sales to product use and recycling. The implementation of producer responsibility extension system requires enterprises to design easy-to-disassemble and renewable product structures, and establish recycling systems by themselves or in cooperation. Through the consumer carbon point reward program, users are guided to participate in the closed-loop value chain formed by the recycling of products [5].

The essence of industrial chain reconstruction is to upgrade social responsibility from moral choice of single enterprise to technical rules of whole chain, and realize cost minimization and benefit maximization of green transformation through mutual recognition of standards, benefit sharing and risk sharing. This process needs to provide institutional guarantees such as cross-industry standard convergence and anti-monopoly exemption at the policy end to avoid obstacles to collaborative innovation due to technological monopoly or conflict of interest.

#### **3.2. Dynamic Adaptation Mechanisms for Technological Innovation Policies**

The complexity of green economy transformation requires breaking through the limitations of single subject governance and constructing a collaborative governance framework guided by government, led by enterprises and participated by society.

The government needs to assume the top-level design and rule-making functions, and guide the transformation direction through a combination of dynamic policy tools. Key points include improving the green technology standard system, establishing a cross-regional environmental rights trading market, and establishing a public service platform for technological innovation. At the same time, policy coherence needs to be strengthened to avoid conflicting objectives across sectors. We incorporate carbon emission reduction targets into local government performance appraisal to ensure synergy between vertical policy transmission and horizontal implementation.

As the main body of technology landing, enterprises need to embed social responsibility into strategic decision-making and operation processes. Upgrade governance structures through the establishment of sustainability committees and integration of environmental performance into executive compensation incentives. At the industrial chain level, leading enterprises should take the lead in establishing technology sharing alliances, promote the open source of common technologies, reduce upstream and downstream collaboration costs, and at the same time drive the technological upgrading of small and medium-sized enterprises through green procurement agreements.

The public, non-governmental organizations and academic institutions form a network of social oversight and intellectual support. Establish a compulsory disclosure system for environmental information to guarantee the public's right to know and participate; cultivate third-party green certification agencies to independently evaluate the technological innovation efficiency of enterprises; promote the co-construction of laboratories by scientific research institutes of universities and enterprises, and accelerate the transformation from basic research to application. The intervention of social forces can not only form external pressure, but also broaden the sources of technical solutions through crowdsourcing and crowd-creation.

### **3.3. Construction of Multi-Agent Collaborative Governance Framework**

The core function of government is to provide stable policy expectations and a fair market environment. By formulating green technology standard system and perfecting environmental rights trading rules, clear transformation boundaries are set for market entities. At the same time, cross-sectoral collaboration needs to be strengthened. In addition, a public technology service platform will be set up to provide common technology research and development support and intellectual property protection, so as to reduce the trial and error cost of enterprise innovation.

Enterprises need to internalize social responsibility into endogenous motivation of technological innovation. By setting up a special department for sustainable development, environmental performance is incorporated into strategic decision-making and performance appraisal to ensure green orientation of technology R & D and production processes. At the level of industrial chain, leading enterprises should take the lead in establishing technology sharing alliance, promote the open-source and standardization of low-carbon technology, and drive the coordinated transformation of upstream and downstream small and medium-sized enterprises. At the same time, explore green technology shares, carbon asset securitization and other modes to transform ecological benefits into sustainable economic benefits.

The public, and academic institutions constitute a network of external oversight and intellectual support for the transformation. Establish a compulsory disclosure mechanism for environmental information, guarantee the public's right to know and participate, and form a pressure mechanism for public opinion to force enterprises to fulfill their responsibilities. Third-party institutions can provide technical improvement direction for enterprises through independent evaluation and certification services; universities and scientific research institutes need to deepen cooperation between industry, university and research institutes to accelerate the transformation of basic research achievements into industrial applications. The deep participation of social forces can not only make up for policy blind spots, but also broaden the sources of technical solutions through crowd-creation and crowdsourcing.

The essence of multi-agent collaborative governance is to integrate scattered transformation forces into systematic synergy through institutionalized cooperation. Only when the government sets rules, enterprises bear the main responsibility, society makes up for shortcomings, and forms an innovative ecology with shared responsibilities and benefits can the sustainable deepening of green economy transformation be realized.

## **4. CONCLUSION**

CSR should be taken as the link for industrial chain reconstruction, so as to promote mutual recognition of upstream and downstream technical standards and circular sharing of resources, so as to realize the large-scale implementation of green transformation. The multi-agent collaborative governance framework integrates decentralized innovation into systematic resultant force through institutional connection and interest balance. Only by embedding technological innovation into the overall framework of responsible governance can we achieve a two-dimensional breakthrough in efficiency and fairness in green economy transformation.

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