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A Mechanism for Digital Finance to Drive Green and Low-Carbon Development

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Abstract: Given the global focus on green and low-carbon development and the increasing prominence of digital finance, it is particularly important to explore how to leverage digital finance to achieve these environmental goals. This study, through mechanism analysis, deeply examines how China's digital finance promotes green and low-carbon development and elucidates the positive interaction between digital finance and the green industry. The study found that digital finance, through more flexible and efficient financial functions, alters the cost structure of carbon emissions, and reduces the risks and costs of green investments, thereby creating a cooperative green mechanism benefiting all parties, and guiding social groups toward a green and low-carbon transformation. Additionally, the rapid development of digital finance has strengthened the implementation of environmental protection policies, effectively promoted the expansion of the environmental protection industry, and established the green ethos as a mainstream concept in financial development. This study aims to provide reference perspectives and suggestions, assist policymakers in promoting the green and low-carbon development of digital finance, and offer insights into the integrated development of digital finance and the green environmental protection industry.

Keywords: Digital finance; Green and low-carbon development; Carbon emission cost; Environmental protection policy; Green environmental protection industry

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1. Introduction

Our ideal is to establish a green, environmentally friendly, economical, and low-pollution social system, which is the main concept for future social and economic development. To achieve this, we need sufficient strength and an effective system to channel this strength into a source of development. This strength is digital finance. Since emerging prominently in the 21st century, the pace of digital transformation has accelerated rapidly, giving rise to a new economic service model: digital finance. Digital finance is particularly flexible and efficient, significantly altering traditional economic operations. Consequently, green and low-carbon development has discovered new possibilities and opportunities through digital finance.

This study aims to explore how digital finance can drive green and low-carbon development, especially in the context of China, the world's largest developing country. Such research holds great practical significance.

The research content includes analyzing how digital finance changes the cost structure of carbon emissions, reduces the risks and costs associated with green investments, and fosters a green cooperation mechanism among relevant parties. It is hoped that the comprehensive insights and suggestions of this study can provide valuable references for policy-making and the integrated development of digital finance and green, low-carbon industries.

2. Background and current situation

2.1. Global trends and impacts of green and low-carbon development

Globally, green and low-carbon development has become a topic of common concern to the international community [1]. With increasing awareness of environmental protection and the intensification of global climate change, countries are paying more attention to green and low-carbon development. The global trend of green and low-carbon development is mainly reflected in the following aspects [2].

Green and low-carbon development has become an important direction of global economic growth. With continuous breakthroughs and applications of clean energy technologies, the international community is gradually reducing its dependence on traditional high-carbon energy, thereby transforming the energy structure. Green and low-carbon development can inject new impetus into economic growth and promote innovation and technological advancements.

Green and low-carbon development has a positive impact on environmental protection and ecological construction [3]. The traditional high-carbon economic model has led to serious environmental issues, such as air pollution and water shortages. Green and low-carbon development can effectively reduce emissions, lower the consumption of natural resources, and contribute to environmental preservation.

Green and low-carbon development contributes to the realization of the Sustainable Development Goals. Sustainable development is a goal pursued by all countries, and green and low-carbon development is one of the effective ways to achieve this. By reducing dependence on natural resources and promoting environmentally friendly industries, green and low-carbon development facilitates coordinated economic, social, and environmental progress [4].

2.2. Exploration of the connection between digital finance and green and low-carbon development

As an emerging financial model, digital finance is gradually integrating with green and low-carbon development, becoming an effective mechanism to promote these goals. There is a close correlation and mutual promotion between digital finance and green and low-carbon development [5].

Digital finance has provided new financial support for green and low-carbon development. Traditional financial systems often face issues like information asymmetry and financing difficulties when supporting green initiatives. The emergence of digital finance has addressed these gaps.

New technologies, such as the Internet, big data, and artificial intelligence, contribute to the development of digital finance. This makes financial services more convenient and efficient, providing essential support for green and low-carbon industries. Traditional finance often struggles to meet the capital needs of low-carbon technologies, whereas digital finance offers more flexible and efficient support for the innovation and dissemination of these technologies, promoting their widespread adoption.

Consequently, digital finance plays a positive role in fostering the maintenance and competitiveness of green and low-carbon industries. These industries typically incur high costs and low efficiency. However, the deepening of digital finance, along with the technical assistance and service innovation it brings, can provide

solutions to these challenges. With the help of digital finance, the green and low-carbon industry can reduce production costs, enhance resource utilization, improve market competitiveness, and achieve long-term sustainable development [6].

The relationship between digital finance and green and low-carbon development is interdependent and interactive. By providing new financial support, digital finance accelerates the innovation and implementation of green and low-carbon technologies [7], enhancing the renewability and market advantages of these industries. This symbiotic relationship has gradually established green and low-carbon development as a global priority, significantly impacting the achievement of the Sustainable Development Goals.

3. In-depth research on green and low-carbon development driven by China's digital finance

3.1. Digital finance-driven model based on mechanism analysis

Digital finance is undoubtedly a new financial trend that plays a crucial role in promoting green and low-carbon development. By facilitating capital flow and asset allocation, digital finance has become the financial steward of the green and low-carbon industry [8]. If digital financial platforms and products are carefully developed and refined, they may attract substantial investment from consortia and individual investors into green and low-carbon sectors, such as clean energy and energy-saving building materials. With adequate financial support, these industries are poised for significant growth.

Furthermore, digital finance not only manages finances but also enhances the efficiency and competitiveness of green and low-carbon industries. By utilizing digital and intelligent methods, it is possible to achieve optimal allocation and efficient utilization of resources within these industries. This minimizes carbon emissions and resource consumption, ensuring the industry remains genuinely green and advanced.

Driven by digital finance, a connection mechanism between green and low-carbon industries and financial institutions can be established, encouraging these institutions to increase their support for green and low-carbon initiatives [9]. By creating credit evaluation and financing mechanisms for these industries, the risk preference of financial institutions towards green and low-carbon projects can be lowered, enhancing their willingness to finance such initiatives.

3.2. Analysis of the role of digital finance in carbon emission cost

Digital finance, as a new financial model, plays a key role in reducing carbon costs. From the perspective of carbon cost reduction, digital finance significantly contributes to lowering carbon emission costs. Leveraging market mechanisms, digital finance stimulates enterprises to reduce carbon emissions [10]. It creates a carbon emission trading market where companies can earn economic returns by trading their carbon rights, thereby incentivizing them to reduce emissions. Digital finance can facilitate carbon rights financing and trading services, helping enterprises lower the costs associated with carbon reduction.

The integration of intelligent monitoring and management systems improves enterprises' carbon emission control levels, with digital finance playing a crucial role in this process. Through digital technology applications, real-time monitoring of enterprise carbon emissions is possible, providing data analysis and evaluation services to help determine focus areas and measures for emission reduction, ultimately reducing carbon emission costs [11].

With the support of digital finance, the research, development, and application of green and low-carbon technologies can be promoted, further reducing carbon emission costs. Digital finance provides financial backing and risk-sharing for the development and application of these technologies, lowering technology

application costs, encouraging widespread adoption, and thus reducing carbon emissions.

3.3. Research on the impact of digital finance on the risk and cost of green investment

As an innovative financial model, digital finance impacts the risks and costs associated with green and low-carbon investments [12]. This section explores the impact of digital finance on these investments from risk and cost perspectives [13].

Digital finance reduces the financing costs of green and low-carbon investments. By applying digital and intelligent technologies, the financing efficiency of these projects can be improved, thus lowering financing costs. Digital finance reduces these costs by lowering the financing threshold and providing risk protection and guarantees.

Digital finance also mitigates the risk of green and low-carbon investments. Through the establishment of digital financial platforms for risk assessment and management, tools and methods for risk management and control are provided, reducing investment risks [14]. By diversifying risks and offering risk protection and insurance, digital finance enhances investor confidence and enthusiasm for green and low-carbon investments.

Supported by digital finance, the return levels of green and low-carbon investments can be improved while reducing investment risks. By providing income assessment and prediction services, digital finance reduces investment uncertainty and risk, attracting more investors to participate in green and low-carbon projects and improving investment returns.

In-depth research on the green and low-carbon development driven by China's digital finance can effectively accelerate the nation's progress towards sustainable development. Digital finance applications not only provide more financial and intelligent technical support for green and low-carbon industries but also reduce carbon emission costs, lower the risks and costs of green investments, and foster deeper integration between green development and financial institutions [15].

4. Implementation and effect of digital finance in driving green and low-carbon development

The construction of a digital finance and green cooperation mechanism must be discussed in depth. Globally, the rapid development of digital finance has had a profound impact on economic, social, and environmental fields [16]. To promote green and low-carbon development, digital finance has injected new vitality, mainly by promoting information reciprocity, improving transaction efficiency, and optimizing resource allocation [17]. To maximize the benefits of digital finance, an effective green cooperation mechanism must be established.

On one hand, this cooperation mechanism requires the participation of the government, enterprises, and social parties to ensure fairness and universality [18]. On the other hand, it is necessary to establish a digital financial platform, provide green financial products, and promote the green investment concept to guide capital flow into the green industry. This includes providing technical and data support, supervising implementation, and ensuring the cooperation mechanism's effectiveness.

Digital finance significantly promotes the implementation of environmental protection policies. With its ubiquitous flow of information, digital finance helps policymakers timely obtain information about environmental issues, leading to more scientific and reasonable policy-making. Using big data analysis, cloud computing, and other technologies, digital finance can evaluate the implementation of environmental protection policies and provide data support for policy adjustments. Through digital finance, the public can participate in environmental protection activities, enhancing awareness and forming a broad social consensus, further promoting the implementation of environmental protection policies.

The integration of digital finance with the green environmental protection industry offers several benefits [19]. With the rapid development of the green economy, the environmental protection industry has become a new source of economic growth. Digital finance can provide various financial services, such as loans and insurance, for the environmental protection industry, reducing financing difficulties for enterprises and promoting technological innovation and R&D investment.

By scientifically analyzing and predicting green financial markets and products, environmental protection enterprises and investors can better understand market trends and risks, improving their decision-making. However, there is still much work to be done in digital finance, such as establishing and improving the green financial system, enhancing the efficiency and transparency of financial services, and cultivating a green financial culture [20].

5. Conclusion

This study provides an in-depth discussion on the mechanism of digital finance in promoting green and low-carbon development, highlighting the positive correlation between digital finance and the green industry. Through mechanism analysis, it explains how digital finance can provide efficient and flexible financial services, change the cost of carbon emissions, reduce the risk and cost of green investment, and create green cooperation mechanisms to promote a green and low-carbon transformation.

The study also reveals how the rapid development of digital finance strengthens the implementation of environmental protection policies, promotes the expansion of the environmental protection industry, and makes green values a mainstream concept in financial development. However, given the complexity and regional variations of digital finance and the green industry, further research is necessary, especially in empirical analysis and practical application, to better understand and apply the mechanisms of digital finance in promoting green and low-carbon development.

Future research should also focus on ensuring fairness, equity, and transparency in digital finance during the promotion of green and low-carbon development. Overall, this study provides a new theoretical perspective and empirical evidence on the important role of digital finance in green low-carbon development, offering valuable insights for policymakers and paving the way for the future integration of digital finance and green environmental protection industry development.

Disclosure statement

The author declares no conflict of interest.

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